History of The Lumber Industry of America

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Volume 1

SECOND EDITION

CHICAGO
THE AMERICAN LUMBERMAN
1906

PREFACE.

Industry and commerce have received in the past but incidental recognition from the historian. He has sought to trace the history of peoples in the political movements in which they have been involved. The successful prosecution of war has appeared to him more notable than the continued preservation of peace. The achievements of diplomats and warriors have appeared more vital than the successes of men of business. The growing respect engendered abroad by a nation's army and navy has seemed a more attractive theme for discourse than the increase of its trade in the markets of the world.

Despite this neglect, commerce always has been a controlling factor in making the world's history. It always has been more important that men should live than that they should live under any particular government or at any particular place. The search for livelihood has guided the migrations of races and been the inciting cause of discovery, settlement and conquest. Encouragement, protection and control of trade have been the most frequent subjects of legislation.

It has been within recent years only that the world at large has accorded the manufacturer and the merchant a position coördinate with that of the warrior and the statesman. Out of this new appreciation have come histories of particular industrial movements and of numerous branches of industry; but, notwithstanding the influence of the forests on New World development and the importance of the present lumber industry of the United States, Canada and the Latin countries to the south, no comprehensive history of the lumber industry of America ever has been compiled.

The early explorers were in search of gold, but they found trees; and the earliest exports from the New World to the Old World were products of the forest. Such products have continued for more than four hundred years to be of conspicuous importance. In even the Twentieth Century the value of forest manufactures exported from British America is exceeded only by the value of the combined products of agriculture, grazing and allied pursuits. Some of the Central American countries derive the larger share of their incomes from their forest products.

While a history of the lumber business is justified fully by its importance, records are meager and its compilation is, therefore, difficult. In the preparation of this work the sources drawn upon have been so multitudinous as to render impracticable individual acknowledgment or complete reference to authority. Government reports and records of the United States and other American countries have been read diligently and every important fact concerning the industry has been extracted; thousands of individuals have been interviewed; the files of the *American Lumberman* and its predecessors, the *Northwestern Lumberman* and *The Timberman*, which have been the most fertile sources of information, have been carefully examined, and the files of other lumber journals—American, Canadian and English—have yielded their share of information.

Grateful acknowledgment is extended by the editor to the many individuals in private and public life who have interested themselves in this work and who have assisted in supplying many of the facts that go to make up this history. The compilation of the matter incorporated in this work has involved the expenditure of a vast amount of labor and a large sum of money; but, if it shall prove to be of interest and value to lumbermen and students of lumbering and shall supply a missing link in the industrial and commercial history of the world, its aim will have been fully attained and the ambition of its editor and its publishers will have been realized.

J. E. Defebaugh.

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CHAPTER I.

DISCOVERY AND EARLY SETTLEMENT.

Civilized man lives in houses, and as the house that does not contain wood in some form is practically unknown the lumber industry accompanies civilized man in all his migrations and progress. It was, in fact, a condition of his migration and advancement until the railroad brought forest and prairie together and made habitable the barren places of the earth. A treeless world might not be uninhabitable, but it is a historical fact that migration, racial progress and growth of population have been guided by the forest distribution of the world—modified, of course, by other conditions, but having that as one of their chief controlling influences.

The early history of civilization proves that countries which are now treeless and, therefore, thinly populated were once blessed with forests. The history of ancient Persia, Assyria and Canaan would be vastly different from what it is if those countries had been in their early days in the forestal condition they are now; or it might be more correct to say that they would have had no history. The disappearance of the forests led to the disappearance of the people; and, as today they are barren and almost depopulated because of the absence of the forests, if the forests had never existed their prominence in the history of civilization would have been withheld from them.

Wherever the cradle of the Aryan peoples may have been, their migrations led them by forest routes to forest countries, and it was not until recent times that the plains attracted them. This is true because shelter and fuel were necessities, which only the forest could furnish. As history goes, the discovery of coal is but of yesterday. Coal was undoubtedly known to the ancients, but it became an article of commerce not more than eight hundred years ago, and it was not until the discovery of the steam engine in 1705 that coal mining assumed important proportions. Until the Nineteenth Century coal in most countries was either a luxury or was used for industrial purposes, while the fuel of the people was wood. Therefore there was an im-

mediate dependence upon the forests which relaxed only when transportation—ample enough and cheap enough—linked the forests and the plains together. It was the railway that finally made habitable the treeless portions of the earth.

Dreamers have wondered what would have been the history of North America if the location of the forests and treeless plains had been reversed—if the discoverers and explorers sighting the shores of the Atlantic and the Pacific had found nothing but prairies, no matter how rich the soil—whether settlement would have awaited the invasion of the railroad. Happily such was not the case, but however inhospitable the climate and severe the aspect of the rockbound shores of New England in other respects the trees waved a welcome and promised shelter and warmth. So, whether the early discoverers were English, French, Spanish or Dutch, they found habitable shores and were able to establish their colonies in Florida and Virginia, on the Hudson, on Massachusetts Bay, on the St. Lawrence, on the coast of Nova Scotia, at the mouth of the Mississippi, in Central and South America and later on the Pacific shores.

From the coast, migration and settlement drifted inland, following the course of the rivers or striking boldly across the country, but always protected and supported by the forests. Whether we consider the individual pioneer with his family or the congeries of population, the villages and cities, all were in earlier days absolutely dependent upon the forests and endured separation from them only by the aid of commerce.

The first colonies in North America were, for the most part, made up of men of every trade and profession, but their development and the extension of their boundaries must be credited to the pioneers who struck off into the forest, a little removed from their fellows, and there hewed out their homes. These men combined in themselves all of the practical trades. They were hunters and fishermen as well as farmers; they were their own carpenters, blacksmiths, millers, tanners, shoemakers and weavers, and all of them were emphatically, at the beginning of the settlement, directly dependent upon the forest which gave them their material for building and for the simple implements of the time, their fuel and even their food. Yet, in a sense, the forest was their enemy, for they had to clear it away to make room for wheat and corn. The settler on American shores was the first American lumberman. He was a lumberman by necessity, as he was a carpenter, shoe-

maker and weaver. So the history of the lumber industry—for the lumber trade as a branch of commerce was a later development—is the history of progress, of settlement and of civilization.

As population increased and as the centers of population enlarged in importance, there came about a sharp differentiation and a natural apportionment of work; and so the lumber industry, which at the beginning merely supplied the needs of the individual settler in the forest, came to supply the requirements of the young towns and the cities of the continent. This was, however, a small matter, for all along the Atlantic coast, the shores of the Gulf of Mexico and on the banks of every tidal river the trees grew in profusion. Every village could be supplied from its own immediate resources. It was only when the increase in population made the requirements so great that local supplies were exhausted that a lumber industry that looked beyond the immediate neighborhood of its mills for the disposal of its product was either needful or possible. As the first settlers were the first lumbermen, so the first settlement was the first site of the lumber industry in America.

From the date of Columbus' first voyage in 1492, for more than a hundred years the process was discovery and exploration and conquest rather than genuine settlement. By the end of the Fifteenth Century the eastern coast of the three Americas had been roughly outlined. Columbus, the Cabots, Pinzon, Cabral, Cortereal, Vespucci, Balboa and others had cursorily examined the coast all the way from Hudson Strait to the vicinity of Bahia, on the eastern coast of Brazil. The lands discovered were usually claimed for the crowns which the voyagers represented and some of these claims were made good by colonization.

The next century was one of combined discovery, exploration, conquest and occupation. By its conclusion the coasts of both oceans had been well outlined and the general character of the countries determined. However, as late as 1600 there had been little genuine colonization, the only successful attempts at occupation being by the Spaniards and Portuguese, and these accomplishments were confined chiefly to the West Indies, Central America, the Isthmus of Panama and isolated portions of South America.

Until the Seventeenth Century, North America, which was destined to exceed all the others in population and wealth, remained practically virgin soil. For example, the Gulf of St. Lawrence was entered by Gaspar Cortereal in 1500, and Cartier voyaged up the St. Lawrence as

far as Montreal in 1535, but it was not until the middle of the century that any attempt at colonization within the present limits of Canada was made and not until 1608 that Quebec was founded.

A brief summary of some of the leading dates and names during the period of exploration may be pardoned. Columbus' first voyage, in 1492, resulted merely in the discovery of some of the West Indies, including Cuba, which he thought to be mainland. In 1493, seven weeks after the return of Columbus to Spain, Pope Alexander VI. assigned the lands discovered and to be discovered west of a certain line to Spain, and east of the same line to Portugal. This line was a great circle passing through the poles, and the following year was defined as passing 370 leagues west of the Cape Verde Islands. This edict was the basis of the Portuguese claims in the eastern part of South America and led to the Portuguese sovereignty over Brazil and its colonization by that power. It also led to a division of authority in the antipodes. The second voyage of Columbus, in 1493, resulted in further discoveries in the West Indies, including Jamaica. In 1498, on his third expedition, Columbus discovered Trinidad and coasted along the delta of the Orinoco and thence to the west. He set out on his fourth voyage in May, 1502, and during the following year he studied the coasts between the gulfs of Honduras and Darien.

In the meantime other navigators had been at work and other governments than that of Spain became interested. The English were early engaged in western explorations, and in 1497 Henry VII. sent out John Cabot, an Italian navigator, accompanied by Sebastian Cabot, his son, who planted the English flag on an unknown coast supposed to have been that of Labrador. The following year the two sailed as far south as Cape Florida and are supposed to have been the first to see the mainland of America. Nearly thirty years thereafter, in 1526, Sebastian Cabot, in the employ of Spain, began a voyage during which he discovered La Plata River and erected a fort at San Salvador, now Bahia.

In the same year that the Cabots began their work of exploration, 1497, Pinzon, Vespucci and others sailed from Cadiz. They are supposed to have first touched the coast of Honduras, whence they followed the coasts of Mexico and the United States, rounding Florida, and are believed to have sailed as far as Chesapeake Bay. In 1499 Vespucci with others followed the northern coast of South America for a long distance, including the coasts of Venezuela, the Guianas and part of the

coast of Brazil. In 1500 Pinzon struck the Brazilian coast near the site of Pernambuco and discovered the Amazon. During a period of about three years, beginning with 1500, Gaspar and Miguel Cortereal made voyages in the interest of Portugal to the north coast of North America, but mainly within the region previously explored by the Cabots.

Thus early in the beginning of the Sixteenth Century not much more had been done than to arouse the interest of the western countries of Europe in those unknown lands to the west, which were still supposed to be parts of Asia, for it was not until 1513 that Balboa discovered the Pacific and not until 1519 that Magellan passed through the straits that bear his name and thus discovered the long sought western passage to the Indies, a passage which had been sought on the north by the Cabots and by numerous explorers at every gulf along the entire eastern coast.

Exploration proceeded rapidly thereafter. Ponce de Leon discovered Florida in 1512. In 1524 Verrazani explored the coasts of Carolina and New Jersey and entered the present harbors of Wilmington, New York and Newport. During 1539, 1540 and 1541 De Soto explored Georgia, Alabama and Mississippi, and discovered the Mississippi River in the last year. In 1542 and the following year Cabrillo sailed along the Pacific Coast. In 1562 Ribault attempted to plant a Huguenot colony at Port Royal, Carolina, but it was abortive. Another Huguenot colony was attempted on St. Johns River, Florida, in 1564, by Laudonniere. It was destroyed by the Spaniards, but the following year, 1565, Menendez established St. Augustine, Florida. During the three years beginning with 1578 Drake made his famous explorations along the Pacific Coast, reaching as far north as Oregon, though he had been preceded by the Spanish (Cabrillo, 1542). The Spanish had been busy on the southern borders and in 1582 Espejo founded Santa Fe, New Mexico. In 1584 and 1587 Raleigh attempted to plant colonies in Virginia, but it will be seen that until the beginning of the Seventeenth Century there were but two settlements within the present boundaries of the United States, both made by the Spanish.

The exploration of Central America and the Isthmus of Panama proceeded rapidly during the early part of the Sixteenth Century and settlement followed closely on exploration. It should, however, be stated that colonization in its proper meaning was seldom attempted. Military and trading posts were established and maintained and these

posts gradually grew into colonies with entities of their own. Closely following the taking possession of the Isthmus and Central America occurred the conquest of Mexico, in which Spanish authority was established by Cortez in 1521, and Mexico became a vice-royalty in 1535. It is, perhaps, worth mentioning that the city of Belize, British Honduras, was a settlement by Wallace, a Scotch buccaneer, and the chief occupation of its people was wood-cutting, or the lumber business, and this business was early in the Eighteenth Century a subject of dispute.

Taking up in outline a review of the discovery and settlement of South America: The coast of Colombia was one of the earliest portions of America to be visited by the Spanish, but the first settlement was at Nombre de Dios, on the Isthmus, in 1508, and by the middle of the century Spanish power was fairly established and flourishing communities had arisen.

Venezuela was made a captain-generalcy in 1550. The coast of Brazil was a favorite field of early exploration by the Portuguese and by 1508 the coast had been outlined, for in that year Vincent Pinzon entered the Rio de la Plata. Amerigo Vespucci explored the coast under royal authority and enormous grants were made to persons who were willing to undertake settlement. Each captaincy, as these divisions of the territory were called, extended along fifty leagues of coast. But settlement was not attempted until about 1531.

The Argentine Republic was first visited by De Solis, in 1516, and in 1535 Mendozo attempted the establishment of Buenos Ayres, but it was not until 1580 that it was successfully accomplished.

The history of Uruguay dates from 1512 with the exploration and landing of De Solis, but no settlement was made until the Seventeenth Century. The coast of Peru was first visited in 1527. The conquest of Peru was accomplished in 1533, and the city of Lima was founded in 1535 by Pizarro.

The first Spanish invasion of Chili was in 1535 and 1536, at which time the city of Santiago was founded.

This brief review of early settlement may well be concluded by a list of some of the leading cities of the Americas and some of the earliest settlements, with the accepted dates of their establishment or occupation by Europeans.

BRITISH NORTH AMERICA.

CITY.	ESTABLISHED.	CITY.	ESTABLISHED.
Quebec	1608	St. John, New Brunswick	1739
Montreal	1642	Vancouver, British Columbia	1885
St. John's, Newfoundland	1613	Victoria, British Columbia	1843
Halifax, Nova Scotia	1749		

UNITED STATES.

CITY.	ESTABLISHED.	CITY.	ESTABLISHED.
Portland, Maine	1632	Jacksonville, Florida	1816
Boston, Massachnsetts	1630	St. Augustine, Florida	1565
Plymouth, Massachnsetts	1620	Pensacola, Florida	1696
New York City, New York	1613	Mobile, Alabama	1702
Philadelphia, Pennsylvania	1681	New Orleans, Lonisiana	1718
Baltimore, Maryland.	1730	Galveston, Texas	1816
Annapolis, Maryland	1605	Portland, Oregon	1845
Jamestown, Virginia	1607	San Francisco, California	1775
Charleston, South Carolina	1670	San Diego, California	1766
Savannah, Georgia	1733		

MEXICO.

City of Mexico	1522	Vera Cruz	1519

CENTRAL AMERICA.

Gnatamala City, Guatamala	1776	Colon, Panama	1849
San Salvador, Salvador	1528	Panama City, Panama	1518

WEST INDIES.

Havana, Cnba	1519	Port an Prince, Haiti	1745
Santiago, Cnba	1514	San Jnan, Porto Rico	1511
Kingston, Jamaica	1693		

SOUTH AMERICA.

Bogota, Colombia	1538	Rosario, Argentina	1725
Caracas, Venezuela	1567	Buenos Ayres, Argentina	1535
Georgetown, British Gniana	1580	Quito, Ecuador	1534
Cayenne, French Guiana	1635	Guayaquil, Ecuador	1531
Para, Brazil	1614	Lima, Peru	1535
Bahia, Brazil	1503	La Paz, Bolivia	1548
Rio de Janeiro, Brazil	1502	Santiago, Chili	1541
Asuncion, Paraguay	1537	Concepcion, Chili	1550
Montevideo, Uruguay	1729		

What did the original explorers of the coasts of America discover in respect to the forests? They found a wooded coast from the Strait of Belle Isle, 52 degrees north latitude, to the mouth of the Rio de la Plata, 35 degrees south latitude, practically without a break. The forest fringed the shores for that enormous distance, spanning nearly one-fourth of the earth's circumference and much augmented by the many and great indentations of the shore line. But what lay back of the wooded shores? For the most part a solid forest extended inland, in some places for two thousand miles. Notwithstanding the great areas of arctic muskeg in the north, the barren plains and mountains of the extreme south and the great treeless areas between—the prairies, the pampas, the llanos—and notwithstanding the areas lifted high above the treeline by the Rockies, the Sierras and the Cordilleras, the western continent was one of forests. It is difficult to define the treeless areas and to say exactly what percentage of the area of any one country or state was wooded or treeless, but in an approximate way some general facts may be stated.

Canada was and is a forested, or rather a wooded, country. Botanists, geographers and students of economics note a difference between forested and wooded areas. The forests yield timber of commercial

value, but the wooded areas offer a welcome and means of livelihood to the settler. The total area of Canada, excluding Newfoundland and Labrador, is estimated at 3,745,574 square miles. Of this great area 1,351,505 square miles is estimated to be still wooded. It is probable that the original wooded area of Canada was about 1,690,000 square miles. All of the arctic territory of Franklin, estimated at 500,000 square miles, and parts of Yukon and Mackenzie and more than half of Keewatin are and were treeless, owing to the influence of their arctic climate. The Labrador Coast and the northern part of Ungava are also largely or wholly treeless. There are also the great prairies of Assiniboia, Saskatchewan and Alberta. Not considering the areas which are treeless because of their northern latitude, fully ninety percent of Canada was wooded. Newfoundland's coast was forbidding, but its interior was heavily wooded.

What is now the United States presented an almost solid and continuous forest from the Atlantic to the Mississippi River and in places still farther west; and then, after an interval of treeless plains, came the mountains with their forest groups and beyond them the wonderful arboreal wealth of the Pacific Coast. The total land surface of the continental United States, excluding Alaska, is 2,972,594 square miles. It is estimated that the present forest area is about 1,000,000 square miles; but, combining the fragmentary records that are to be found and estimating areas from the history of settlement and of agricultural development, as well as by the effect produced by the lumbering industry, it can be asserted with confidence that the original forested area of the present United States was at least 1,400,000 square miles, or nearly one-half of the entire land area.

Alaska has an area of about 591,000 square miles. Its wooded area, some of which is densely covered with large timber, can be safely estimated at about 100,000 square miles, while a much greater area is covered with brush.

The total area of Mexico is 767,000 square miles, of which about 150,000 square miles are of woodland.

The area of Central America is 163,465 square miles, of which about 100,000 square miles is estimated to have been forested.

South America has for the most part a climate favorable to tree growth mainly of the tropical sort, due to its peculiar formation. The important mountain system of the continent lies close to the Pacific Coast, and in it many rivers which empty into the Atlantic Ocean or the

Caribbean Sea have their rise. The eastern trade winds sweep over the continent, depositing moisture as they go, but are finally exhausted by the Andes and the other great mountain systems of the western coast. Thus the abundantly watered interior of the continent north of the Paraguay River is largely forested. There are exceptions in the llanos of the Orinoco and in some of the tablelands of the west, and Argentina is largely open grass land or barren plains. The total area of South America is estimated at about 7,685,000 square miles. A careful review of the conditions in each country leads to the conclusion that of this total area at least 6,000,000 square miles are naturally wooded. The great western ranges lift themselves above the treeline, the extreme southern part of the continent is almost antarctic in its characteristics and there are some naturally treeless plains, but, as noted above, approximately seventy percent of the area is wooded and the vast stretches of forest are of the most luxuriant kind. The growth of vegetation in South America is the most varied and the heaviest to be found in the world. Even in Africa only comparatively small and isolated portions compare with it.

Summing up the Americas we find the following results in total area and wooded area:

	Total area, square miles	Wooded area, square miles
British North America	3,795,308	1,725,000
United States, with Alaska	3,572,040	1,140,000
Mexico	767,000	150,000
Central America	163,465	100,000
South America	7,685,000	6,000,000
Total	15,982,813	9,115,000

Consequently, of the total area of the New World, more than fifty-five percent was covered with forests, which were most dense on the eastern coast, the one first approached by discoverers and explorers. The forests ranged from the light and easily worked woods of general utility of North America, such as the white and yellow pine, to the heavy and hard woods of the tropics and semitropics, adapted to multitudes of uses according to their qualities of beauty in color and grain and their adaptability to ornamental use, or as dye stuffs. Hence, the lumber industry was practically the first to be established and to form the basis of eastbound commerce across the Atlantic. Before grain, cotton, furs or even tobacco were exported from the Americas, lumber and timber had already established themselves in the favor of the Old World, and many of the explorers who were searching for gold returned with wood.

These subjects, both from historical and present statistical stand-

points, will be treated under the heads of the countries, states or provinces concerned. In taking up the more detailed account of the origin and development of the lumber industry it has been deemed best to treat the subject not entirely chronologically but to a certain extent geographically and with regard to its present magnitude and highest development. Thus, beginning with North America, and in that continent governed somewhat by geographical relations, first place is given to the British possessions. If a chronological arrangement had been determined upon, undoubtedly preference would have been given to Central America and the northern part of South America. Again, in North America proper the industry might be supposed to have witnessed its first development in connection with the oldest settlements. Such undoubtedly was the fact, but St. Augustine, and Florida as a whole, for hundreds of years played but a minor part in the forestal development of the continent and little or no part in international commerce. The early English settlers in Virginia were comparatively little concerned about wood. It was on the northeastern coast of the United States and in the Maritime and Laurentian provinces of Canada that the lumber industry early reached a high development and first became an important element in international trade. Geographical considerations and the further fact that within Canada lie the northern boundaries of the tree growths of the continent constrain us to take up first Canada rather than the United States, and the Maritime provinces rather than Maine.

CHAPTER II.

NORTH AMERICAN FOREST GEOGRAPHY.

Before entering into a minute discussion of the timber resources and the lumber history of Canada, it is well to review briefly the North American continent in its relation to tree distribution, especially with reference to the United States and Canada, which countries are one in their forest characteristics. While there is one prominent tree species which is almost wholly confined to Canada, and a few others whose native habitat is largely within its area, and while about half of the tree species of the continent, belonging to the southern United States, do not appear north of the international boundary, that arbitrary line of demarcation between the two countries cuts across the mountains, the treeless plains, the forested areas and the lines of tree growth; so that in a discussion of tree distribution the two countries should be treated as one, the differences being determined by soil and climatic conditions which have no relation to political divisions.

It should be noted first that the Atlantic Coast, including its islands, is practically all timbered from the Strait of Belle Isle, or certainly from the northern boundary of the main body of Newfoundland, to the Strait of Florida. The treeline follows the Gulf Coast from near the southern point of Florida to about west of Galveston, Texas, so that the Gulf and Atlantic coasts of the United States, with small exceptions, are timbered.

As the northern arm of Newfoundland is practically barren, so is the Labrador Coast. Starting from the Strait of Belle Isle, the northern forest limit runs a little inland from the coast, following the boundary between Labrador and Ungava to Ungava Bay; thence bending westerly and southerly it strikes Hudson Bay at about 57 degrees north latitude. The northern limit on the western side of Hudson Bay begins farther north, at about Fort Churchill, and follows an approximately straight line northwestward, passing north of Great Slave Lake, to the mouth of the Mackenzie River, north of the Arctic Circle; thence it turns to the southwest through Alaska, striking the coast again in the southwestern part of that American territory.

The Pacific Coast of North America has characteristics quite different from those of the Atlantic Coast, owing to the mountain uplift which closely follows the coast. Instead of a solid and wide body of timber, as is the condition on the Atlantic Coast, there are smaller areas heavily timbered, intersected and separated by mountain areas which are nearly or quite treeless. The presence of the mountains further results in a semiarid condition farther inland. Practically all the way from Cook Inlet, in Alaska, to the Bay of San Francisco, the coast has a continuous fringe of heavy forest growth, widening out as local topography will permit into the great forests which are found in British Columbia, Washington and Oregon.

The western mountain and plateau country of the continent is more or less timbered throughout, barren plains being crossed or bounded by forested mountain slopes, or the barren mountains of the North being penetrated by tree-lined valleys. This condition obtains, with variations due principally to latitude, all the way from the Alaskan peninsula to the Gulf of Tehuantepec.

Between the widespread and comparatively solid and uniform forests of the East and the broken and varied forests of the West lies the great, almost treeless, interior plain of the continent. The boundaries of this treeless plain may be thus roughly outlined: Starting from Galveston, Texas, the line runs in an approximately northern direction through the eastern part of Texas and the western part of Indian Territory. Thence it turns eastward, crossing the southeastern corner of Kansas, thence across Missouri, thence bending into Illinois and reaching just beyond the Indiana line. Thence in a curve it turns to the north and northwest, striking the Mississippi River in northern Illinois, leaving it in southern Minnesota, and passes north between Red Lake and the Red River of the North. Crossing the international boundary in a northerly direction, it sweeps around Winnipeg to the northwest and strikes about the northwestern corner of Manitoba. Thence northwesterly and westerly it crosses Saskatchewan and northern Alberta, and then, turning again to the southwest and south, follows the line of the Rocky Mountains back along the western border of Alberta, across Montana, Wyoming, Colorado and New Mexico, to and across the Mexican border. West of the latter part of this line is the broken mountain flora previously described.

Within this great interior plain are trees, but few forests, so that in a general way the line described surrounds the great agricultural and

grazing section of the continent, the rich agricultural regions east of the prairies having been won from the forest through more than a century of settlement and development.

TREE SPECIES AND THEIR DISTRIBUTION.

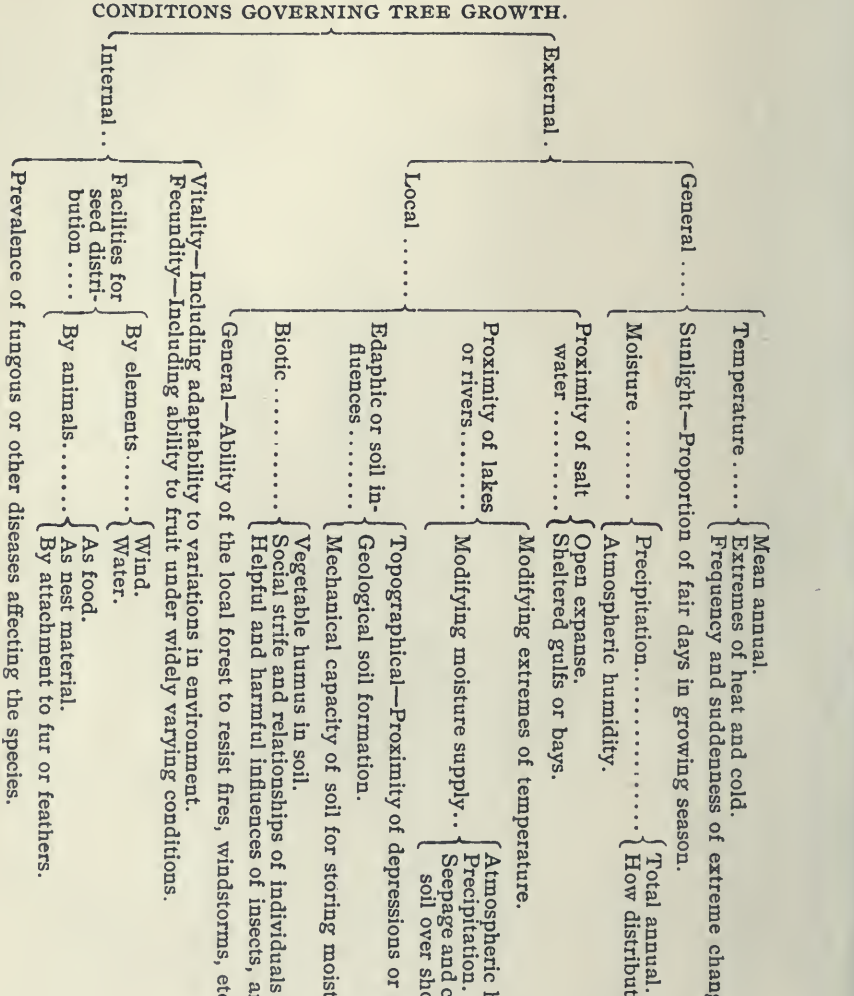
It will be seen from the above that the conformation of the forested area of the United States and Canada (including all the solid, or nearly solid, formations of arboriferous flora) is extremely irregular. It would, however, be expected that when we come to study the constituent tree species of the forest they would show a gradual and somewhat regular latitudinal gradation from tropical and sub-tropical species in the South to the most arctic species, bounded on the north by a zone where no vegetation except lichens and mosses can exist. While the above is true in a general way, yet the northern and southern limits of most tree species have little relation to isothermal lines of mean annual temperature, showing that there are potent influences other than temperature to be considered. Botanists classify these as climatic, including amount and distribution of light, heat and moisture; edaphic or soil influences, including soil formations, earth-moisture, etc., and biotic, or the influences of other plants, of insects and animals, and of decaying animal and vegetable matter. A more specific summary of the influences governing tree distribution has been prepared by Doctor Robert Bell, of the Geological Survey of Canada,[1] as follows:

1. Distance or proximity of the sea, or of the areas which were covered by it in recent geological times.
2. Changes which have taken place in the arrangement of land and water while the trees were spreading over the continent.
3. General dryness or moisture of the climate affecting considerable areas.
4. Extremes of heat and cold.
5. Local heat and moisture from lakes and rivers.
6. General elevation above the sea.
7. Local elevation (with consequent dryness) over level, wet or cold lands.
8. Large local depressions.
9. Diseases and insect pests.
10. Rapid or slow natural means of dispersion.

This summary is quite complete, but a better idea of the logical re-

[1] "The Geographical Distribution of Forest Trees in Canada."—Scottish Geographical Magazine, June, 1897, pp. 281-296.

lationship of these various influences is perhaps conveyed by the following analytical diagram, with the explanatory text which follows it:



INFLUENCE OF PAST CONDITIONS UPON THE PRESENT.

It would be an error to interpret the foregoing outline as applying solely to influences existing at the present time or even in the immediate past. We must go back thousands of years to find the origin of some of the influences affecting the present distribution of tree species; while the evolution or development of existing arboriferous flora has been a process extending over an inconceivably longer period. A brief review of past geologic conditions is therefore necessary as a foundation to an intelligent discussion of existing forest formations.

In the evolution of plant forms upon the earth the trees are comparatively recent arrivals. It was formerly believed that the coniferæ were represented in the luxuriant vegetation of the Carboniferous period whose remains are our coal deposits; but it is now known that the fossil remains which had been identified as coniferous wood were really the trunks of huge ferns, nearly as large as our forest growths of today, and that the ferns and their allies constituted about seventy-five percent of the vegetation of that period. In the next or Triassic period appeared the cycads,[1a] trees closely allied to the coniferæ and still plentifully represented in tropical species, though existing in our country only in a few Florida species and in *Cycas revoluta* and some other common greenhouse plants. These were closely followed by true coniferæ, which had their maximum development in the next or Jurassic period. They are estimated to have constituted at that time sixty percent of the earth's vegetation. Among the earliest fossil coniferæ are found the Araucarian pines, closely related to those now found in South America, though they have entirely disappeared from North America. A little later appeared Sequoian pines not greatly different from the only two species of that genus now left upon the earth, *Sequoia washingtoniana* and *Sequoia sempervirens*, both restricted to California, though their ancestors have left their impress upon the Triassic rocks of widely distributed areas of the United States. The "bigtrees" and redwoods are therefore forest patriarchs not only in size and individual longevity but also in ancient ancestry; they belong to the First Families of the Forest, and were probably represented here six or seven millions of years before the existing mountain chains of the continent were upheaved from the Tertiary plains. If they are now confined to the Pacific Coast, it is probably not because of the Rocky Mountain bar-

[1a] Geologists are not agreed as to this order of appearance. Professor N. S. Shaler, of Harvard University, writing in 1896 (Aspects of the Earth), gave the order as follows: Conifers and yews, followed by palms, cypresses and cycads.

rier, but because they find there the only congenial habitat remaining to them—conditions of heat and moisture most nearly approaching those which must have prevailed when their ancestors flourished in the old geological summer when the land was flat, when the ocean beds were not deep enough to hold all the waters nor the shores of the continent high enough to resist their partial invasion.

Compared with the coniferæ in general the greatly diversified hardwood families are modern arrivals, though the first of them can be traced back as far as the Cretaceous period, next following the Jurassic, three million years or so ago. This is a very brief period as geologists reckon time, yet during that period the hardwoods had their evolution, their maximum of development and a rapid decline, so that in nearly all the botanical families the fossil species outnumber those now existing. One of the most important deciduous lumber trees, the yellow poplar *(Liriodendron tulipifera)*, is the sole surviving species of a genus which formerly comprised many species. The same is true of sassafras *(Sassafras sassafras)*, and true in a less extreme measure of many other genera. Including the coniferæ also, it may be said that the present forests are a bare remnant of those which have existed on the continent in recent geological times, and that the tree species now represented in North America are very limited compared with those of that past. It is also true that we have here over five hundred tree species as compared with barely a dozen indigenous to the British Isles, and in almost any square mile of typical forest growth in the United States may be found more different species than in all of Europe.[1b]

INFLUENCE OF CLIMATIC CHANGES.

This decline in the number of tree species and in the extent of the forests does not necessarily imply a biological decline; that is, it does not necessarily imply that the present tree species are in any sense degenerates, as are the ferns of today compared with their giant ancestors of the Carboniferous period. Our present trees are undoubtedly the highest possible development of their present environment, and the changes in the forest have been undoubtedly caused by great climatic changes occurring later than the geologic periods which have been discussed in connection with the evolution of tree forms, and which changes

[1b] "The reason seems to be that the glacial periods in Europe serve to overwhelm the vegetable life, and this because when the glacial envelope comes upon the continent and forces the army of plants down to the southward, they have no secure field for retreat, as in North America, but find their migrations stopped by the great gulf of the Mediterranean. It is likely that the wide difference between the richness of the forest life in the Old World and the New is, in part at least, determined by this cause."—Prof. N. S. Shaler, Aspects of the Earth, 286.

will now be considered in connection with their influences upon the present distribution of tree species, with which they have much to do.

It is difficult for the average layman, who conceives of the earth as a gradually cooling sphere, to grasp the idea of the great differences in mean temperature which have undoubtedly existed upon its surface at different periods, or to evolve any theory to account for them. Even the geologists, though the facts are indisputably written in their rock records, have as yet agreed upon no hypothesis, and have sought for the cause in an eccentric orbit of the earth around the sun, in abnormal altitudinal elevation of the fields of glacial action and in variations of the earth's atmosphere. The most generally accepted though not firmly established hypothesis takes the last direction and is based upon possible variations in the amount of carbonic acid gas[1c] in the atmosphere at different periods. According to this hypothesis there have been long periods during which the carbonic acid gas of the atmosphere has been eroding mountain rocks and has been washed down to the sea in the form of bicarbonates of lime and of other rock alkalis, this action continuing until land elevations were reduced to the plain level, when erosion would be at its minimum until other mountains had been upheaved for it to act upon. During this rest period the bicarbonates in the expanse of waters would be converted into monocarbonates and the surplus of carbonic acid gas be again restored to the atmosphere in readiness for a second cycle of change. It is known that the present proportion of this gas in our atmosphere, though extremely small, has a definite influence in imprisoning atmospheric heat and preventing the diffusion of the earth's heat into surrounding space; that a small percentage of increase in the amount would greatly extend the climatic conditions of the tropical and temperate zones northward, while if the small amount now in our atmosphere were reduced by one-half it would restore the conditions of the Glacial period.

Whether or not this interesting theory shall stand the test of further investigation, the fact is known that during the Tertiary ages following the Cretaceous period already mentioned (during which the hardwood trees and other angiosperms appeared) a temperate climate extended in North America very close to the north pole and the territory was covered with vast forests consisting of species not greatly different from those which still survive, together with tropical forms. This condition was succeeded, probably so gradually that little or no change

[1c] In modern chemical terminology "carbon dioxide," though the older term still has the widest popular use.

would have been apparent during the average tree lifetime, by the Pleistocene or Glacial epoch of the Quaternary period, at the culmination of which a thick ice sheet covered America as far south as northern Pennsylvania, the Ohio River Valley as far west as the Mississippi River, and then through central Missouri and northward to near the international boundary line and westward to the Rocky Mountains. Trees as well as all other vegetation were swept out of existence in all this field of glacial action, and it is hardly possible that any of their seeds could have survived the thousands of years of glacial winter, while all the more tropical of the species to the southward of the ice field must have been destroyed or driven far toward the equator by the prevailing cold. Then came another geological springtime; the southern limit of the ice field receded and the timber line began gradually creeping after it. The northern tree limits of Canada still conform somewhat to the old parallels of glacial action. It is not strange, therefore, that of the great variety of tree species that flourished on the continent during the warm Tertiary ages only a comparatively few of the hardier ones should have survived; and some of our modern species have probably originated or evolved from older forms since the glacial age, which is variously estimated as having been from 20,000 to 40,000 years ago. It is believed that the receding glaciers left the Falls of Niagara near where the city of Lewiston now stands, and that they have since then cut the river gorge back to their present location.

Another geological influence upon tree distribution may be found in the presence of great barriers which prevent or retard migration. Such wide river valleys as that of the Mississippi undoubtedly have such an influence. Mountain ranges may act in the same manner, and the Rocky Mountains in particular seem to have had a marked influence. There are found in the region west of the Rocky Mountain ranges sixty-two species of coniferæ which do not grow at all in other portions of the continent; twenty-seven species indigenous to the eastern portion of the continent do not grow in the Rocky Mountain region, while only two species may be classified as common to both sections. One of these is the common or dwarf juniper, and the other the white spruce, whose far western habitat is chiefly in the Canadian Rockies. On the other hand 185 hardwood species of the eastern United States are not found on the Pacific slope at all, though ninety-three other deciduous species have their exclusive habitat in that region. This preponderance of the East over the West in the variety of hardwoods would appear greater but for

the exclusion from the above figures of ninety-four species of a tropical character which are found only in the southern Florida lowlands or along the Mexican frontier. But thirteen species of hardwoods may be considered as indigenous on both sides of this barrier line, and some of these show a much wider distribution upon one side than upon the other. Of these thirteen species five are willows; the other eight are the aspen *(Populus tremuloides)*, one of the most widely distributed of American trees, and the allied species of *Populus balsamifera* or balm of Gilead; the paper birch *(Betula papyrifera)*, which grows on the Pacific Coast no farther south than the vicinity of Seattle, Washington; the live oak *(Quercus virginiana)*, a subtropical species which extends from Mexico north along the Atlantic Coast to Virginia and along the Pacific Coast to southern California; the hackberry *(Celtis occidentalis)*; the elderleaf mountain ash *(Pyrus sambucifolia)*; the longspine haw *(Crataegus macracantha)*, which reaches west only to the eastern slopes of the Cascade Mountains; and the box elder *(Acer negundo)*.[2] It will be seen that few, if any, of the species common on both sides of the Rocky Mountains have any particular commercial importance. This difference in floras is the more remarkable because no such difference exists in any other two areas of the continent having practically the same conditions of soil and climate. The reasons for this great differentiation are obscure and must be looked for largely in the geological past.

PRESENT INFLUENCES AFFECTING TREE DISTRIBUTION.

With what has already been said regarding geological influences the diagram upon page 14 may now be considered as though it related entirely to present conditions. The internal conditions have to do only with the ability of the individual species to make the most of its opportunities; the influences grouped as external embrace all those which are usually given consideration, and these have been divided into general and local; the former including those climatic conditions which are prevalent over wide areas and which would tend to the formation of homogeneous forest growth throughout their sphere of influence; and the latter including the influences at work in more restricted areas and which produce widely varying forest formations under the same general or climatic conditions.

General Influences.—The climatic influences are largely the product

[2] These compilations have as a basis the tree species and ranges of distribution as given in the "Check List of the Forest Trees of the United States," by George B. Sudworth, dendrologist of the United States Division (now Bureau) of Forestry, 1898.

of latitude, altitude and prevailing winds. The former are coördinate in the production of mean temperature, and sub-Alpine and Alpine vegetation is of much the same type as subarctic and arctic. Upon the isothermal line connecting localities of the same mean annual temperature may, however, exist wide variations of climate in other respects: In the average extremes of temperature during the winter and summer seasons; in the frequency, suddenness and severity of temporary extreme changes of temperature, succession of freezing and thawing weather; in the amount of precipitation and its character and distribution, whether in gentle rainfall or in prevalent violent storms succeeded by periods of drouth; in the humidity of the atmosphere, and in the amount of sunlight. These moisture influences are largely controlled by the prevailing winds, and the clouds which these carry of course govern the proportions of sunshiny and of cloudy weather over the area.

Local Influences.—All these general conditions are, however, largely modified by local influences, while still other local influences affect forest growth directly in other ways than through the climate. The proximity of the ocean has a great effect on climate, which is, however, more marked upon an open coast. The lines bounding the northern limits of the arctic tree species in northern Canada show little or no southern deflection as they approach the shores of Hudson Bay, but in the vicinity of the Labrador Coast they do not come out to the ocean at all except upon the comparatively sheltered shore of Ungava Bay, and sweep southward toward Newfoundland at a greater or less distance from the ocean according to the ability of the species to resist its bleak influence. Inland bodies of water have a profound local influence upon the forests immediately lining their shores, acting as storage reservoirs for heat, modifying extremes of temperature and preventing late spring and early autumn frosts in their immediate neighborhood, supplying moisture through the atmosphere and for short distances through the soil, and also to some extent doubtless influencing precipitation, though rain-bearing clouds usually discharge their contents at some distance from the locality of their origin. In the widespread benefit of this influence their immediate vicinities share.

The topography of the neighboring country also has its influence. There may be neighboring elevations to act as a wind shield if located upon the side from which come the prevailing winds, or if the relative positions of the forest area and of the elevations are reversed they may, if of sufficient height, draw the moisture from the air currents and send

it back again as streamflow through the forest. The influence of the Rocky Mountains in diverting moisture from the treeless plains lying to the eastward, for the benefit of their wooded western slopes, is a conspicuous illustration of this influence, which may be seen in less degree in many other forest formations. The topographical contour of the forest floor also determines the character of its drainage to a considerable extent, though the supply of earth moisture is usually classed with soil influences.

Edaphic or Soil Influences.—That different soils have an important influence upon plant growth is generally recognized. These soils have been formed through long ages of rock erosion, and there has been going on also a much more rapid process of soil sifting and transportation by water movement, building up the rich and fine alluvial soil of the valleys with particles washed down from the upper portions of the watersheds. The most obvious distinction in soils is between the clayey and the sandy kinds, not only in their chemical composition but in their relative capacities for mechanically entrapping and holding moisture, and for yielding it up again on demand to the capillary rootlets of growing vegetation. Some tree species are quite limited in their soil adaptability, while others will flourish in almost any character of soil if other conditions are congenial.

The character of the original soil has been modified, in both woodland and prairie, by the deposition of decayed or decaying vegetable humus, usually called "leaf mold," though not the leaves only but every part of every plant in time finds its way back again to Mother Earth and becomes partially predigested food for future plant generations. Such a deposit of vegetable humus of course favors the advent of new species suited to such a soil, though not so well adapted as the primitive types to extract their nourishment from the cruder chemical constituents of purely rock soils. As this leaf mold is a vegetable product, however, it forms a sort of connecting link between the soil influences and those to be considered in the next paragraph.

Biotic Influences.—In systematic botany all the influences exerted upon the plant or plant group by other vegetable or animal life or matter are known as biotic, and this somewhat formidable title includes some of the most interesting subjects to be considered in the study of tree growth. It involves the relation of the tree to the tree-society of which it forms a part, and indeed—as has already been explained—to all the trees or other plants which have occupied the ground before it

and, dying, helped to enrich the soil upon which it feeds.[3] When we come to look into these relations we shall find the forces at work are closely allied to those which govern human society. There is the same fight for existence or for supremacy, the same racial clannishness shown in the tendency of certain species to gather into groups, while other tree individuals incline toward solitude rather than companionship. The trees have their helpful as well as their antagonistic relationships also, and contribute somewhat to a common defense, so that different forest formations will be found to differ in their powers of resistance to such common foes as fire and windstorms. Different species also have curious inter-relationships; some are not favored in infancy by the prevalence of their own kind, but do best under forest cover of alien growth, which they often ungratefully crowd out of existence when they reach their own lusty prime. In short, the student of trees will find individual and racial character as sharply defined as among mankind, and probably more widely differentiated. The subject is a most inviting one, but it can not be discussed here any farther than it relates to the forest as a whole and to the distribution of species.

Forested and Nonforested Areas.—In the contest of different tree species to occupy the same ground, where the opposing forces are evenly matched the firstcomer, of course, has the advantage. Dense forests now occupy most of the northern half of the continent which was stripped of all vegetation by the glaciers. These forests must have marched up slowly from the south, and upon the frontier of tree progress were the kinds which possessed the greatest facilities for migration by means of seed distribution, in addition to general adaptability to growth in the open. When these began to shade the ground others crept after them which required shade cover for their early growth, and in this way the northward march proceeded, until the different species reached the northernmost limits where they could exist and reproduce —if all the species have reached such limits, it being a question whether they are not still slowly extending northward, the rate of progress of

[3] The lichens especially have played an important part in soil formation, as they possess the power to feed upon and decompose rock. This peculiar qualification was almost a necessity of their existence when they first appeared upon the earth, before the higher forms of vegetation, for there was then little but rock for them to feed upon; and ever since they have had a part in rock erosion, together with the forces of sunlight, wind, water, frost and the carbonic acid gas of the atmosphere. Decaying vegetable humus is, however, the most profound biotic influence in its reaction upon rocks and rock soils, by charging the waters which pass through it with carbonic acid gas and thereby increasing many fold their solvent action. This corrosive action extends underground as far as these waters penetrate, while the atmosphere corrodes only the surface rocks. A considerable portion of the earth elements thus taken into solution are carried down to the sea and feed the entire series of living forms which inhabit it; so that the forests in this way feed the whales and seals as surely as those animals which inhabit its own domain.

course becoming slower and slower as the northern limit is approached.[3a] By a somewhat similar process the timber line is advancing to occupy any favorable open area which may have been created in any way, such as by the abandonment of farm land, or the creation of cut-over or burned-over areas where forest had previously existed. In the two latter instances, however, very rarely is the denudation so complete that there does not remain over all the area the germ of the new forest in seeds, roots and partly live stumps.

There is a popular belief that most of the area which is now open prairie was quite recently the site of forests which have been destroyed by fire or other causes. Some prairie land may have been created in this way, and tree growth upon some of the prairies undoubtedly is prevented by the prevalence of prairie fires; but it is altogether unfair to the fire fiend to charge all the treeless areas against his account, nor even all but the more obviously desert sections where moisture is lacking to support plant life. Very rarely are forest fires sufficiently severe to kill out all tree life, even to the roots in the soil, so that they would not send up fresh sprouts and in time reproduce the forest over the burned area. Wherever forests have stood trees have been blown over by the wind; and wherever this occurs the upturned roots carry a quantity of earth with them, and, decaying, leave a hummock beside the hollow formed by the upheaval of the roots. It takes hundreds of years on level ground for these characteristic irregularities to disappear entirely in the surface level, and wherever they are not to be found it is safe to assume that forests have not existed there within such a period.

Still another argument against the fire theory is found in the fact that fires seem to be a regular feature of the usual cycle of forest growth, at least in all forests where coniferous trees predominate. Doctor Robert Bell, of the Geological Survey of Canada, insists upon this point and says that when conditions are ripe for a fire it is often set by lightning instead of by any human agency. After a vivid description of a Canadian forest fire[4] he furnishes the following account of the growth of the new forest, which will in a general way apply to the northern United States as well, except that there forest growth is more

[3a] Prof. Shaler (Aspects of the Earth, 285) also points out that in the pre-glacial southward migration the trees could not choose their own rate of progress before the advancing ice. "The individual forms, of course, are not free to move, but the succession of generations must win their way southward with sufficient speed to keep ahead of the oncoming ice. If any species failed in this work it would inevitably be overwhelmed by the glacier, and thus disappear from the face of the earth."

[4] "The Geographical Distribution of Forest Trees in Canada," Scottish Geographical Magazine, June, 1897, pp. 281-296.

rapid than farther north and the successive stages follow each other at somewhat shorter intervals than he gives:

The dead trunks of the larger trees generally stand for many years after a fire. In the summer following one of these conflagrations the blackened ground becomes partly covered by a growth of herbaceous plants, berry bushes and shoots from the roots and butts of deciduous trees which have retained some vitality, besides numerous small seedling trees. The huckleberry bushes, which are very common for the first few years, especially on rocky silicious ground, bear abundant crops of fruit. They have sprung from large old roots which are almost everywhere present in the thick woods, although their tops are quite inconspicuous and bear few or no berries. In fifteen or twenty years the ground is covered with poplars, birches, willows, etc., to the height of about thirty feet. By this time the dead trunks of the old *brule* have lost most of their branches and the smaller ones have fallen down. If we look under this growth we shall discover many healthy young coniferæ overshadowed by the more rapidly growing deciduous trees. At the end of about fifty years the coniferæ are everywhere showing their heads in the form of sharp apices, their dark green color contrasting strongly with the lighter shade of the other trees. In the race to get above the deciduous growth they develop tall trunks with the branches high up. In one hundred years the poplars are dying and falling down and the canoe birch has attained maturity and soon after shows signs of old age. In the meantime the older coniferæ have overtopped the older trees and given a new character to the general appearance of the forest. The younger coniferæ of various ages which have been springing up from seed every year, take possession of the ground left by the decay of the first occupants. In about one hundred and fifty years the forest has again become almost entirely coniferous and is ready to be destroyed once more by fire. Such is the rotation of crops of trees which is perpetually going on in these regions. Perhaps one-third of the whole area consists of "second growth" of less than fifty years, one-third of trees from fifty to one hundred years old, while the remaining one-third may be one hundred years old and upward.

The above, of course, applies only to those northern forests where the coniferæ tend eventually to predominate. Many deciduous forests are not subject to fire except in very dry seasons, or perhaps in the fall after the foliage has fallen; and the mature southern pines are little subject to injury from fire because of their height and the protection of their trunks afforded by a thick bark, while the fire runs close to the ground and finds little to feed upon.

Among the biotic influences must be mentioned the activities of living insects, animals, and the animal man. Many forest trees depend upon bees and other insects for flower fertilization, some of them, like basswood and honey locust, being notable honey-producers; others pollenize so profusely that the winds can be relied upon to distribute the pollen. The office of birds and quadrupeds in carrying edible seeds

from place to place is well understood. The squirrel is notably diligent in this regard and buries his food stores in the earth, where they may grow if he fall a victim to predatory appetite before he himself eats his buried store of food. Some seeds like those of the burdock have organs of attachment by means of which they may secure transportation by passing animals, but it is not now recalled that any tree seeds are so strongly specialized in this way.

Forest trees have insect enemies as well as insect friends, and sometimes there are great invasions of insect pests attacking certain species, such as the pine in the Black Hills region of South Dakota a few years ago, and the larches of Canada about 1896. Last and most potent of the animal agencies is that of man himself; and it is his relation to the forest that forms the main theme of the present work.

COMMERCIAL TREE SPECIES OF AMERICA.

George B. Sudworth, accepted in this work as authority on the forest tree species of the United States,[5] gives 510 distinct species,[6] not counting hybrids nor species variations, some of the latter of which would rank almost as distinct species. The following table will show the botanical classification:

	Number of—		
	Families.	Genera.	Species.
Gymnospermæ (pine and yew families)	2	15	93
Monocotyledones (palm and yucca families)	2	15	15
Dicotyledones (all hardwood trees)	56	146	402
Totals	60	176	510

Of these sixty families eighteen are represented in the United States only in the southern portion of Florida or along the Mexican boundary, being tropical plants and not characteristic of the flora of the country as a whole. These families include thirty-one genera and forty-two species, and there are sixty-four species in other families which might also be classified as tropical, making a total of 106 tropical species. There are seventeen species which were not originally indigenous to this country but are now found growing here wild, having escaped from cultivation. Of the remaining species (as has already been stated in discussing the influence of the Rocky Mountains as a botanical barrier), 212 are found only in the eastern and middle United States, 159 are found only on the Pacific slope or in the Rocky Mountains, and sixteen

[5] See footnote No. 2, page 19.

[6] Charles S. Sargent, in his monumental work, "The Silva of North America," states (preface to Vol. XIII.) that 585 species are treated. Such differences arise chiefly in two ways—first, from some botanists considering as distinct species trees which others consider as mere varieties; second, from differences of judgment as to whether certain species are trees or shrubs. In addition is the frequent discovery and identification of new species.

species are common to both geographical divisions. Canada is not known to have any tree species not in Sudworth's list, and her flora comprises only 127 of the 510 species listed by him.

THE COMMERCIALLY VALUABLE WOODS.

When we come to consider the woods which are of commercial importance the list becomes restricted to such an extent that room may be made for it here. Many other woods than those given have local uses or are valuable for other purposes than for lumber, but this list includes practically all the woods which furnish sawlogs, and a few besides, on account of their wide distribution. Sudworth's list is followed throughout in giving the range, except where otherwise stated:

Pinus[7] *strobus*. White pine. Its range includes Newfoundland, southern and western Quebec, Ontario (except the far northern portion), southeastern Manitoba near Lake Winnipeg, northern and eastern Minnesota, practically all Wisconsin and Michigan, northern Illinois, northeastern Ohio, south along the Allegheny Mountains to northern Georgia, and most of the New England and middle states.

Pinus resinosa.[8] Norway or red pine. Northern range almost the same as that of white pine. Southern range (from east to west) through Massachusetts, northern Pennsylvania, northeastern Ohio, central Michigan, northern Wisconsin and northeastern Minnesota.

Pinus divaricata. Banksian pine (Canada) or jack pine (United States). Of restricted commercial importance, but interesting because the most northern in habitat. Sudworth gives its range as follows: "New Brunswick to New Hampshire and west through Great Lake and Hudson Bay (southern shores) region to Great Bear Lake, Mackenzie River and Rocky Mountains; south into northern Maine, northern New York, northern Indiana and Illinois and central Minnesota." Bell's timber map[9] agrees with above in the northern boundary, but gives the southern limits as passing through Lake Superior and touching the United States only in the northern point of Minnesota and the northern peninsula of Michigan, which is obviously incorrect.

Pinus palustris. Longleaf pine. The well known southern longleaf yellow pine. Atlantic Coast region from near Norfolk, Virginia, to Tampa Bay, Florida; west[10] to eastern Texas; north to northeastern Alabama and northwestern Georgia.

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[7] The *Pinus* genus. According to Sargent's Silva there are about seventy species, of which one is in the Philippines, twenty-one in the western United States, thirteen in the eastern United States. Only one species grows in the far north; four in the St. Lawrence basin and northern New England; increased to five in the middle Atlantic states, and in the lowlands of the South eight species are found. In Mexico perhaps twelve or fourteen species exist (Vol. XI, p. 2). At least 100 species are believed to have flourished in North America in the Miocene period (Lesq., Rept. U. S. Geol. Survey VII, 72, 83, 17, f 25-33). For insects see footnote 40, p. 11 of Vol. XI, Sargent.

[8] "Only American representative of a peculiar Old World group of pine trees, of which *P. sylvestris* (Scotch pine) is the best known."—Silva XI, 68.

[9] See footnote No. 4, page 23.

[10] "West to the uplands east of the bottoms of the Mississippi River;" in Texas to the Trinity River and to latitude 32 degrees north, and in Louisiana nearly to the northern boundary.—Silva XI, 152, 153.

Pinus echinata (*Pinus mitis*, Michx.). Shortleaf pine. The shortleaf yellow pine of the South, though not so closely restricted to the South in its range as is longleaf. Found as far north as Staten Island, New York, and ranges all down the coast to Florida; west to southern Missouri, eastern Indian Territory and northeastern Texas.[11] Sudworth does not define its northern limits very closely. Sargent[12] states that it is found in Union and Jackson counties, Illinois, forms large, solid forests in northern Arkansas, Kansas and Missouri and reaches its greatest development in western Louisiana, southern Arkansas and eastern Texas. On the Atlantic Coast known commercially as North Carolina pine.

Pinus tæda. Loblolly pine. Oldfield pine. Range from New Jersey to Florida, west to eastern Texas,[13] and north into southeastern Indian Territory, Arkansas, and southern border of middle and western Tennessee. Intermixed with either the longleaf or the shortleaf pine. An inferior lumber wood, used somewhat for turpentining,[14] and the characteristic second growth of abandoned fields and other open areas of the South. Is at its best in eastern North Carolina.

Pinus lambertiana. The sugar pine of the Pacific Coast, a valuable lumber wood.[15] Found in the mountain regions from Oregon to California, extending back to the head of the McKinzie and Rogue rivers in the former State and in the latter to the Sierra Nevada, Santa Lucia, San Bernardino and Cuyamaca mountains.

Pinus ponderosa. Bull pine. Known commercially as California white pine and also as western yellow pine.[16] Ranges from South Dakota and British Columbia on the north to western Texas and Mexico throughout the Pacific and Rocky Mountain region. The most generally distributed tree of large commercial importance in the western mountain region.

Pinus monticola. Silver pine. Known commercially as the "western white pine" of Idaho and Montana (with admixture of allied local species). Range from Vancouver Island and southern British Columbia through northern Idaho to northern Montana, having its highest development in these two States;[17] thence southward through Washington and Oregon to Sierra Nevada Mountains in California.

Pinus flexilis. Limber pine. The most valuable lumber wood of central Nevada,

[11] Most abundant and attains its largest size west of the Mississippi River. Silva XI, 144.

[12] Silva XI, 145.

[13] "Fifty years ago the low hills in Bastrop County, central Texas, were covered with forests of *P. tæda*, which also spread into the adjacent counties. Extensive lumbering operations were carried on here, all the towns of the central and western parts of the State before the building of the Texas railroads being constructed from timber cut in these pineries, which, however, are now exhausted as sources of commercial prosperity."—Silva XI, 112, footnote 4. The original large trees of the Pamlico Sound region appear to have been of better quality than either the virgin or second growth of today. The average quality is better west of the Mississippi River, and there it is often mixed in with the other lumber pines. Silva XI, 114.

[14] "Contains large quantities of resin, but it does not flow rapidly when the trees are boxed, and soon hardens on exposure to the weather, and this species is probably not much worked commercially for the production of turpentine."—Silva XI, 114.

[15] Attains its largest size in southwestern Oregon. Silva XI, 29. Is largest of the pines. Silva XI, 30. Grows 200 to 220 feet high, and six or eight, or occasionally ten or twelve, feet in diameter. Silva XI, 27.

[16] A polymorphous species tending to break into distinct varieties in different localities. Silva XI, 81. "Principal lumber tree of eastern Washington and Oregon, of western Montana, Idaho and the Black Hills of South Dakota, and of western Texas, New Mexico and Arizona."—Silva XI, 81.

[17] Sargent is authority for this statement, confirmed by general knowledge and belief.

though knotty and considered inferior to other pines found farther north in its range limits. Ranges in the Rocky Mountain region from Montana to western Texas and New Mexico, and in the mountains of northern Arizona, Utah, Nevada and California.

Larix laricina (L. americana[18] Michx.). Tamarack. Not largely used for lumber except in shipbuilding and for rowboats, but widely used for posts, poles and ties. Range from Newfoundland and Labrador to northern Pennsylvania, northern Indiana, Illinois, central Minnesota; next to spruce the most northern species, extending from Hudson Bay northwest to Great Bear Lake and the mouth of the Mackenzie River.

Larix occidentalis.[19] Western larch. A larger species than the eastern tamarack and a valuable lumber tree.[20] Range from southern British Columbia south in the Cascade Mountains to the Columbia River and to western Montana; also found in the Blue Mountains of Washington and Oregon.[21]

Picea[22] *mariana*[23] (*P. nigra* Link.). Black spruce. A valuable lumber wood, undistinguished in commerce from the white spruce next described, both being manufactured as "spruce." Range from Newfoundland to Hudson Bay and northwestward to the Mackenzie River; southward in Michigan, Wisconsin, Minnesota, and in the eastern mountains of North Carolina and Tennessee. Both Sargent[24] and Bell agree in including in its range the entire Labrador Peninsula except the extreme northern point and the immediate vicinity of the Atlantic Ocean. Upon Bell's timber map of Canada it and white spruce are platted together as having the most northerly limits of any wood, tamarack coming next; and Sargent speaks of it as "forming, especially north of the fiftieth degree of latitude, extensive forests on the watersheds of the principal streams or in cold, wet swamps; then small, stunted, and of little value." Both these spruces are, however, extensively used as pulpwood in much smaller diameters than would be desirable for saw timber.

Picea canadensis (*P. alba* Link.). White spruce. As to commercial uses see remarks under black spruce above. Northern range same as black spruce according to Sudworth and Bell, though they do not agree on the limits, as see above, except that Sudworth gives it as extending to Alaska and the black

[18] Sargent prefers *L. americana.*

[19] "When it has grown under the most favorable conditions, on low, moist soil, at elevations of between 2,000 and 3,000 feet above the sea level, the western larch often arises to the height of 250 feet, with a trunk from six to eight feet in diameter; on poorer soil and exposed mountain slopes it has an average height of about one hundred feet, with a trunk two or three feet in diameter."—Silva XII, 11.

[20] Especially for interior finish. Silva XII, 12.

[21] Its home is in the basin of the upper Columbia River. Silva XII, 12. The great thinness of its bark unfits it to resist fire, and, being a poor seeder, it is becoming reduced in quantity. Silva XII, 13.

[22] *Picea.* There are sixteen known species, seven in North America, one of these in the Appalachian Mountains, two in the Rocky Mountains, one on the northwest coast, one extending to Bering Sea in the far north, and one extending from the east to beyond the Rocky Mountains. The spruces are believed to have inhabited Europe during the Miocene period.—Silva XII, 20.

[23] "In the United States it is most common and grows to its largest size in the territory adjacent to the Great Lakes, where, however, it is nowhere abundant, thriving only in the moistest situations and rarely producing trunks a foot in diameter. It is far less abundant than the red spruce in all the Appalachian region, and everywhere east of the Allegheny Mountains . . . is a small and comparatively rare tree. . . . It is probably rarely used, except in Manitoba and Saskatchewan, for other purposes than the manufacture of paper pulp."—Silva XII, 31.

[24] Silva XII, 30.

spruce as extending only to the Mackenzie River. Sargent agrees with Bell on its range including Labrador Peninsula to Ungava Bay. Southern range to northern New York, Michigan, Wisconsin, Minnesota, South Dakota, Montana and British Columbia. Sargent also specifically includes Maine[25] and northeastern Vermont, as Sudworth does by inference.

Picea engelmanni. Engelmann spruce. Range, northern Arizona and through the Rocky Mountain region to British Columbia. Sargent says that it is largely manufactured into lumber for the construction of buildings and is also extensively used for fuel and charcoal. The wood is very light and stringy, but not soft.

Picea sitchensis. Sitka spruce or tideland spruce. Known also commercially as western white spruce. One of the prominent lumber woods of Washington and Oregon. Range in the Pacific Coast region from Alaska[26] to northern California.

Tsuga[27] *canadensis*. Hemlock. Important commercially because of its wide distribution and its especial adaptation for the coarser building materials on account of its strength and durability.[28] Range from Nova Scotia westward through southern Quebec and Ontario to Minnesota, through Wisconsin, Michigan and southward along the mountains to northern Alabama and Georgia.

Tsuga caroliniana. Carolina hemlock. A local southern species closely allied to *T. canadensis*, formerly considered a variety of the species, occurring in the same forests and farther south than the range of the *T. canadensis*, and undistinguished commercially.[29] Range mountains of southwestern Virginia, western North Carolina, and northern Georgia; very local.

Tsuga heterophylla. Western hemlock. Of larger growth[30] than the eastern species and a better lumber wood, though not yet very largely used. Range from Alaska[31] to Idaho and Montana and southward in the mountains to California.

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[25] "Occurring very close to the shore, where it is bathed in the spray of the ocean."—Silva XII, 38.

[26] In Alaska "occurring at the sea level often to the height of more than a hundred feet, and ascending to elevations of three thousand feet, but decreasing in size as it ascends or leaves the neighborhood of the ocean."—Silva XII, 156. "It is the principal lumber manufactured in Alaska."—Silva XII, 57. "The greatest of all spruce trees, this inhabitant of the northwestern coast is surpassed by few others either in thickness or height of stem."—Silva XII, 57.

[27] *Tsuga*. Seven species, confined to temperate North America, and eastern and southern Asia. In North America two species east and two west. Japan, two species, and the seventh in the Himalaya Mountains. Not greatly subject to insects or fungi in this country. Name is the common Japanese name of the tree (tsuga).—Silva XII, 60, 61.

[28] The use of the bark for tanning should be mentioned. "It is estimated that in the year 1887 1,200,000 tons of bark of this tree were harvested; and although a large part of the timber of the trees, cut and stripped of their bark, is allowed to rot on the ground, it is believed that the average annual value of the material of all kinds obtained from the hemlock is not less than $30,000,000."—Silva XII, 66, footnote 3. United States census of 1900 reported a product of 473,222 cords valued at $1,945,452 during the year 1899.

[29] Silva XII, 69.

[30] "Frequently 200 feet in height, with a tall trunk from six to ten feet in diameter."—Silva XII, 73.

[31] . . . "where it forms with the tideland spruce the largest part of the great coast forest which extends from the sea level up to elevations of about two thousand feet, sometimes one and sometimes the other predominating."—Silva XII, 74.

Pseudotsuga[32] *taxifolia* (*P. mucronata*[33] or *P. douglasii* Carr.). Douglas spruce. Also known commercially as red fir, Douglas fir and as Oregon pine. The most important lumber wood of the Pacific Coast.[34] Widely distributed[35] in the Rocky Mountain region and on the Pacific Coast in the United States and northward into British Columbia. Has its maximum development in Washington and Oregon and on Vancouver Island.

Pseudotsuga macrocarpa.[36] Bigcone spruce. Range, southern California (San Bernardino Mountains to the Cuyamaca Mountains).

Abies[37] *balsamea*. Balsam fir. Given because it is the typical western species, though not used for lumber,[38] being, however, employed to some extent for pulpwood. It belongs in the most arctic group of woods, its northern limits through most of their extent reaching within twenty to thirty miles of those of the spruces (see *Picea mariana*). It extends south to Pennsylvania, Michigan and Minnesota, and in the eastern mountains as far south as Virginia. An allied species (*A. fraseri*[39]) is found only in the Appalachian Mountains.

Abies grandis. Lowland fir, white fir. Known also commercially as the silver fir or great silver fir. Coast region from Vancouver Island to California, and from Washington and Oregon to northern Idaho and Montana.[40] Manufactured into lumber and used for interior finish, packing cases, cooperage, etc.

Abies concolor. White fir. Oregon to southern California, and northern Arizona and New Mexico to Colorado and Utah. This and *A. grandis* seem to be known together as "white fir" in Oregon, while only *A. grandis* is known in Montana and Idaho, and only *A. concolor* in California, where it reaches its greatest development. Sargent thinks the latter may be only a southern variety of the former, and says it is occasionally manufactured into lumber and used for packing cases, butter tubs and other local purposes.

Abies amabilis. Amabilis or lovely fir. Known also as larch among Oregon lumbermen, and also in Washington, where it is cut and sold with *A. nobilis*.[41]

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[32] *Pseudotsuga*. Three species, two in America and the third in Japan. Not known to be seriously injured in this country by insects or disease.—Silva XII, 84.

[33] Preferred by Sargent.

[34] "A tree, when grown under favorable conditions, often 200 feet in height, with a trunk three or four feet in diameter, and frequently much taller, with a trunk ten or twelve feet in diameter." "I have not been able to obtain any reliable information concerning the maximum height of the Douglas spruce. Lumbermen on Puget Sound habitually speak of trees from 300 to 350 feet tall, but their statements unsupported by actual measurements must be accepted cautiously." He goes on to say that the tree often towers over forests which average 200 feet in height, so it must at its maximum be a very tall tree.—Silva XII, 88, and footnote 1. For coarse purposes, railway ties, piles, and for spars and masts is unequaled in strength.—Silva XII, 90.

[35] "No other American tree of the first magnitude is so widely distributed, or can now afford so much timber, and the rapidity of its growth and its power of reproduction under favorable conditions make it the most valuable inhabitant of the great coniferous forests of the Northwest."—Silva XII, 91, 92.

[36] Is "occasionally manufactured into lumber, and largely used for fuel."—Silva XII, 94.

[37] *Abies*. Twenty-three species. In America two occur east, seven west, and two are found only in Mexico and Guatemala. The rest of the species are found in the mountains (chiefly) of Europe, Asia and Africa. Does not suffer severely in America from insects or fungi.

[38] "Except to some extent for box lumber."—Silva XII, 109.

[39] "Grows thirty to forty, and rarely seventy to eighty feet high, with a trunk occasionally two and one-half feet in diameter."—Silva XII, 105. "Occasionally used for lumber in building mountain hotels."—Silva XII, 106.

[40] "Does not grow gregariously."—Silva XII, 118.

[41] United States Geological Survey, 1899-1900, Part V, pp. 100-101.

It is ranked seventh among the ten or eleven principal timber trees of Washington, both as to desirable qualities of the wood and as to size, quantity and accessibility of the timber, and constitutes about 3.74 percent of the stand of commercial timber in that State.[42] Sargent says that it reaches its greatest development on the Olympic Mountains of northwestern Washington.[43] Range from the Fraser River region in British Columbia southward in the Cascade Mountains to Washington and Oregon.

Abies nobilis. Noble fir. Known also commercially as larch. In Washington and Oregon (in company with the nearly related *A. amabilis*) it constitutes about five percent of the total timber stand.[44] Found in Washington in the coast mountains in the southwestern part of the State; in the Olympic Mountains on Soleduck River; and from Mount Baker southward in the Cascade Mountains, to Oregon, as far as headwaters of McKinzie River in Lane County.

Abies magnifica.[45] Red fir. Range California (Mount Shasta and along the western slopes of Sierra Nevada Mountains).

Sequoia[46] *washingtoniana* (*S. gigantea* Decaisne, *S. wellingtonia* Seeman). Bigtree. A characteristic species, though not much used for lumber, except locally, on account of its large size and consequent difficulty of manufacture.[47] Range in California from latitude 39 degrees north to a little south of latitude 36 degrees north, or from the middle fork of the American River and along the western slopes of the Sierra Nevada Mountains to the headwaters of Deer Creek.

Sequoia sempervirens.[48] Redwood. Range from the southern borders of Oregon and southward in the coast region, twenty to thirty miles inland, through California to Salmon Creek canyon. Largest bodies are found in Humboldt, Mendocino and Del Norte counties, California.

Thuja[49] *occidentalis*. Arborvitæ. Known commercially as white cedar. Not used so much for lumber as for posts, poles and shingles. Sudworth lists forty-six cultivated varieties of this species. Indigenous range from New Brunswick to Lake Winnipeg and south to central Minnesota and Michigan, northern Illinois and in the Atlantic Coast region along the mountains to North Carolina and eastern Tennessee.

Thuja plicata.[50] Giant arborvitæ. Known commercially as (western, or Washington) red cedar. Forms about five percent of the stand of western timber

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[42] United States Geological Survey, 1899-1900, Part V, p. 127.

[43] Silva XII, 126.

[44] "Occasionally manufactured into lumber, it is used under the name of larch for the interior finish of buildings, and for packing cases."—Silva XII, 135.

[45] "In California is occasionally manufactured into coarse lumber employed in the construction of cheap buildings, and for packing cases."—Silva XII, 139.

[46] The genus *Sequoia* was named after Sequoyah (George Guess), the half-breed inventor of the Cherokee alphabet.

[47] "The most massive stem, though not the tallest tree, in the world."—Silva X, 146.

[48] "The most valuable timber tree of the forests of Pacific North America."—Silva X, 142 See Muir, "Mountains of California," p. 195.

[49] *Thuja* (*Thuya* Sargent). Four species. One, the type of the genus, in northeastern North America; one in northwestern North America. One in the mountains of central Japan, and the fourth in China. The type is ancient and was widely distributed in the Tertiary ages through both hemispheres. Not injured seriously by insects or fungi. Silva X, 124.

[50] *T. gigantea* (Nuttall) preferred by Sargent.

woods. Range from coast of southern Alaska to northern California; eastward through British Columbia and northern Washington to northern Idaho and Montana, and along the western slopes of the Rocky Mountains.[51]

Libocedrus[52] *decurrens*. Incense cedar. Known also commercially as white cedar. Range from Oregon southward on the western slopes of the Cascade Mountains through California, Lower California and western Nevada.

Taxodium[53] *distichum*. Bald cypress. Known commercially simply as "cypress," though no true cypress *(Cupressus)* of commercial value exists in this country. Range in the Atlantic Coast region from southern Delaware to Florida, westward along the Gulf Coast to Texas, and northward from the Gulf Coast through Louisiana, Arkansas and eastern Mississippi and Tennessee, southeastern Missouri, western and northwestern Kentucky, southern Illinois and southwestern Indiana. Reaches its highest development in the bayou district of Louisiana and in similar regions of deep alluvial deposits along the Gulf and Atlantic coasts.

Juniperus[54] *virginiana*. Red juniper. Known commercially as pencil cedar or as red cedar. Of slight importance because of limited supply, being sparsely distributed over a wide[55] area. Range from Nova Scotia and New Brunswick to Florida,[56] west in Ontario to Dakota, central Nebraska and Kansas, and Indian Territory. *J. barbadensis*, pencil cedar, is by Sudworth considered a distinct species.

Juglans[57] *cinerea*. Butternut. Of considerable use for interior finish, furniture, etc. Range from southern New Brunswick to Delaware, and on the Appalachian Mountains to Georgia and Alabama; westward through Ontario to Dakota, southeastern Nebraska, southern Missouri, and northeastern Arkansas.

Juglans nigra. Black walnut. The most valuable native cabinet wood, but now

[51] "The noblest of its race, and one of the most valuable timber trees of northwestern America, *T. gigantea* is rapidly disappearing with the spread of forest fires, which, burning through their thin bark, soon kill these trees."—Silva X, 130.

[52] *Libocedrus*. "Eight species of *Libocedrus* (which is, perhaps, too closely connected with the *Thuya* to be considered generically distinct) are now distinguished; one is widely scattered through the mountain forests of western North America; two inhabit western South America, where they are distributed from Chili to Patagonia; two occur in New Zealand, two in New Caledonia, and one in southwestern China." Species closely analagous to the present North American inhabited Greenland in the Cretaceous period.—Silva X, 134.

[53] *Taxodium*. Two species, one in the United States and one in the Mexican highlands. Not seriously injured by pests or fungi.—Silva X, 150. "'Dry rot in living timber often diminishes its value and in Louisiana and Mississippi is said to affect at least one-third of all the trees' (Dickson and Brown, Am. Jour. Sci., Ser. 2, Vol. 15, on 'The Cypress Trees of Mississippi and Louisiana')."—Silva X, 150, footnote 5. Nevertheless its products show great resistance to rot.

[54] Gin is flavored with the crushed berries of *J. communis*. This species might be included as a characteristic one on account of being one of the very few that may be said to be transcontinental in habit. *J. monosperma* is much used for fencing and fuel, according to Silva X, 90. Its range is eastern base Rocky Mountains of Colorado (Platte and Arkansas Rivers) and southward into western Texas; southern Utah to central New Mexico and Arizona.

[55] "The most widely distributed coniferous tree of North America."—Silva X, 94.

[56] "In western Louisiana, Texas, and southern Arkansas, it attains its greatest dimensions on rich alluvial bottom lands, and in Kansas and eastern central Nebraska grows usually on dry limestone river bluffs, where, before the coming of white men, it often formed groves of considerable extent."—Silva X. 94, 95. "The straightest grained and most easily worked cedar wood is obtained from the swamps near the western coast of the Florida Peninsula, and large factories have been established at Cedar Keys, Florida, and at other points in the southern states, by German manufacturers, to cut up the wood for pencil making."—Silva X, 95, footnote 3.

[57] *Juglans*. Ten species now known, two in North America generally, and a third in western Texas, Mexico, etc., one or two additional species in Mexico, one in western California. One in the Antilles, and perhaps one or two others in South America. One in Europe, one in northern China, one in Japan.

scarce. Range from southern Ontario to Florida, central Alabama and Mississippi, and westward through southern Michigan, Wisconsin and Minnesota to Nebraska, Kansas and Texas.

Hicoria[58] *alba.* Mocker nut, American white hickory.

Hicoria minima. Bitternut or swamp hickory.

Hicoria ovata. Shagbark.

Hicoria glabra.[59] Pignut.

All four of the above are known indiscriminately as lumber woods under the name of "hickory." All have practically the same range, from Quebec and Ontario to Florida along the Appalachian Mountains, and west to Nebraska, Kansas, Indian Territory and Texas.

Populus[60] *tremuloides.* Aspen. The most widely distributed American tree, but of no particular commercial value, though used for pulpwood and to some extent in turnery.[61] Ranging from Newfoundland through the central Labrador Peninsula to Hudson Bay, and northwestward to the mouth of the Mackenzie River and to Alaska; southward to the mountains of Pennsylvania, and to Missouri, southern Nebraska, and generally through the western mountains to New Mexico, lower California and into Mexico.

Populus balsamifera. Balm of Gilead. Not of much commercial importance,[62] but one of the few trees which are of transcontinental distribution. In the extent of its northern limits it is exceeded only[63] by American larch and the black and white spruces. Its range includes Newfoundland, nearly all the Labrador Peninsula, and from the western shore of Hudson Bay northwestward to the mouth of the Mackenzie River and the Alaska coast, southward

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[58] "*Hicoria* is confined to the temperate regions of eastern North America, distributed from the St. Lawrence to the Mexico highlands, where one endemic species occurs. Nine species are known, eight of which inhabit the territory of the United States, the headquarters of the genus, as represented by the greatest number of species, being in southern Arkansas. Traces of hickory have been found in the Tertiary rocks of Greenland; paleontologists have described numerous species in the Upper Tertiary formation of Europe, and there are evidences that it once ranged in North America far to the westward of its present home."—Silva VII, 132.

[59] "Extremely common in all the northern states . . . in Missouri and Arkansas it is, perhaps, the commonest species . . . and it probably attains its largest size in the basin of the lower Ohio River. . . . Commercially is not distinguished from the wood of the shellbark hickory."—Silva VII, 167.

[60] *Populus.* Temperate and boreal regions in the northern hemisphere. One endemic species in Lower California, two in the Himalayas. "Of the eighteen or nineteen species (f. 5, Many hybrids occur) which have been distinguished, nine inhabit British Columbia and the United States, where poplars are distributed from within the Arctic Circle to Mexico, and from the shores of the Atlantic Ocean to those of the Pacific. In the eastern hemisphere poplars extend north to the Arctic Circle and abound in northern and central Europe and in northern and central Asia, where they are often the most conspicuous feature of the vegetation."—Silva IX, 152. "*Populus* is the oldest type of dicotyledonous plants yet identified, and its traces, with those of the sequoias, pines and cycads, have been found in the Lower Cretaceous rocks of Greenland. It was common on the midcontinental plateau of North America during Cretaceous times, and in Europe and North America during the Tertiary epoch, and predominated in the Miocene of Europe, the remains of twenty-eight species of that period having been described."—Silva IX, 153. "The most valuable timber trees of the genus being the North American *P. deltoida* (*deltoides* Sudworth), *P. heterophylla* and *P. trichocarpa*."—Silva IX, 155, 156. Range of *P. heterophylla* is from Connecticut and Long Island southward near the coast to southern Georgia; westward in the Gulf region to western Louisiana and through Arkansas to southeastern Missouri, western Kentucky, and Tennessee, and southern Illinois and Indiana.

[61] "And sometimes for flooring."—Silva IX, 159. "Valuable as a cover tree for other young seedlings."—Silva IX, 160.

[62] "Often 100 feet in height, with a tall trunk six or seven feet in diameter."—Silva IX, 167. "It is made into paper pulp, and in northern Michigan is manufactured into pails, tobacco boxes and small packing cases."—Silva IX, 167.

[63] According to Dr. Robert Bell.

to New England and New York, central Michigan and Minnesota, Dakota, northwestern Nebraska, and northern Montana, Idaho, Oregon and Nevada.

Populus deltoides (*Populus monilifera* Aiton). Cottonwood. The generally known cottonwood of commerce, although a Pacific Coast species (*P. trichocarpa*[64]) is largely used locally for slack cooperage and woodenware. The range of *deltoides* is from Quebec and Vermont through western New England and New York, Pennsylvania, Maryland and the Atlantic Coast states to western Florida, and west to the Rocky Mountains from southern Alberta to northern New Mexico. It is, however, only in the South that it grows large enough and plentiful enough to be prominent as a lumber wood—particularly in the lowlands of the Mississippi Valley from Illinois south.

Betula[65] *papyrifera*.[66] Paper birch. Known largely in Canada as canoe birch from the use of its bark in making canoes. Not prominent as a saw timber, though largely used in turnery, in the manufacture of shoe lasts and pegs, spools and other small articles. It and the aspen (*Populus tremuloides*) grow the farthest north of the deciduous woods, the range including the Labrador Peninsula to Ungava Bay, except a narrow strip along the open coast, across to Hudson Bay, and northwest to the mouth of the Mackenzie River, Yukon River and the Alaska coast; southward to New York and northern Pennsylvania, central Michigan and Minnesota, northern Nebraska, Dakota to the Black Hills region, northern Montana, and northwestern Washington, near Seattle.

Betula lutea.[67] Yellow birch. Probably the most plentiful lumber birch, though the red or river birch (*B. nigra*[68]) and the sweet birch, next to be described, are also used.[69] The yellow birch ranges from Newfoundland along the northern shores of the Gulf of St. Lawrence to Abbitibbe Lake and Rainy River;

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[64] *P. trichocarpa*. Black cottonwood, balsam cottonwood. "A tree often nearly two hundred feet in height, with a trunk seven or eight feet in diameter."—Silva IX, 175. "In Oregon and Washington, where the demand for the wood has already caused the destruction of most of the old trees, it has been largely made into the staves of sugar barrels, and it is also used in the manufacture of woodenware pails and butter-tubs, although its bitter taste lessens its value for these purposes."—Silva IX, 176. "In western British Columbia, Washington and Oregon it abounds in all the river valleys, and is the largest of the broad-leaved trees."—Ibid.

[65] *Betula*. "About twenty-four species may be distinguished. Nine occur in North America; of these six are trees and three are low shrubs. Six or seven species inhabit Europe, the most important, *B. alba*, also ranging in several forms through Siberia to Japan. The type is an ancient one; its traces appear in the Cretaceous rocks of the Dakota group formation, and later, during the Tertiary period, it spread over the central plateau and the northwest coast of North America, and abounded in Europe, where paleontologists have recognized in the Eocene, Pliocene and especially in the Miocene the remains of numerous species, the direct ancestors of those now living."—Silva IX, 46, 47, 48.

[66] "A tree, usually sixty or seventy, or, on the northwest coast, occasionally 120 feet tall, with a trunk from two to three feet in diameter."—Silva IX, 57. "West of the Rocky Mountains, where it attains its largest size, the canoe birch usually grows singly, and is found only along the banks of streams." "Preferred for making spools."—Silva IX, 59.

[67] "A tree occasionally 100 feet high, with a trunk three or four feet in diameter; or, in the neighborhood of the coast or toward the southern and the extreme northwestern limits of its range, much smaller, and often not more than twenty or thirty feet in height."—Silva IX, 53. "One of the largest deciduous-leaved trees of the northern forests of northeastern North America. . . . Is exceedingly abundant; and attains its largest size in the eastern provinces of Canada, and in northern New England and New York."—Silva IX, 54.

[68] *Betula nigra*. "Eighty or ninety feet in height, sometimes five feet in diameter."—Silva IX, 61. Used for furniture, woodenware, wooden shoes and in turnery. "It is one of the most interesting trees of this genus. It is the only semiaquatic birch, and its seeds . . . ripen in early summer when the water of swamps is usually at its lowest level, and, falling on the damp, rich soil of their exposed banks, germinate at once and produce plants which obtain a firm foothold and grow to be several inches high before the autumn. . . . Other birches inhabit cold northern countries or high mountains in warmer regions; but the river birch flourishes and attains its largest size in the damp, semitropical lowlands of Florida, Louisiana and eastern Texas."—Silva IX, 62-63.

[69] Also *B. populifolia*, which, "while the smallest and least widely distributed of the birch

southward to northern Minnesota, and through the northern states to eastern Tennessee, North Carolina and Delaware.

Betula lenta.[70] Sweet birch. Known also commercially as black birch or cherry birch, and in Minnesota as river birch. Range much the same northward as the yellow birch; in the South reaching southern Indiana and Illinois, and along the Allegheny Mountains to central Kentucky, Tennessee and western Florida. Used to some extent for furniture.[71]

Ostrya[72] *virginiana.*[73] Hornbeam. Both this and blue beech *(Carpinus caroliniana)* are largely known as ironwood, and have some use for tool handles, levers and other purposes requiring a very strong, hard wood. Of little commercial importance. Range from Quebec and Ontario south to northern Florida and west to eastern Kansas.

Fagus[74] *atropunicea*[75] (*F. ferruginea* Aiton).[76] Beech. Range Nova Scotia to Lake Huron and northern Wisconsin; south to western Florida, and west to southeastern Missouri and Texas.

Castanea[77] *dentata.*[78] Chestnut. Range from southern Maine to northwestern Vermont, southern Ontario and southeastern Michigan; southward to Delaware and southeastern Indiana, and on the Allegheny Mountains to central Kentucky and Tennessee, central Alabama, and Mississippi.[79]

Quercus[80] *alba.* The true white oak. Commercially other varieties are known in-

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trees of eastern North America, is largely used in the manufacture of spools, shoe pegs, wood pulp and for the hubs of wheels. It makes excellent fuel."—Silva IX, 56.

[70] "A tree seventy or eighty feet in height, with a trunk from two to five feet in diameter."—Silva IX, 50.

[71] "It is largely used in the manufacture of furniture, and for fuel, and in the Maritime Provinces of Canada in ship and boat building."—Silva IX, 50.

[72] *Ostrya.* "Four species now known, two in north central America, one of them being widely-distributed, the other in Arizona, one in southern Europe and western Asia, and the fourth in northern Japan. In Eocene and Miocene Europe ranging as far north as Greenland."—Silva IX, 32.

[73] "Occasionally fifty or sixty feet in height, with a trunk two feet in diameter. . . . Grows to its largest size in southern Arkansas and the adjacent parts of Texas."—Silva IX, 34, 35.

[74] *Fagus.* Fifteen or sixteen species. One eastern America; one Europe, western Asia, and China, and Japan; three are endemic to Australia, four are found in New Zealand, five in southern Chili and Tierra del Fuego. The type is ancient.—Silva IX, 22.

[75] "A tree, usually seventy or eighty, or under exceptionally favorable conditions occasionally 120 feet in height, with a trunk three or four feet in diameter."—Silva IX, 27. "*F. americana*, though less common than several oaks, is one of the most widely distributed trees of eastern North America, inhabiting the rich soil of valleys and mountain slopes, where it often forms nearly pure forests of considerable extent, and sometimes at the South the bottom lands of streams and the margins of swamps." "It is in the lower Ohio Valley, the southern Allegheny Mountains, and banks of the lower Mississippi, where, associated with the evergreen magnolia, it grows to great perfection. . . . Largely used in the manufacture of chairs, shoe lasts, plane stocks and the handles of tools."—Silva IX, 28, 29.

[76] Sargent prefers *F. americana* Sweet.

[77] *Castanea.* Four species, the type species being *C. castanea*, which in various forms inhabits Europe, Africa and Asia. The three other species are known to the eastern United States, two of them trees, and the third a shrub. Existed before the Middle Tertiary in northern Greenland and Alaska, in the Miocene of Oregon and the Upper Miocene of Colorado. Existed in Europe in the Cretaceous period.—Silva IX, 8, 9, 10.

[78] "Occasionally 100 feet high in the forest, with a tall, straight, columnar trunk three or four feet in diameter, or often when uncrowded by other trees develops a short trunk which in some exceptional individuals attains a diameter of ten or twelve feet."—Silva IX, 13. "Largely used in the manufacture of cheap furniture and in the interior finish of houses, and for railway ties, fence posts and rails, its durability, owing to the large amount of tannic acid which it contains, being its most valuable quality."—Silva IX, 14.

[79] "Except at the north it does not range far beyond the Appalachian hills, upon which in western North Carolina and eastern Tennessee it attains its noblest dimensions."—Silva IX, 14.

[80] *Quercus.* "Nearly three hundred species [of oaks] have been described. Inhabitants of the temperate regions, they occur also at high altitudes within the tropics, ranging south to the moun-

discriminately as white oak, among them *Q. lyrata*,[81] common through the South; *Q. platanoides*[82] (*Q. bicolor* Willdenow), ranging from Maine and northwestern Quebec to southeastern Iowa and western Missouri, northern Kentucky and Arkansas, and along the Appalachian Mountains to northern Georgia; *Q. michauxii*,[83] from Delaware and southern Indiana southeast; *Q. breviloba*[84] (*Q durandii* Buckley), Alabama to Texas, and according to Sargent the most valuable white oak of the latter State; *Q. oblongifolia*,[85] western Texas, and others.[86] The far western species most nearly approaching *Q. alba* are *Q. garryana*, the most valuable Pacific Coast white oak,[87] Vancouver Island and British Columbia southward through Washington and Oregon to California; *Q. douglasii*,[88] California; *Q. arizonica*,[89] Arizona and southern New Mexico. *Q. alba* ranges from southern Maine to southwestern Quebec and through central and southern Ontario, the lower peninsula of

tains of Colombia in the New World, and in those of the Indian Archipelago in the Old World, a few degrees south of the Equator, they find their most southern home. The genus has no representative in central and southern Africa, in South America beyond Colombia, or in the islands of the Pacific, in New Guinea or in Australia. The great centers of distribution are the highlands of Central America and Mexico, and the Indian Archipelago and Malaysia, whence it ranges to the Philippine Islands and to Asia and Japan. In North America, exclusive of Mexico, fifty species are distinguished. With four exceptions they all under favorable conditions sometimes assume the habit of trees. In both the eastern and extreme western part of the country [United States] *Quercus* is oftentimes the conspicuous feature of the vegetation. In eastern America at the extreme northern limits is represented by a single species. The number greatly increases south, and in New England ten grow. In the south Atlantic and gulf states the number is increased to nineteen, the greatest aggregation of species, though in the Mississippi Valley the oak trees are more abundant and grow to larger size than in any other part of North America. In the West reaching British Columbia and Washington with but a single species, the number increases southward, five species occurring in southern Oregon and thirteen grow in California. The type is an early one."—Silva VIII, 2, 3. Commercially all the oaks that furnish material for the sawmill are roughly divided into two classes—the white oaks and the red oaks. A ready method of distinguishing them is by the leaf. Those classed as white oaks, generally have lobes with rounded extremities, while the lobes of the red oaks terminate in a sharp point or even in a thorny process.

[81] "A tree, usually 100 feet in height, with a trunk from two to three feet in diameter."—Silva VIII, 47. "It is most common and grows to its largest size in the valley of the Red River in Louisiana and the adjacent parts of Texas and Arkansas; and in southern Illinois, on the swampy bottom lands, it is the prevalent species of the forest."—Silva VIII, 48.

[82] "A tree, usually sixty or seventy, or occasionally 100 feet in height, with a trunk two or three or occasionally eight or nine feet in diameter."—Silva VIII, 63. "It usually grows in small groves, rarely forming an important part of the forest, and is probably more abundant and of larger size in western New York and northern Ohio than in any other part of the country." "Commercially it is not distinguished from the wood of the *Q. alba* and *Q. macrocarpa*."—Silva VIII, 64.

[83] "A tree, often 100 feet in height, with a trunk sometimes free of branches for a distance of forty or fifty feet above the ground, and from three to seven feet in diameter."—Silva VIII, 17. "*Q. michauxii* is one of the most important timber trees of eastern North America, and the largest and most valuable white oak of the southeastern states."—Silva VIII, 68. *Q. lyrata*, *platanoides* and *michauxii* are sometimes distinguished from white oak under the name of swamp oak, being differentiated more or less from *Q. alba* under varying conditions of growth.

[84] "A tree, sometimes eighty or ninety feet in height, when growing east of the Mississippi River, with a tall, straight trunk frequently from two to three feet in diameter; in Texas much smaller."—Silva VIII, 71. "When grown in Alabama and Mississippi it is said to equal the best white oak, and to be used for the same purposes as that wood. It is especially valued for the pins in cotton gins, and in the manufacture of spools, baskets and wagon hubs."—Silva VIII, 72.

[85] "Exceedingly difficult to cut and split, it is sometimes used for fuel, but has no other economic value."—Silva VIII, 88.

[86] *Q. acuminata* should perhaps be mentioned with other eastern white oaks. "A tree, from eighty to 100 or occasionally 160 feet in height, with a tall, straight trunk three or four feet in diameter."—Silva VIII, 55. "Probably attains its largest size on the banks of the lower Wabash River and its tributaries in southern Indiana and Illinois."—Silva VIII, 56. "It is largely used in cooperage and the manufacture of wheels, for fencing and for railway ties."—Silva VIII, 56.

[87] "As a timber tree, *Q. garryana* is the most important oak of Pacific North America."—Silva VIII, 30.

[88] "Of little use in construction or the arts, it makes excellent fuel."—Silva VIII, 80.

[89] "Extremely difficult to cut and split, it is only used for fuel."—Silva VIII, 90.

Michigan and southern Minnesota to southeastern Nebraska and eastern Kansas; south to northern Florida and Texas.[90]

Quercus macrocarpa. Bur oak or mossycup oak. Often undistinguished commercially from white oak, though of superior durability in contact with the soil.[91] Range from New Brunswick and Nova Scotia through the St. Lawrence River valley in Ontario to southern Manitoba; from Massachusetts and Pennsylvania west to the eastern slope of the Rocky Mountains in Montana, western Nebraska, central Kansas, and southward into central Tennessee, Indian Territory and Texas.

Quercus minor (*Q. obtusiloba* Michaux). Post oak. Sometimes called white oak in Kentucky and Indiana. Range southern Massachusetts and along the New England Coast region to northern Florida, southern Alabama, and Mississippi; west to Missouri, eastern Kansas, Indian Territory and Texas. Sargent says[92] it is "the most common and widely distributed oak of the gulf states west of the Mississippi River, forming the principal growth of the Texas 'cross-bottoms.'"

Quercus virginiana[93] (*Q. virens* Aiton). Live oak. A very strong and durable commercial species[94] largely used in shipbuilding in the days of wooden ships. From Virginia on islands and near the coast to and through southern Florida, and along the Gulf Coast to western Texas; also in lower California, and extending into Mexico, Central America and Cuba. *Q. agrifolia*,[95] north-

[90] "Rarely in Quebec or northern New England, where it is found mixed with the white pine, it is abundant and grows to its largest size in Ontario, frequently forming a considerable part of the forest growth."—Silva VIII, 17. "The most abundant and grows to its greatest height on the western slopes of the Allegheny Mountains in Tennessee and the Carolinas, and on the bottom lands of the lower Ohio basin."—Silva VIII, 18.

[91] "This is one of the largest oaks of North America, rising sometimes to a height of 160 or 170 feet, and forming a trunk six or seven feet in diameter and clear of limbs for seventy or eighty feet above the ground."—Silva VIII, 43. "Common in the lowland forests of the Mississippi basin and in eastern Texas, growing probably to its largest size in southern Indiana and Illinois; it is the common species of the scattered oak forests or 'oak openings' of western Minnesota, where the eastern woodlands are gradually replaced by prairies. . . . It is the most frequent and generally distributed oak of Nebraska. . . . It is the most generally distributed oak of Kansas also."—Silva VIII, 45. "Is one of the most valuable timber trees of North America, its wood being superior in strength even to that of *Q. alba*, with which it is commercially confounded. It is heavy, strong, hard, tough, close grained and very durable in contact with the soil."—Silva VIII, 45.

[92] "A tree rarely 100 feet in height, with a trunk two or three feet in diameter."—Silva VIII, 37. "In the Mississippi basin it is one of the most common oak trees, on dry, gravelly uplands, where it grows to its largest size; it is the most abundant oak of central Texas, being usually found on limestone hills and sandy plains, and toward the western limits of its range in Texas and the Indian Territory it forms with *Q. marilandica* (black jack) an open forest belt, to which the name of 'cross bottoms' was given by the early travelers and settlers." "It is largely used for fuel, fencing and railway ties, and in some states west of the Mississippi River, especially in Texas, in the manufacture of carriages, for cooperage, and in construction."—Silva VIII, 39.

[93] "A tree, forty or fifty feet in height, with a trunk three or four feet in diameter above its swollen or buttressed base."—Silva VIII, 99. "On the Atlantic and east Gulf Coast, where it attains its largest size, the live oak grows on rich hummocks," etc.—Silva VIII, 100.

[94] "*Q. virginiana* is one of the most valuable timber trees of North America. The wood is very heavy, hard, strong, tough and close grained, with a satiny surface susceptible of receiving a beautiful polish, it is rather difficult to work. . . . Formerly it was largely used in shipbuilding, and is still occasionally employed for this purpose."—Silva VIII, 101. Footnote 2 on this page of Silva gives an interesting account of reservations by Congress of live oak timber in 1799, 1817, 1825, and their partial abandonment in 1879 and 1895, though the Florida reservation was still held at the date of the writing.

[95] "This is a low, round topped tree, occasionally eighty or ninety feet in height, with a trunk three or four, or rarely six or seven, feet in diameter."—Silva VIII, 111. "It is very abundant and grows to its largest size in the valleys south of San Francisco Bay. . . . In southwestern California it is the largest and most generally distributed oak tree between the mountains and the sea." "Valued and largely used for fuel, it is little esteemed for other purposes."—Silva VIII, 112.

ern to Lower California, is known as California live oak, but is of little value except for fuel. *Q. chrysolepis*[96] is another Pacific Coast variety.

Quercus rubra.[97] Red oak. In the commercial red oaks are also often included *Q. texana,*[98] Texan oak (formerly classified as a variety of the *rubra* species), northeastern Iowa and central Illinois south through western Kentucky and Tennessee to Florida, and through southern Missouri, Arkansas and Louisiana to western Texas;[99] *Q. digitata*[100] (*Q. falcata* Michaux), or Spanish oak, from southern New Jersey to central Florida and through the gulf states to eastern Texas, Arkansas, southwestern Missouri to middle Tennessee and Kentucky, and southern Illinois and Indiana; and other rarer species. *Q. rubra* ranges from Nova Scotia and southern New Brunswick[101] through Quebec and along the northern shores of Lake Huron; southward to middle Tennessee and Virginia, and along the Appalachian Mountains to northern Georgia; west to eastern Nebraska and central Kansas.

Quercus prinus.[102] Chestnut oak. Used to some extent for lumber purposes,[103] but its chief commercial value lies in its tannin, which is extracted not only from the bark but from the wood itself in the form of cordwood. It is richest in tannin of any of the oaks, a far western variety, the tanbark oak of California (*Q. densiflora*),[104] also having this as its principal use. The range of *Q. prinus* is from southern Maine and eastern Massachusetts to Maryland, and in the mountains of northern Georgia and Alabama; westward from New York to central Kentucky and Tennessee. *Q. velutina*[105] is one of three tannic acid oaks given by Sargent.

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[96] *Q. chrysolepis.* Live oak, hemlock oak, Sargent. Canyon live oak, Sudworth. "This California live oak is usually not more than forty or fifty feet in height, with a short trunk from three to five feet in diameter."—Silva VIII, 105. "More valuable as a timber tree than the other oaks of central California. . . . Although difficult to cut and work, it is used in the manufacture of agricultural implements and wagons."—Silva VIII, 107.

[97] "A tree, usually seventy or eighty feet, or occasionally nearly 150 feet in height, with a trunk three or four feet in diameter."—Silva VIII, 125.

[98] "A tree, occasionally almost two hundred feet in height, with a trunk free from branches for eighty or ninety feet, seven or eight feet in diameter above the much enlarged and strongly buttressed base."—Silva VIII, 129.

[99] "On the low river bottom lands of the Mississippi basin it attains its largest size and is exceedingly common." "Lumbermen and manufacturers consider it more valuable than the eastern red oak, with which it has always been confounded."—Silva VIII, 130.

[100] "A tree, usually seventy or eighty feet tall, with a trunk from two to three feet in diameter."—Silva VIII, 147. "The wood of the upland tree is hard and strong, not durable in contact with the ground, cross grained and liable to check badly in drying. . . . Sometimes used in construction, and largely as fuel."—Silva VIII, 148-9.

[101] "The most boreal of the oak trees of eastern America." "Reaches its largest size in the states north of the Ohio River."—Silva VIII, 127.

[102] "A tree, usually sixty to seventy, or occasionally 100 feet in height, with a trunk three or four, or rarely six or seven, feet in diameter."—Silva VIII, 51.

[103] "It is largely used in fencing, for railway ties and for fuel."—Silva VIII, 52.

[104] "The tanbark oak (of California) is usually seventy or eighty, or sometimes nearly 100 feet in height, and although its trunk generally does not exceed three feet in diameter, individuals with stems double that size occasionally occur."—Silva VIII, 183. "Exceedingly abundant in the humid California coast region north of San Francisco Bay. . . . Of little value for construction, it is largely used as fuel. The bark, which is exceedingly rich in tannin, is largely used for tanning leather, and is preferred for this purpose to that of any other tree in the forests of Pacific North America." "The only American representative of a peculiar group of Asiatic trees in which are combined the characters of the oak and the chestnut, *Q. densiflora* is, from the point of view of botanical geography and botanical archæology, one of the most interesting inhabitants of the forests of the United States."—Silva VIII, 184.

[105] "A tree, often seventy or eighty, and occasionally 150 feet in height, with a trunk three or four feet in diametcr."—Silva VIII, 137. "Grows to its largest size in the basin of the lower Ohio

Ulmus[106] *americana*.[107] White elm; also called American elm and water elm. From southern Newfoundland to north shores of Lake Superior, and to the eastern base of the Rocky Mountains, here extending up to the Saskatchewan River; south to Florida; west to Dakota, western Nebraska, western Kansas, Indian Territory and Texas.

Ulmus racemosa.[108] Cork elm. Known commercially as rock elm. From Quebec through Ontario, and south through northwestern New Hampshire to southern Vermont; westward through northern New York, southern Michigan, and Wisconsin, to northeastern Nebraska, southeastern Missouri, and middle Tennessee.[109] Sargent says, "most abundant and attains its largest size in Ontario and the southern peninsula of Michigan." Now becoming scarce through lumbering.[110]

Magnolia[111] *fœtida*[112] (*M. grandiflora* Linnæus). Magnolia, bull bay or big laurel. A good cabinet and interior finishing wood,[113] but not widely used as yet except for fuel. Coast region of North Carolina to Florida, and westward in the Gulf Coast region to Texas; through western Louisiana to southern Arkansas.

Magnolia acuminata.[114] Cucumber tree, mountain magnolia. Uses much the same as the magnolia. From western New York through southern Ontario to southern Illinois, and south in the Appalachian Mountains to southern Alabama and northeastern Mississippi; central Kentucky and Tennessee, and Arkansas except in the northwestern part.

River. The only species of the red oak group which reaches the south Atlantic and Gulf coasts, where, while not common and never gregarions, it is generally scattered on dry ridges through the Maritime pine belt."—Silva VIII, 138. "The bark is largely nsed in tanning (Trimble, 'The Tannins,' 31, f. 20, 21)."—Silva VIII, 139.

[106] *Ulmus*, "of which fifteen or sixteen species can be distinguished, is widely distribnted throughout the boreal and temperate regions of the northern hemisphere, with the exception of western North America, where no elm tree is found. Reaching in the New World the mountains of southern Mexico, upon which one species occurs, and in the Old World the snbtropical forests of the Sikkim Himalayas, the home of *U. lancifolia*. The forests of eastern North America contain five species; in Europe three species occur. . . . The type is an ancient one, its traces existing in the early Tertiary rocks of Greenland. Before the Glacial period it long inhabited Europe, western Asia and North America, where it abounded on the midcontinental plateau and reached westward to the shores of the Pacific Ocean."—Silva VII, 40, 42.

[107] "A tree sometimes 100 to 120 feet high, with a tall trunk six to eleven feet in diameter."—Silva VII, 43.

[108] "A tree eighty to 100 feet in height, with a trunk occasionally three feet in diameter, which diminishes slowly in thickness, and is often free of branches for sixty feet."—Silva VII, 47. "This name (*U. racemosa*) was nsed . . . in 1800 for a European species of elm, and therefore was not applicable to the American tree, for which the name of *U. thomasi* is proposed."—Silva XIV, 102.

[109] Sargent gives *U. serotina* as a distinct species in his appendix XIV, 41, 42, and credits it with the middle Tennessee distribntion formerly assigned *U. racemosa*.

[110] "The valne of the wood of the rock elm threatens its extinction; the most of the large trees have already been cut in the forests of Canada, New England, New York and Michigan."—Silva VII, 48.

[111] "The genus *Magnolia* is now confined to eastern North America, sonthern Mexico, and eastern and southern Asia. Twenty species are known. Of these, six are North American, with their center of distribntion in the sonthern Allegheny Monntain region; two are Mexican; ten are eastern Asiatic; one is a native of the mountains of Yun-nan, and four are Himalayan."—Silva I, 1.

[112] "A noble tree, . . . sixty to eighty feet in height, with a tall, straight trunk sometimes under favorable conditions four to four and a half feet in diameter." "On the rich high rolling hills of the Mississippi bluffs, this tree reaches its highest development."—Silva I, 3.

[113] "The wood of *M. fœtida* is harder, heavier, and more valuable than that of the other North American magnolias."—Silva I, 4.

[114] "A tall, slender tree, attaining in its native forests a height of sixty to ninety feet, with a trunk three or four feet in diameter." "It flourishes on the lower slopes of mountains, on the rocky banks of streams, and in narrow valleys, reaching its greatest size and abundance in those abont the base of the high mountains of Carolina and Tennessee."—Silva I, 7.

Liriodendron tulipifera.[115] Tulip-tree. Known commercially as yellow poplar, though not a *Populus* and belonging to the *Magnoliaceæ* family instead of the *Salicaceæ*. The only living species of the fossil *Liriodendron* genus,[116] and one of the most valuable[117] of American hardwoods, though occurring in a restricted range and nowhere forming compact bodies of timber, the best timber averaging in large tracts only 1,000 to 3,000 feet board measure to the acre, intermixed with oak and other hardwoods. Range from Rhode Island to southwestern Vermont and west to Lake Michigan; south to Florida, southern Alabama, and Mississippi; west of the Mississippi River in southeastern Missouri and adjacent Arkansas.[118]

Liquidambar[119] *styraciflua.*[120] Sweet gum. Known also as red gum, and in the export markets as satin walnut. A valuable lumber wood, though difficult to season properly. Used as a general building, box and veneer lumber and (especially in Europe) as a furniture and interior finishing wood. From Connecticut to southeastern Missouri and Arkansas; south to Florida and Texas.[121] Sargent says: "Has its greatest development in the bottom lands of the Mississippi basin."

Platanus occidentalis.[122] Sycamore. Sometimes used as a cheap furniture wood, but chiefly for tobacco boxes.[123] Southeastern New Hampshire and southern Maine to northern Vermont and Lake Ontario; west to eastern Nebraska and

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[115] "One of the largest and most beautiful trees of the American forest. The occidental plane and the southern cypress are the only American deciduous trees which grow to a larger size. It sometimes attains, under favorable conditions, a height of 160 to 190 feet, with a straight trunk eight or ten feet in diameter, destitute of branches for eighty or 100 feet from the ground. Individuals 100 or 150 feet tall, with trunks five or six feet in diameter, are still common."—Silva I, 19.

[116] "The genus *Liriodendron*, with a single species, is found in eastern North America and western China. It was represented by several species in the Cretaceous age, when the genus was widely distributed in North America and Europe. It continued to exist during the Tertiary period, with a species, hardly different from the one now living, extending over eastern North America, and Europe as far south as Italy, until the advent of Glacial ice destroyed it in Europe, and restricted its range in America to the shores of the Gulf of Mexico."—Silva I, 17.

[117] "One of the most valuable products of the American forest. Canoes made from it were used by the aborigines when this country was first visited by Europeans, and ever since it has been largely manufactured into lumber used in construction, in the interior finish of houses, in boat building, and for shingles, pumps and woodenware."—Silva I, 18.

[118] Though "yellow poplar" has for years been shipped from a wide extent of territory west of the Mississippi River, including points as far south as northern Louisiana, it is claimed by some careful observers in the lumber trade that no true yellow poplar *(Liriodendron tulipifera)* grows west of the Mississippi and that all such shipments have been of cottonwood *(Populus deltoides)*. However, Sargent and Sudworth agree in the statement that *Liriodendron* is found west of the Mississippi, but so limit its range that the contention noted above is sustained in the main.

[119] *Liquidambar* is now confined to the eastern United States, to central and southern Mexico, Central America, the Orient, and middle and southeastern China; although . . . the immediate ancestor of the existing American species inhabited Alaska, Greenland, and the midcontinental plateau of North America. . . . Three species are distinguished in the genus as it is now usually limited: *L. styraciflua* is American; *L. orientalis* inhabits a few provinces in southwestern Asia Minor; and *L. formosana* is found in China and on the island of Formosa." "All the species produce hard, straight grained, handsome, dark colored wood and valuable balsamic exudations."—Silva V, 7.

[120] "A tree, eighty to 140 feet in height, with a straight trunk four or five feet in diameter."—Silva V, 10.

[121] "It reappears on the mountains of central and southern Mexico and ranges southward to the highlands of Guatemala."—Silva V, 11.

[122] "A tree, occasionally 140 to 170 feet in height, with a trunk sometimes ten or eleven feet in diameter, above its abruptly enlarged base."—Silva VII, 102. *Platanus* has six or seven species, three of them in temperate North America. It flourished in late Cretaceous and Tertiary periods, when it inhabited Greenland and arctic America in a form hardly distinguishable from the existing species of eastern North America and Europe.

[123] "It is largely used and is the preferred material for the boxes in which tobacco is packed, for ox-yokes, and butcher blocks, and for furniture and the interior finish of houses, where its broad, conspicuous, medullary rays and cheerful color make it valuable."—Silva VII, 103.

Kansas; south to northern Florida, central Alabama and Mississippi, and Texas. The only other two sycamores are western varieties: *P. racemosa*, California to Lower California, and *P. wrightii*, southwestern New Mexico, southern Arizona, and Mexico. Neither are recognized commercial woods.

Pyrus[124] *americana*. Mountain ash. Also called rowan in Canada and elsewhere. Of no commercial importance, but one of the most northern deciduous woods. Range from Newfoundland through the upper central part of the Labrador Peninsula to Hudson Bay, west to Reindeer Lake and northern Manitoba; south through Quebec and Ontario, Great Lake region, and high elevations in northeastern United States to eastern Tennessee, Virginia and North Carolina.

Prunus[125] *serotina*.[126] Black cherry. Known commercially as cherry, a valuable cabinet wood, now becoming scarce, and widely imitated in stained birch. From Nova Scotia westward through the Canadian provinces to the Kaministiqua River; south to Florida; west to North Dakota, eastern Nebraska and Kansas, Indian Territory, and eastern Texas; western Texas in the mountains.[127]

Robinia[128] *pseudacacia*. Locust, acacia, yellow locust.

Gleditsia[129] *triacanthos*. Honey-locust, three thorned acacia. Although these two trees do not even belong to the same genus the wood is very similar and has the same commercial uses in both species; a very strong, hard wood, the *Robinia* somewhat the heavier, both very durable in contact with the ground; used to some extent for cabinet woods, turnery, wagon hubs, and locally for construction purposes, but more especially for posts, and now being planted by some railroad companies on an extensive scale (more especially the locust)

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[124] "The genus *Pyrus* is widely and generally distributed through the temperate parts of the northern hemisphere; from thirty to forty species may be distinguished. . . . In North America the genus is represented by seven species, of which five are small trees and two are shrubs of the eastern states."—Silva IV, 68. This genus includes *Pyrus malus*, the apple, supposed to be indigenous in the northwestern Himalayas, and *Pyrus communis*, the pear tree.

[125] "Of the genus *Prunus*, now extended to include the plums, almonds, peaches, apricots and cherries, about 120 species are distinguished. They are generally distributed over the temperate regions of the northern hemisphere. . . . The genus is represented in tropical America by numerous species. . . . It has no representative in . . . the southern countries of South America. In North America the genus is spread from the shores of the Atlantic to those of the Pacific, and from near the northern limits of tree growth, to southern Mexico. The territory of the United States contains at least twenty-five indigenous species, of which fourteen attain arborescent habit, and one is a large and important forest tree."—Silva IV, 8.

[126] "A tree, . . . sometimes attaining a height of 100 feet, with a stout, straight trunk four to five feet in diameter."—Silva IV, 45. "*P. serotina* is one of the most valuable timber trees of the American forests. . . . The wood of no other North American tree is better colored or more valuable for cabinet making and the fine interior finish of houses, and the great demand for it for these purposes has caused a destruction of the largest and best trees in all parts of the country."—Silva IV, 46-7.

[127] Sargent enlarges the range of *P. serotina*, stating it is distributed along the mountain ranges of southern New Mexico and Arizona and on those of Mexico and the Pacific regions of Central America, Colombia and Peru.—(Silva IV, 46.)

[128] "The genus *Robinia* is North American. Four species inhabit the territory of the United States; and two, or possibly more, very imperfectly known, occur in Mexico."—Silva III, 37.

[129] "*Gleditsia* is represented in the flora of eastern America by two species, one of which is the type of the genus."—Silva III, 73. Besides honey-locust and other species is *aquatica*, the water locust. It grows "fifty to sixty feet in height, with a short trunk from two to two and a half feet in diameter, usually dividing a few feet from the ground."—Silva III, 79. Water locust is "found in the coast region of the southern Atlantic states, from South Carolina to Matanzas Inlet in Florida, and in the gulf states from the shores of Tampa Bay to the valley of the Brazos River in Texas; it spreads northward through western Louisiana and southern Arkansas to middle Kentucky and Tennessee, and to southern Illinois and Indiana."—Silva III, 80.

in order to provide future railroad tie material. *R. pseudacacia* ranges in the Appalachian Mountains[130] from Pennsylvania to northern Georgia, and is probably also indigenous in parts of Arkansas and Indian Territory; widely naturalized and escaped from cultivation in many other parts of the country. *G. triacanthos* ranges from the western slopes of the Allegheny Mountains in Pennsylvania to Georgia and west to Texas through the gulf states; and from Pennsylvania west through southern Michigan[131] to eastern Nebraska and Kansas, and Indian Territory; escaped from cultivation in many other sections; "reaching its greatest development in the bottoms of the lower Ohio River basin" (Sargent).

Swietenia[132] *mahogani.*[133] Mahogany. Occurs in the United States only on the Florida Keys, and not in commercial size and quantity there, though it sometimes reaches a diameter of two feet in that locality. Worthy of mention because of its commercial importance as the most valuable wood of the North American tropics.[134]

Ilex[135] *opaca.* American holly. Being the only holly of economic value, it is usually known commercially simply as holly. A valuable cabinet and turnery wood, nearly white in color and turning light brown on exposure. Coast region from Massachusetts to Florida, through the gulf states to eastern Texas, and from southern Indiana south in the Mississippi River valley, "reaching its greatest development in the rich bottoms of southern Arkansas and eastern Texas" (Sargent).

Acer[136] *saccharum (Acer barbatum*[137]*).* Sugar maple. Called also hard or rock maple. The most valuable[138] commercial species, and usually indicated

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[130] "It is most common and attains its best development on the western slopes of the mountains of West Virginia."—Silva III, 40.

[131] "In the valleys of the smaller streams of southern Indiana and Illinois *G. triacanthos* attains its greatest size and majesty. Here individuals may still [1893] be found from 120 to 140 feet in height, with trunks six feet in diameter and free of branches for sixty or seventy feet."—Silva III, 76.

[132] "*Swietenia*, of which three species are recognized, is tropical American and west-tropical African. *S. mahagoni*, the type of the genus and one of the most valuable timber trees known, is distributed from south Florida, the most northern station of the genus, to Mexico, Central America and Peru. *S. humilis*, perhaps a form of the last species, is found on the Pacific Coast of Mexico. *S. angolensis*, a large deciduous tree, inhabits the mountain forests of central Quitta in west-tropical Africa."—Silva I, 99.

[133] "A tree, with a trunk forty or fifty feet in height and six or eight feet in diameter above the swell of the great buttresses which sometimes expand ten or twelve feet from the trunk, and with massive spreading branches." "Grows in Florida on Key Largo and on Elliott's Key. It is found on the Bahama and West India islands; it is widely distributed in tropical Mexico and Central America and occurs in Peru."—Silva I, 100, 101.

[134] "The wood of other trees sometimes appears in commerce under the name of mahogany . . . *Khaya senegalensis*, a large tree of west-tropical Africa, supplies the so-called African mahogany."—Silva I, 101, footnote No. 3.

[135] "About 175 species are now recognized, the headquarters of the genus, as represented by the largest number of species, being in Brazil and Guiana, where sixty-seven are known. The mountain regions of western South America contain at least ten species; seven have been distinguished in southern Mexico and Central America and ten in the West Indies; while in eastern North America there are thirteen or perhaps fourteen species, of which four are small trees."—Silva I, 103-4.

[136] "The genus *Acer* is represented in all the geographico-botanical divisions of the northern hemisphere, but extends south of the Equator only to the mountains of Java. . . . In North America nine species occur; five of these belong to the Atlantic and two to the Pacific region; one is peculiar to the central mountain ranges and one extends across the continent."—Silva II, 79, 80.

[137] Preferred by Sargent.

[138] "A noble tree, 100 or 120 feet high, with a trunk three or four feet in diameter, rising sometimes in the forest to the height of sixty or seventy feet without a branch." "*A. barbatum* is one of the most widely and generally distributed trees of eastern North America." "The wood

where "maple" is specified. "Bird's-eye" and "curly" maple are accidental (not varietal) forms of this species. From southern Newfoundland to Lake of the Woods and Minnesota; south through the northern states, and on the Allegheny Mountains to northern Georgia and western Florida; west to eastern Nebraska, eastern Kansas, and eastern Texas.

Acer saccharinum (*A. dasycarpum* Ehrhart). Silver maple. Usually known commercially as soft maple, and used to some extent for furniture, flooring, etc., as a cheaper substitute for hard maple, being lighter in weight[139] and of inferior wearing quality. From New Brunswick to western Florida; west to southern Ontario, and through Michigan to eastern Dakota, Nebraska, Kansas, and Indian Territory. Widely cultivated elsewhere as a shade tree.

Acer negundo (*Negundo aceroides* Moench). Box elder. Also known as ash-leaved maple, mountain maple, Manitoba maple. Commercially of somewhat limited use for interior finish, woodenware, cooperage and paper pulp. The most northern of the *Acer* genus, extending from Vermont,[140] New York, and eastern Pennsylvania[141] northwestward to Winnipeg, to the eastern base of the Rocky Mountains in British Columbia, and to Montana, Utah, western Texas, New Mexico and eastern Arizona; south in the eastern mountains to Florida.

Acer rubrum. Red maple, swamp maple. A species generally distributed throughout the eastern half of the United States, frequenting, especially, the borders of streams and swamps. Its wood is heavy and close grained, but easily worked and not very strong. It is used in the manufacture of furniture, turnery, for woodenware and for gun stocks. From New Brunswick, Quebec and Ontario (latitude 49 degrees) to Florida; west to Lake of the Woods, eastern Dakota and Nebraska; Indian Territory and eastern Texas.

Tilia[142] *americana*. Basswood. Also known as linden, and locally as linn, lind or lein. A commercially important wood of wide distribution, though the genus is not represented at all on the Pacific Coast. Range, New Brunswick to Virginia and along the Allegheny Mountains to Georgia and Alabama; west in Canada to Lakes Superior and Winnipeg, to the Assiniboine River, and in the United States to the eastern Dakotas, eastern Nebraska, Kansas, Indian Territory and eastern Texas.[143] *T. heterophylla*, or white basswood, is undistin-

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of the sugar maple is more valuable and more generally used than that of any other American maple."—Silva II, 97, 98.

[139] Sargent (Silva, volume II, page 98 and page 104) gives the specific gravity of absolutely dry wood of sugar maple as 0.6912, equivalent to a weight of 43.08 pounds a cubic foot, while the specific gravity of soft maple is 0.5269, equivalent to a weight per cubic foot of 32.84 pounds.

[140] Doctor Bell speaks of Minnesota as being the general eastern limit of this tree, and his timber map does not show its boundary line east of the point where it strikes the western end of Lake Superior.

[141] "I am not certain if this tree is native in Pennsylvania. Around Easton it is spread everywhere over fields from the seeds of trees planted along the streets of the city."—T. C. Porter, quoted by Sargent in Silva XIV, 99.

[142] "The genus *Tilia* is widely distributed in the temperate regions of the northern hemisphere. . . . It is represented in eastern North America by four species, of which one is Mexican."—Silva I, 49.

[143] "*T. americana* is one of the most common trees in the northern forest. It occupied, before the country was generally cleared, large tracts of the richest land to the exclusion of other trees, or often formed two-thirds of the forest growth. . . . It is less common towards the southern and western limits of its range than it is near the northern boundary of the United States; reaching, however, its greatest size on the bottom lands of the streams which flow from the north into the lower Ohio River."—Silva I, 53.

guished commercially within its range, which is from Pennsylvania through the Allegheny Mountains to western and central Florida and Alabama; west to southern Indiana and Illinois, Kentucky and middle Tennessee.

Cornus florida. Flowering dogwood. Known commercially as boxwood. An extremely hard wood of some use in turnery, and for engraving blocks, shuttle blocks and other limited special purposes. From eastern Massachusetts to central Florida, and west through southern Ontario, southern Michigan, to southwestern Missouri, southeastern Kansas,[144] Texas and Mexico. Having its greatest development in the South.

Nyssa[145] *sylvatica.* Black gum. Known also as tupelo, but the tupelo gum of commercial nomenclature is the following species. From Maine to Florida; west to southern Ontario, southern Michigan, southeastern Missouri, and Texas.

Nyssa aquatica[146] (*N. uniflora* Wangenheim). Tupelo gum. Also known commercially, and particularly in the export trade, as bay poplar. Used for wagon hubs, turnery, cooperage, and coming into use as a cheap furniture and interior finish wood. Coast region from southern Virginia to northern Florida, and through the gulf states to Texas; northward through Arkansas, western Tennessee, and Kentucky, southern and southeastern Missouri to southern Illinois.

Diospyros[147] *virginiana.*[148] Persimmon. Of considerable commercial utility for nearly the same purposes as dogwood (except engravers' blocks), and probably used in larger quantity than that wood;[149] preferred for shuttle blocks. Range from Connecticut and southern New York to Florida; from southern Ohio to southern Alabama; west to southwestern Iowa, southern Missouri and eastern Kansas, Indian Territory, and Texas.

Fraxinus[150] *americana.*[151] White ash.[152] From Nova Scotia and Newfoundland

[144] Silva XIV, 101, is authority for including southeastern Kansas.

[145] "*Nyssa* is now confined to the eastern United States, where three species are distinguished, and to southern Asia, where the genus is represented by a single species."—Silva V, 73.

[146] "A tree, eighty to 100 feet in height, with a trunk three or four feet in diameter above the greatly enlarged tapering base."—Silva V, 83. "It is an inhabitant of deep swamps inundated during a part of every year, growing in great numbers with the cypress, the liquidambar, the swamp white oak, the water ash, the scarlet maple, the water locust and the cottonwood. In some parts of the country, especially in the valley of the lower Mississippi River, the tupelo gum is one of the largest and most abundant of the semiaquatic trees. It attains its greatest size in the cypress swamps of western Louisiana and eastern Texas."—Silva V, 84.

[147] *Diospyros.* About 160 species, abounding principally in tropical Asia and Malaysia. Not represented in western North America. Two species in eastern North America. The ebony of commerce, and some other cabinet woods, is furnished by tropical species of this genus.

[148] "A tree, usually thirty to fifty feet in height, with a short trunk rarely more than twelve inches in diameter."—Silva VI, 7.

[149] "It is employed in turnery, for shoe lasts, plane stocks, and many small articles of domestic use; for shuttles it is preferred to other American woods."—Silva VI, 9.

[150] *Fraxinus.* Thirty species, nearly half of which inhabit North America. Found in all parts except the extreme north. The type is an ancient one, and during the Tertiary period inhabited the Arctic Circle, from which it gradually spread southward. Sargent gives *F. quadrangulata*, or blue beech, as "largely used for flooring, and in carriage building, and probably not often distinguished commercially from that of the other species of the northern and middle states."—Silva VI, 36.

[151] "A tree sometimes 128 feet in height, with a tall, massive trunk five or six feet in diameter, although usually much smaller."—Silva VI, 43.

[152] "One of the most valuable timber trees of North America. . . . It is used in immense quantities in the manufacture of agricultural implements, for the handles of tools, in carriage building, and for oars and furniture, and in the interior finish of buildings."—Silva VI, 44, 45.

to Florida; westward to Ontario and northern Minnesota, eastern Nebraska, Kansas, Indian Territory and Texas.

Fraxinus lanceolata[153] (*F. viridis* Michaux). Green ash. Inferior commercially to white ash, though often substituted. From Vermont to northern Florida; westward to the Saskatchewan River, eastern ranges of the Rocky Mountains, and extending into Utah and northern Arizona, and through eastern Texas.

Fraxinus nigra[154] (*F. sambucifolia* Lamarck). Black ash. A coarser wood than white ash, but nearly as largely used for many purposes.[155] From the northern shores of the Gulf of St. Lawrence and Newfoundland to Manitoba, and southward to Delaware, Virginia, southern Illinois, central Missouri, and northwestern Arkansas.

Catalpa[156] *speciosa*.[157] Hardy catalpa. Well adapted for cabinet work and interior finish, but more largely used for posts, railroad ties and for other purposes which bring it in contact with the soil, on account of its remarkable durability in such location,[158] it being preëminent among soft and rapidly growing woods in this respect. It has therefore been planted to some extent by railroad companies to grow for tie and fence post uses. Through southern Illinois and Indiana, western Kentucky and Tennessee, southeastern Missouri and northeastern Arkansas; elsewhere naturalized through cultivation, especially in southeastern Arkansas, western Louisiana, and eastern Texas. Should not be confounded with the common catalpa of dwarf habit widely planted as a shade tree (*C. catalpa*[159]).

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[153] Sargent gives this as a variety of *F. pennsylvanica*.—Silva VI, 50, and footnote No. 4.

[154] "A tree, occasionally eighty or ninety feet in height, with a tall trunk rarely exceeding twenty inches in diameter."—Silva VI, 37.

[155] "It is largely used in the interior finish of houses and cabinet making, and for fences, barrel hoops, and in the making of baskets."—Silva VI, 38.

[156] *Catalpa*. "Is now confined to the eastern United States, the West Indies and China." Seven species, two in North America. Not seriously injured by insects or fungal diseases.—Silva VI, 86.

[157] "A tree, in the forest occasionally 120 feet in height, with a tall, straight trunk rarely four and one-half feet in diameter; usually smaller, though often 100 feet high, and when grown in open places rarely more than fifty feet in height, with a short trunk."—Silva VI, 89.

[158] "It is largely used for railway ties, fence posts and rails, and occasionally for furniture and the interior finish of houses."—Silva VI, 90.

[159] *C. catalpa*. "A tree, rarely sixty feet in height, with a short trunk sometimes three or four feet in diameter." "It is used and highly valued for fence posts, rails and other purposes where durable wood is needed."—Silva VI, 86, 87.

CHAPTER III.

LABRADOR AND NEWFOUNDLAND.

In taking up a discussion of the forest resources and lumber history of British North America it seems wise first to dispose of that comparatively small territory which did not in 1867 enter the Canadian Confederacy and thus become a part of the Dominion of Canada. Newfoundland remained independent, accountable only to the Imperial government and, therefore, with its jurisdictional dependency, the Labrador Coast, will be first considered.

LABRADOR.

A strip of seacoast 1,100 miles in length and, for the most part, consisting of bleak, rocky, forbidding cliffs opposing themselves to the waters of the Atlantic, comprises the present Labrador, under the jurisdiction of Newfoundland. It lies between the parallels of 52 and 61 degrees north latitude (about), and meridians 55 and 65 degrees west longitude from Greenwich, extending from Hudson Strait on the north, in a southeasterly direction to the Strait of Belle Isle on the south, which separates it from Newfoundland. To the southwest is the northeastern extremity of the Province of Quebec and the territory of Ungava, both of which formerly formed a part of Labrador. Previous to 1895 Labrador[1] included all that territory extending from Hudson and James bays and Ontario on the west to the Gulf of St. Lawrence and the Atlantic on the east, the southern boundary being the "Height of Land," but during that year a division was made and the eastern coast strip, comprising about 7,000 square miles, was designated as Labrador, and the region to the west as Ungava, which, being a territory of Canada, will be treated under that head, though often referred to as "the Labrador Peninsula," in accordance with still prevailing habits of thought.

Hundreds of years before the time of Columbus, Labrador is believed to have been visited by Northmen from Greenland and Iceland. In the year 1000 Leif, son of Eric the Red, started out to find an un-

[1] Prior to the creation of the district of Ungava, in 1895, and the limitation of the jurisdiction of Labrador to a coast strip, and prior to an order in council on December 18, 1897, by which the boundaries of Ungava were changed, Labrador had an area estimated at about 420,000 square miles. By the changes referred to, the former area of Labrador was distributed about as follows: Labrador Coast 7,000 square miles, Ungava 355,000 square miles, while the area of Quebec was increased by about 58,000 square miles.

known land, which Biarne Heriulfson, sailing from Iceland to Greenland in 986 and being driven by a storm to the south, said he saw. Leif was successful, spent the winter in this new land, explored it and named different regions he visited Helluland, Markland and Vinland. Some investigators believed Helluland to be identical with Newfoundland, while others believe Helluland to have been Labrador or the north coast of Newfoundland, and Markland, Newfoundland. To just what extent these Norse records are to be credited is doubtful. Much of fiction has doubtless been woven in with the truth, as the records were made two hundred years after the voyages. Certain it is that no definite proof has ever been found of the presence of the Northmen on the American continent.

Labrador has the honor of being the first of the American continent to be reached by an explorer in modern historical times. Nearly fourteen months before Columbus on his third voyage saw the mainland of the new world he had unknowingly brought to light, and over two years before Amerigo Vespucci sailed west of the Canaries, on June 24, 1497, John Cabot discovered the western continent by sighting the dreary cliffs of Labrador. It was probably at about 56 degrees north latitude that he made his discovery. He skirted the coast for many leagues, coming also to the island of Newfoundland.

In 1500 Cortereal, a Portuguese navigator, voyaged to Newfoundand and Labrador, and is said to have given its name, which means "laborers' land," to Labrador. This name is accounted for in another way, also: A whaler by the name of Labrador penetrated the country as far as a bay, which, in honor of him, was called Labrador, though it is now known as Bradore Bay. In time the whole coast was given the whaler's name. Gomez, who sailed from Spain in 1525, while searching all along the coast from the sunny shores of Florida and Cuba to the frozen regions of the north in hope of finding a passage to India, came also to Labrador. But the distinction of being the first to make a landing on Canadian soil is given to Jacques Cartier, who landed at Esquimaux Bay, now called Hamilton Inlet, on June 21, 1534.

The history of the lumber industry of Labrador can be given in a single word, "nil." Comprising, as this country now does, but a narrow strip of sea coast, made up of rocky cliffs and fringed by many stony islands, and having its shores washed by the chilling Arctic current, which gives it an intensely cold and rigorous climate, there is not much chance for the growth of trees. What few there are have a stunted growth and are of practically no commercial value.

An account of the coast of Labrador was found among some papers of Sir Francis Bernard, governor of the province of Massachusetts Bay at the time it was written. The following is taken from this account: "Captain Henry Atkins sailed from Boston in the ship called the *Whale*, on a voyage to Davis Strait in 1729. . . . As Captain Atkins coasted that main, he found the country full of woods, alder, yew, birch and witch-hazel, a light, fine wood for shipbuilding; also fine, large pines for ship-masts, of a much finer grain than in New England, and of course tougher and more durable, though of a slower growth; and no question but naval stores may be produced here."

If, as the account says, this is a description of the coast of Labrador, it is very different from a true representation of that region today, and it seems from present indications that this must be a description of another coast passed by Captain Atkins on his journey north.

Practically the only industry of Labrador is its fisheries. During the fishing season thousands of fishermen from Canada, the United States and Newfoundland flock to the Labrador coast. The shore itself is adapted to this pursuit, as it is indented along its entire length by deep fiords and inlets. Cod, herring, salmon and seal are the principal fisheries.

NEWFOUNDLAND.

Newfoundland with its dependency, Labrador, constitutes one of the oldest colonies of Great Britain. This may be due to the fact that it is the nearest of any point in the western hemisphere to Europe. In size it is the tenth largest island in the world and contains 42,734 square miles, having an area approximating that of the State of New York. It lies at the entrance to the Gulf of St. Lawrence, in the Atlantic Ocean, between the parallels of 46 degrees 37 minutes and 51 degrees 39 minutes north latitude, and in longitude west from Greenwich between 52 degrees 35 minutes and 59 degrees 25 minutes.

Lying, as it does, so near Labrador, from the southern point of which it is separated, at its northern extremity, by the Strait of Belle Isle, ten miles in width, it is not strange that the dates of its early discoveries and explorations are almost identical with those of Labrador. Newfoundland, like Labrador, is supposed to have been visited by the Northmen in the year 1000, and is thought by some to be the Helluland of Leif. In 1497 John Cabot discovered Newfoundland after touching the Labrador coast to the north. In 1500 Gaspar Cortereal, perhaps using Cabot's charts as a guide, struck the coast of Newfoundland at a

point north of Cape Race, on the southeastern coast. For a number of years after Cortereal's voyage the English continued sending ships to the island, chiefly for the purpose of fisheries. The Portuguese also established fisheries at about the same time. In 1524 Verrazano, in the interest of France, coasted from North Carolina to Newfoundland. In 1525 Gomez, sailing from Spain, reached Cape Race. Jacques Cartier in May, 1534, touched Cape Bonavista, in latitude 46 degrees north, but, finding the land still covered with snow and the shore icebound, he dared not attempt landing.

Several unsuccessful attempts at colonization were made by England, the first being in 1583. Lord Baltimore, who afterward figured in the history of Maryland, was at last successful in planting a colony on the eastern coast about forty miles north of Cape Race in the year 1623. Immigrants came later from Ireland, and colonies prospered, until by 1655 Newfoundland contained a population of about 2,000, distributed in fifteen small settlements along the east coast. These settlements were made up of fishermen of different nationalities, the French being especially active and having established several colonies. France desired possession of the whole island, but by the treaty of Utrecht, in 1713, Newfoundland and its dependencies were declared to be the possessions of Great Britain. Fishing rights were, however, reserved to the French, which rights have been a matter of dispute ever since.

Newfoundland has never joined the Canadian Confederacy, and though attempts have been made repeatedly toward that end it still remains an independent colony of Great Britain.

The coast of Newfoundland is rugged and rocky, and deeply cut by numerous fiords and bays, which furnish a great number of good harbors. The coast is practically treeless, but the interior of the island contains valuable forests, especially in the regions of the rivers. The interior is an undulating plateau traversed by ranges of low hills. Near the western coast is the principal mountain range, known as Long Range, which extends nearly the entire length of the island, reaching far into the northwestern part, which is a long peninsula stretching in a northeasterly direction past the Strait of Belle Isle. This peninsula is believed to be barren for the most part and undesirable for settlement. Newfoundland contains a remarkably large number of lakes and rivers. Most of the larger rivers have their source in the lakes in the interior, taking their courses through many fertile valleys in all di-

rections to the ocean. This interior region has not yet been thoroughly explored, and it was not until later than 1880, when railroad construction was begun, that much was known of its physical characteristics. The largest river is the Exploits, which rises in the southwestern part of the island, flows in a northeastern direction, expands near the central part into the Red Indian Lake, and empties into the Bay of Exploits, an inlet from Notre Dame Bay. This river drains an area of between 3,000 and 4,000 square miles, many parts of the valley through which it flows containing forests of fine pine timber. The largest lake of Newfoundland is Grand Lake, about fifty-six miles long and five miles broad; the next in size is Red Indian Lake, nearly thirty-seven miles long and five or six miles in width.

While the east coast of Newfoundland is practically treeless the interior is well wooded. The following is a list of the principal trees found on the island, given in order, beginning with the one covering the least area, or, in other words, the one whose northern limit is the farthest south:

Sugar maple *(Acer saccharum)*.—Of very limited area. Found on the northern and eastern shores of St. George's Bay, which is on the west coast just north of the southwestern point of the island.

White elm *(Ulmus americana)*.—Found on St. George's Bay and on the peninsula stretching to the southwest of the bay, as far as Cape Ray, the extreme southwestern point of Newfoundland.

Black ash *(Fraxinus nigra* or *F. sambucifolia)*.—Grows over the entire Southwestern Peninsula and to the eastward along the southern shore of Newfoundland.

Yellow birch *(Betula lutea)*.—Grows in the central and southern part of the island, covering about seventy-five percent of the whole area.

White and red pine *(Pinus strobus* and *P. resinosa)*.—Occupy about eighty-five percent of the entire area, being found in all parts except the Northern Peninsula and the northeast coast region.

Balsam fir *(Abies balsamea)*.—Found in all parts of the island except the northern half of the Northern Peninsula.

Paper birch *(Betula papyrifera)*, aspen *(Populus tremuloides)*, balsam poplar *(Populus balsamifera)*, commonly known as balm of Gilead, and larch *(Larix laricina* or *L. americana)*, commonly called tamarack, are found in all parts of Newfoundland except the northern part of the Northern Peninsula, the limit of each one extending slightly farther to the north than the preceding one.

Black spruce and white spruce (*Picea mariana* or *P. nigra*, and *P. canadensis* or *P. alba*).—Found over the entire island except the northeastern extremity of the Northern Peninsula.

It is only recently that the immense timber resources of the forests of the interior of Newfoundland have been made available, owing to the want of means of communication. The island is but sparsely settled, the inhabitants being mainly confined to the neighborhood of the coast, where, until recently, they were engaged almost exclusively in the fisheries. Persons to whose interest it was to keep the inhabitants at the fisheries, represented the interior as a barren waste; however, the exact opposite has been proved to be the truth. The lumber industry has been on a small scale until a few years ago, when it began to develop rapidly owing to the stimulus of railway construction, which opened up some of the best lumbering districts in the interior. The Newfoundland railway, which traverses the entire island from St. John's, on the Southeastern Peninsula, to Port-aux-Basques, in the southwestern extremity, a distance of 548 miles, was opened for traffic over its entire length in 1898. Sections of it had been in operation for some years before that time, which had done a good deal to develop the lumber trade.

Newfoundland contains large tracts of pine, besides great areas of spruce suitable for pulpwood, and fir which is as tough as spruce and has been found by exhaustive tests to make almost as good pulp. The utilization of fir greatly increases the quantity of timber available for pulp purposes. The principal lumbering districts are the Gander, Gambo and Exploits valleys, and on the west coast the Humber valley and St. George's Bay district.

The "History of Newfoundland," by D. W. Prowse, published in 1895, contains the following reference to the progress of the lumbering industry as the result of railway construction:

> Although only in operation for one season the northern railway has developed splendid granite quarries and a lumber business which bids fair to be one of the greatest industries of the colony, already consisting of several great mills besides smaller operators and hand loggers whose united turn-out this year [1893] will not be less than 20,000,000 feet of lumber. Botwoodville, owned by the Exploits Lumber Company, of London, will cut 6,000,000 feet of lumber; the Benton mill at Soulis Brook, owned by Mr. Reid, another 6,000,000; the Campbell mill at Terra Nova River, 3,000,000; Sterritt's mill at Gander Crossing, Glenwood, about 1,000,000. At Gambo there are the five mills of Messrs. John Murphy and Osmond; at Gander Arm, Philips' mill, with unrivaled facilities for collecting and shipping; Arthur's mill, and some smaller establishments. The whole cut of timber for the season of 1893 may be safely estimated at 20,000,000 feet, which, at the low average price of $15 a thousand feet, amounts to $300,000.

American capital is transforming the lumber business of Newfoundland. A corporation, The Timber Estates Company, headed by H. M. Whitney, of Boston, Massachusetts, acquired several of the largest properties in the island and in 1904 operated them on a scale unequaled before. George J. Barker, of Boston, acquired another large grant and developed it extensively, and an American syndicate in 1904 began negotiating for tracts on the west coast for charcoal manufacture as well as lumbering operations.

One of the largest operators on the island until he sold to The Timber Estates Company in 1903, was Lewis Miller, a Scotchman, who for a quarter of a century was engaged in lumbering operations in Sweden. Owing to the exhaustion of the supply which he controlled there, he removed his plant to Newfoundland about 1900, erected three large sawmills, built twenty-five miles of branch railway and sidings and constructed the largest lumber wharf in the colony at Lewisport, on Notre Dame Bay, on the east coast. His output of lumber was handled over fifty to seventy-five miles of the Newfoundland railway to this wharf. The product of his mills was principally spruce, but included a quantity of white pine and tamarack. The largest of these sawmills, located on Red Indian Lake and reached by a branch line, twenty-one miles in length, connecting with the Newfoundland railway, employed over three hundred people day and night. It is estimated that the limits which he owned, provided that they escape devastation by forest fires, will yield a yearly cut of 40,000,000 feet for the next fifty years.

Latterly Newfoundland has attracted numerous lumbermen who formerly operated in Nova Scotia, but who have been compelled to abandon or limit their business there on account of the depletion of their limits. Another factor which tends to the growth of the industry in this colony is the great advantage which it possesses over the Maritime Provinces of the Dominion in point of nearness to the European markets, the distance being much shorter than that from the most eastern ports of the mainland.

The enormous pulpwood resources of the island are attracting much attention from British manufacturers, owing to the increasing difficulty experienced by English newspaper proprietors in securing adequate supplies of paper. Alfred Harmsworth & Bros., publishers of the *Daily Mail* and other journals in London, have secured from the Newfoundland Timber Estates Company, for the sum of $500,000, the pulp concession on 2,000 square miles of timber in the interior, for the establishment of a large pulp and paper-making plant.

Accurate information as to the extent of the lumbering industry of Newfoundland is afforded by the census of 1901, according to which there were, in the year previous, 195 sawmills, valued at $292,790, for the supply of which 1,616,449 logs were cut, the output being 43,648,000 superficial feet of sawn lumber, of the value of $480,555, and 16,197,000 shingles. The number of men employed was 1,408 in logging and 2,408 in the mills.

A comparison with the corresponding figures of the census of 1891 shows the rapid development of the industry during the decade and indicates that in all probability there has been an equal rate of increase during the last few years. In 1890 (census of 1891) the number of sawmills reported was fifty-three, valued at $178,510; number of logs cut, 415,600; output, 13,682,000 superficial feet of sawn lumber, valued at $299,634, and 6,275,000 shingles; number of lumberers employed, 625; number employed in mills, 807.[2]

The cut of lumber in 1904 was by far the largest in the lumber history of Newfoundland, being double that of the preceding year, and was divided among the different mills as follows: Newfoundland Timber Estates, Limited, 40,000,000 feet; New Lands Lumber & Pulp Company, 7,000,000; Botwoodville Mills, 10,000,000; Union Lumber Company, 10,000,000; Grand Pond and Deer Lake, 3,000,000; small mills, west coast, 2,500,000; small mills of White Bay, Notre Dame Bay, Bonavista Bay, Trinity Bay, Conception Bay and southwest coast, 3,500,000; total, 76,000,000 feet. Of this amount 35,000,000 feet was exported, Great Britain being the chief market for it, some going to South America, and the remainder used for local demands. As short a time as fifteen years ago, most of the lumber used in Newfoundland was imported from Nova Scotia and other Canadian provinces, while now enough is manufactured within its own boundaries not only to supply the home demand but also to ship millions of feet to foreign countries.

CROWN LANDS TIMBER REGULATIONS.

Until a comparatively recent date no government dues were exacted from those engaging in lumbering. Subsequently a ground tax of $2 a square mile was imposed with Crown dues of fifty cents a thousand feet on the cut, coupled with the condition that the purchasers of limits

[2] These statistics include Labrador (as that territory is under the government of Newfoundland), which at that time comprised what is now the territory of Ungava as well as the present Labrador, the division not having been made until 1895; but the lumber industry in that quarter was and is even yet very limited in extent.

must put up a mill and begin manufacturing within one year. In 1903 amendments were adopted making the regulations considerably more stringent. Under the law, as it now stands, timber licenses are issued at a bonus of so much a square mile, the amount being fixed according to location and value, but in no case to be less than $2. In addition, an annual ground rent of $2 a square mile is charged, together with a royalty of fifty cents a thousand feet board measure on all trees cut—except in Labrador, where the royalty is fixed at twenty-five cents a thousand. The licensee is bound to erect a sawmill of a capacity of 1,000 feet a day for every five square miles in his limit, or, as an alternative, to establish such manufactory of wood goods as may be considered an equivalent. The license may be granted for fifty years or for a longer period if deemed necessary. The licensee is bound to take from every tree cut all the timber fit for use and manufacture the same into sawn lumber or other salable products, to prevent all unnecessary destruction of growing timber and to exercise strict supervision to prevent fires.

Licenses to cut timber for pulp and paper manufacture may be granted for ninety-nine years or longer for areas of not less than five or more than one hundred and fifty square miles, at a charge of $5 a mile and subsequent payments of $3 a mile a year. The licensee must spend $20,000 in the erection of buildings and machinery. No holder of either a timber or pulp license is allowed to remove for exportation any unmanufactured logs or timber.

Every indication points to a very extensive development of the lumbering and pulp-making industries of Newfoundland in the near future, as, in addition to abundance of the raw material, the island possesses unrivaled water power, cheaper labor than is obtainable elsewhere in North America and a shorter sea voyage to the principal markets than any rival. The principal danger to be feared is that of the destruction of her forests by fire as the country is opened up. It is estimated that the loss in 1904 from this source amounted to about $20,000,000. Unless some better means of meeting this cause of annual loss be adopted than those now in force, it is certain to prove a serious drawback to the anticipated prosperity of the trade.

Forest fires were not unknown in this colony as early as 1818, as the following account of the voyage of H. M. S. *Rosamond* in that year to Newfoundland and the southern coast of Labrador, given by Edward Chappelle, will show:

"On the third day after our arrival one of our seamen, while employed in felling timber for the ship's use, was so imprudent as to kindle a fire in the forest, in the hope that, by the smoke, he would probably rid himself and his companions of the innumerable myriads of mosquitoes, which tormented them almost to madness. This scheme succeeded to their utmost wish, and they were rejoicing at their deliverance, when, in an instant, the whole country appeared enveloped in fire! A high wind drove the flames from tree to tree with the rapidity of lightning; and had it not been for the intervention of the river, the whole of the forest must have been inevitably reduced to ashes. . . . The rapidity with which the flames spread in the forests of these countries has been noticed by many early writers."

CHAPTER IV.

CANADA—ITS COMMERCIAL FORESTS.

Before taking up in detail the provinces and territories constituting the Dominion of Canada, it is well to review briefly the extent and location of the commercial forests of that country and to discuss various matters concerning the lumber interests of the Dominion as a whole.

The commercial forests of Canada are divided into two great sections—the eastern and the western. The western, which is included in the Rocky Mountain region and on the Pacific slope, will be reserved for detailed treatment in connection with the history of the lumber industry of the Pacific Coast of the United States, with which it is so closely connected and which have been developed together.

These western forests of commercial importance are practically all contained within the Province of British Columbia, the outlying woodlands and forests east and north of the Province being comparatively unimportant. The coast region of British Columbia, however, including Vancouver and other islands, is wonderfully rich in timber resources, probably being excelled in this respect by no section of similar size in the world.

British Columbia includes nearly all the Pacific Coast species particularly treated in the previous chapter. The leading woods are red fir *(Pseudotsuga taxifolia)*, giant arborvitæ, or red cedar, western hemlock, bull pine *(Pinus ponderosa)*, Engelmann spruce, tideland spruce, white pine *(Pinus monticola)*, lowland fir *(Abies grandis)*, etc. Between the western and eastern timber regions is the plains country of Alberta, Saskatchewan, etc., which is either open prairie, or a country of scattered groves and trees, or, in the north, a practically continuous forest of subarctic species and characteristics.

The timbered region of eastern Canada stretches in a continuous body from Manitoba east to the Atlantic, and north to Hudson Bay and the northern treeline described in Chapter II. As has before been remarked, there is no dividing line in tree growth between Canada and the United States corresponding to the international boundary, and in all the territory in which grow the commercial forests of Canada, and especially those suited for lumber purposes, the species represented all

exist south of the boundary line and, conversely, all, or practically all, of the commercial timbers of the northern United States are represented in the flora of Canada.

If this timber were equal in its quality to the area it covers and to its quantity, it would constitute one of the greatest forests on the globe; but as it is, with much of it dwarfed by climate and perhaps to some extent by inhospitable soil, it has an enormous quantity of merchantable timber. The most valuable part of these forests consists of white pine *(Pinus strobus)*, red or norway pine *(Pinus resinosa)* and spruce.

Formerly there was an almost solid forest of hardwoods in southern Ontario, in that peninsula bounded by Lake Erie, Lake Huron and Georgian Bay and extending along the northern shores of Lake Ontario, but as these hardwood lands were particularly attractive to the farmer, they have been largely cleared and the result is an agricultural section seldom excelled in its productiveness and beauty. In these early years of the Twentieth Century, therefore, the hardwood resources and production of the Dominion are comparatively insignificant, though there is a considerable quantity of oak, maple, elm, ash, etc., yet remaining. There is still a sufficient supply to meet most of the domestic requirements, though for some of the more exacting classes of industries hardwoods are imported from the United States. Canada formerly exported hardwoods in considerable quantities, but the magnitude of that business has been much reduced.

The Height of Land, which is the dividing ridge or boundary line between the waters which flow into Hudson Bay or into the Atlantic north of the Strait of Belle Isle, and those which by the Great Lakes find their way through the St. Lawrence to the ocean, marks a somewhat clearly defined northern boundary of the most valuable soft woods. South of that line are found white and red pine, hemlock, tamarack, spruce, etc., of sizes which fit them for sawmill use. North of that line white and norway pine practically disappear and other species decrease in size as one goes north until, of commercial woods, spruce of diminished size is left standing in a continuous forest, extending to Hudson Bay—that great inland sea, which has been the dream of navigators, but which is not likely ever to assume large commercial importance—and to the northern treeline of the continent.

The basis of value of the present forests is the white pine, and it is, perhaps, worthy of note that the center of timber value is found in a latitude corresponding somewhat closely to the best growth of white

pine in the United States, which was in the lower peninsula of Michigan and in Wisconsin. Within the rough triangle bounded by the Ottawa River on the northeast, Georgian Bay and Lake Huron on the west and Lake Erie and Lake Ontario on the south, grow the finest forests of the Dominion. The pines in former years used to reach well down toward Lake Erie, but they have largely been cut away from that section, as the hardwoods were at a later date. Now this forest of especial value is restricted to the northern portion of this territory, reaching north to Lake Nipissing and the Ottawa River, and beyond.

As one goes in any direction from this favored district, the forests change in character and decrease in value. Going east from the Ottawa River the woodsman finds a decrease in the amount of pine and an increase in the amount of spruce, until below the City of Quebec the vast bulk of it is of the latter species. Perhaps the best spruce of the Dominion is found between the St. Lawrence River and the United States boundary, but there is also much fine log spruce north of the river, though as one goes north it decreases in size. Going north, northwest and west from the Georgian Bay district white and red pine constitute the bulk of the forests all the way to Manitoba, except through a district north of Lake Superior, where they are replaced largely by banksian or jack pine and other inferior timbers, but nowhere do they show such high quality as in the Georgian Bay and Ottawa River districts.

Spruce is the prevailing timber north of the Height of Land and grows in substantially solid forests. It is not, however, in that part of the Dominion, of log size to any great extent, but, nevertheless, constitutes a magnificent supply of pulpwood whose quantity can only be guessed at, but which will probably be sufficient to supply the needs of the world for generations. Comparatively little of that territory has been surveyed and much of it is totally unexplored. Even the latest maps of Ontario, issued by the Crown Lands Department of the Province, represent the course of streams by dotted lines only, indicating that their exact course is a matter of conjecture. While both pine and spruce were found in the original forests of both Ontario and Quebec, Ontario was, emphatically, the pine province and Quebec the spruce province. It is a matter of some dispute as to which of the two has the larger amount of spruce, but there is no question that the Quebec spruce forest is superior in the quality and availability of its spruce supply and particularly in the proportion of it that is of sawlog size.

The Maritime Provinces were originally heavily timbered, with, perhaps, the most dense forests in Nova Scotia.

The present condition of the individual timber resources of the provinces will be treated in connection with the lumber history of each of them, and it is enough to say here that the entire area of Canada south of the Height of Land from the Atlantic to Manitoba was originally covered with commercial lumber timber.

An outline definition of the leading lumber districts of the Dominion of Canada, is as follows: The Nova Scotia district, of which Halifax is the commercial, though not manufacturing, lumber center; the St. John River district, in New Brunswick, of which the center is the City of St. John; the Miramichi district, of eastern New Brunswick, of which Chatham is the center; the Chaleur Bay district, of northern New Brunswick and southeastern Quebec, of which Bathurst, Dalhousie and other points are centers; on the St. Lawrence River, the Quebec district, of which the City of Quebec is the commercial center; the Ottawa River district, of which Ottawa, with its environs, is the chief manufacturing center and Montreal the chief center from the standpoint of export trade; the Georgian Bay district, which includes all the territory draining into Georgian Bay, with many milling points, but its commercial interests most definitely centering at Toronto, and what may be called the western Ontario district, lying to the northwest of Lake Superior, having as manufacturing and commercial centers such points as Port Arthur and Pigeon River.

The commercial forests of Canada have been and are so located that they have been singularly independent, either from a logging standpoint or for marketing their product, of railroads. Indeed, it was not until the construction of the Canadian Pacific Railway that the railroad was to any important extent a primary means of marketing the product of Canadian mills; and even today its use is practically confined to the western provinces and territories. The great St. Lawrence water system, reaching from the head of Lake Superior to the Atlantic, with the never-failing streams flowing into it from the north, gives an adequate outlet for the timber and lumber production of Quebec and Ontario, while the Maritime Provinces, with their deeply indented coasts, find marine transportation sufficient.

British North America advanced much more rapidly in respect to the exportation of forest products than did the United States. There were two reasons for this: One was that the forests north of the

United States were, relative to population and domestic requirements, much more important than those of the United States; and, the second, that the ample system of waterways connecting with the Atlantic naturally led Canada to look abroad for its markets, especially as, until within the last fifty years, the market in the United States was almost completely supplied from domestic sources. Indeed, up to the time of the construction of the Champlain Canal, connecting Lake Champlain with the Hudson River, which was completed in 1822, and of the Oswego Canal, connecting Lake Ontario at Oswego with the Erie Canal at Syracuse, N. Y., completed in 1828, timber grown on the St. Lawrence watershed of New York, Vermont and New Hampshire, largely went to Montreal or Quebec and thence abroad.

Not only can the forests of Canada be logged by water, and its mills be located at the mouths of logging streams on deep water, but also the chief markets of the Dominion, in all that territory from the head of Lake Superior to the Atlantic, can be reached by water. Hence it is that Canada, at the time of this publication, was still pursuing methods of logging and of lumber transportation that largely obtained in the United States until twenty-five years ago, when the development of lumbering operations away from the water courses gradually brought about an increased use of the railroad in that country. British Columbia also is, to a considerable extent, served in its lumber interests by waterways; but there is a vast extent of rapidly developing country lying between Lake Superior and the Rocky Mountains and reaching from the national boundary north to the Peace River, that is dependent upon the railroads for its supply of building material, which must be furnished from the forests of western Ontario or from British Columbia, or to a certain extent from the smaller sized, but still available, timber north of Manitoba.

The following table gives the names of the several provinces and territories of the Dominion, the dates of their creation or admission into the confederation, their land area and total area, and the estimated area remaining afforested in 1904. All the columns relating to areas show variations from other tables, differences in forested areas being due to different estimates, while in the other columns the figures are changed[1] from time to time as the boundaries of the provinces and ter-

[1] This list of provinces and territories was radically changed by an act of Parliament taking effect Sept. 1, 1905. That part of the Northwestern Territories lying west of the 110th meridian west of Greenwich (the fourth principal meridian of the Dominion system of land surveys), east of British Columbia and south of Mackenzie was made the new Province of Alberta, with an area of

ritories are changed or defined, and as the surveys become more accurate:

AREA OF FORESTS IN CANADA.

Name.	Date of Organization or Creation.	Area in Square Miles.		
		Total Area.	Land Area.	Forest Area.
PROVINCES.				
Ontario	July 1, 1867	260,862	220,508	82,528
Quebec	July 1, 1867	351,873	341,756	225,552
Nova Scotia	July 1, 1867	21,428	21,068	16,958
New Brunswick	July 1, 1867	27,985	27,911	17,538
Manitoba	July 15, 1870	73,732	64,327	25,626
British Columbia	July 20, 1871	372,630	370,191	285,554
Prince Edward Island	July 1, 1873	2,184	2,184	797
DISTRICTS.				
Keewatin	Apr. 12, 1876	470,416	456,997	
Assiniboia	May 17, 1882	88,879	88,279	
Saskatchewan	May 17, 1882	107,618	103,846	
Alberta	May 17, 1882	101,883	101,521	
Athabaska	May 17, 1882	251,965	243,160	696,952
Franklin	Oct. 2, 1895	*500,000	*500,000	
Mackenzie	Oct. 2, 1895	562,182	532,634	
Ungava	Oct. 2, 1895	354,961	349,109	
Yukon	June 13, 1898	196,976	196,327	
		3,745,574	3,618,818	1,351,505

*Estimated.

An outline sketch of the Canadian provinces and territories, with the distribution of timber in each, compiled from Canadian official sources, is as follows:

DISTRIBUTION OF CANADIAN WOODS BY PROVINCES.

Nova Scotia, which embraces 21,068 square miles of land, and New Brunswick, with 27,911 square miles, have large areas of spruce, hemlock, larch, pine, oak, elm, maple, beech and birch. Lumber makes up about two-thirds of their total exports.

Prince Edward Island, lying between the two, is about 150 miles long and much indented by bays. It has an area of 2,184 square miles. Agriculture has progressed in this Province and the remaining timber is chiefly confined to the northern end of the island, where there are small lumbering operations. The woods are the white and the black spruce, larch, elm and oak.

Quebec embraces a land area of 341,756 square miles. The forest

253,500 square miles and an estimated population of 250,000. The part lying between the 110th meridian and Manitoba and south of Mackenzie was made the new Province of Saskatchewan, with 251,100 square miles of area and an estimated population of 250,000. This division, however, left out a strip along the eastern end of Athabaska, exactly one degree of longitude in width, and clipped off the irregular eastern end of the old Province of Saskatchewan, no provision having been (in May, 1905) made for these two excluded areas, though doubtless they were to be added to the governments to the east by later enactment. The eastern boundary line of the new Province of Saskatchewan is therefore the western boundary line of Manitoba as far as that extends, beginning at about longitude 101 degrees 20 minutes on the international boundary and running due north, with an offset westward on each survey correction line. This holds true in the new extension of the boundary northward from the northwestern corner of Manitoba, until at about latitude 55 degrees 40 minutes these offsets bring the line in coincidence with the 102nd meridian and that becomes the boundary line for the remainder of the distance. The provisional capital of Alberta is Edmonton, and that of Saskatchewan is Regina.

lands are of great magnitude and include most of the staple woods common to the eastern and central states.

Ontario has a land area of 220,508 square miles and a water area of 40,354 square miles. There are large areas of forest.

Manitoba includes 73,732 square miles, of which 64,327 are land. The principal timber is poplar, with some white elm, green ash, box elder and mossycup oak, the latter forming a scrub growth in most parts of the Province. White spruce is also found over a limited area. The trees in the northern part of Manitoba are large enough to be merchantable.

The Northwestern Territories, which adjoin Manitoba, in many respects resemble that Province. They consist of four provincial districts: Assiniboia, with a total area of 88,879 square miles, Saskatchewan, embracing 107,618 square miles, Athabaska, with 251,965 square miles and Alberta with 101,883 square miles. The greater part of the southern portion, from the United States boundary for about two hundred miles north, is flat or rolling prairie, a large part being treeless.

The Province of British Columbia is heavily timbered and contains 372,630 square miles. The heaviest timber growth is found west of the coast range, and embraces an area of 100 to 150 miles wide and 700 miles long. There is little hardwood of any sort.

An interesting review of the lumber resources and situation of Canada was made some years ago by Mr. E. Stewart, Superintendent of Forestry of the Dominion of Canada. It is particularly of value as showing in a graphic way the important place which spruce holds and will continue to hold in the timber resources of the Dominion. While the policy of the Dominion, as expressed in its forest reserves and its method of leasing timber limits, whereby the title to the land is retained by the Government and cutting is done under restrictions, will undoubtedly prolong the productive life of the pine forests and perhaps enable them to contribute in perpetuity to the welfare of the nation, it is spruce which, to the greatest extent, will supply the demand for forest products and under intelligent direction will never be exhausted. Mr. Stewart said in part:

"Though we have lost vast quantities of timber by fire, still Canada undoubtedly stands at the head of those countries from which a future supply may be expected. It is true that our virgin white pine can not last very many years longer, but we have other varieties of great value. In British Columbia we have the Douglas fir, the cedar, the western

white pine, and a hemlock very much superior to our eastern hemlock, but above all we have the spruce, the most widely distributed of all our forest trees. If we visit the mills of the Maritime Provinces we find them cutting that timber for export to Europe, and so fast is its natural reproduction in the moist climate of the coast that the same territory can in the ordinary way of lumbering be recut about every twenty years.

"Starting west from the Atlantic in Nova Scotia we find the white and black spruce in all the older provinces and in all the districts of our Northwest Territories, while in the interior of British Columbia another variety, the Engelmann spruce, a very useful tree, is found in great abundance, and west of this and extending to the coast, the giant of this species is found in the Menzies or Sitka spruce,[2] which almost rivals in size and utility the giant Douglas fir of the same district.

"Not only is the range of the different varieties of the spruce bounded only by the Atlantic and Pacific on the east and west, but it also extends over more degrees of latitude than any other of our native trees, reaching practically across the whole country from its southern boundary up to the limit of tree growth, in some places extending beyond the Arctic Circle. It must not be inferred that the whole of this vast area is covered with merchantable timber, but on the other hand there can be no question that this country possesses an immense quantity of spruce timber which probably no other country can equal. A very large portion of it is growing on land which, from its rough character and also from its severe climate, is unsuited for the growth of agricultural products and should be kept permanently for the production of timber.

"In addition to the utility of spruce for lumber it is of all varieties the one best adapted for pulp, an article which is now being applied to such a variety of purposes that the demand for pulpwood is enormously increasing every year, and there seems little question that this industry is only in its infancy and that our northern forest regions with the unlimited water power they possess will in the not distant future be the home of important and lasting industries."

It would be interesting to know what the forest area of Canada means as to total present supply of commercial timber and the annual product which, under favorable conditions and intelligent management,

[2] The *Picea sitchensis*, known not only as above, but also as the tideland spruce. This is the spruce whose manufacture has been most actively prosecuted on Grays Harbor, Washington, a tidal bay on the Pacific Coast of the State.

might be expected for the future. Unfortunately, no estimate has been made, nor is likely soon to be made, as to these points that is more than guesswork.

According to the next preceding table, the forest area of Canada, not including Newfoundland and the Labrador Coast, is 1,351,505 square miles, equivalent to about 865,000,000 acres. Such an area, reasonably well covered with forest, has, in any event, enormous possibilities. If it should be admitted that it will average only 1,000 feet an acre of sawmill timber, the total quantity would be 865,000,000,000 feet. If the long period of 100 years were allowed for cutting this quantity for reproduction, we would have an annual production of 8,650,000,000 feet, or about one-quarter the present output of lumber and timber of the United States and a quantity about fifty percent greater than the output of Canadian mills and of hewn timber in its various forms. But if the period of cutting should be limited to fifty years, as, under intelligent forestry management it could be, the product would be increased to 17,300,000,000 feet annually without deterioration or diminution of the stand. If the estimate should be 2,000 feet of sawmill timber to the acre, the maximum product on the basis of fifty years' cutting would be nearly 35,000,000,000 feet annually, or more than is now produced by the United States.

Looking at the matter in another way, ignoring the territories, if there be taken the reported forested areas of Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia, there would be found a total area of forests of 654,553 square miles, or 418,914,000 acres. An estimate of 2,500 feet per acre of commercial timber would give a total of 1,047,285,000,000 feet, which, on the basis of 100 years' cutting, is equivalent to the product of 10,472,850,000 feet annually, or, on the basis of fifty years' cutting, would provide over 20,000,000,000 feet annually.

These speculations are extremely general, but they serve the purpose of pointing out the fact that Canada is enormously rich in timber resources and that the possibilities of long continued production are almost incalculable. To the estimates of sawmill timber should, of course, be added that timber which is of value in the shape of cordwood, poles, railroad ties, pulpwood and for miscellaneous uses, local or general.

CHAPTER V.

CANADA—FORESTRY AND FOREST RESERVES.

As will be seen in later chapters, forest management has almost from the beginning of European occupation attracted the attention of the law-making authorities of what is now the Dominion of Canada. Royal authority was exercised to preserve to the uses of the Crown certain classes of timber and to introduce, in a partial and inadequate way, something like forest management. But so vast were the timber resources of Canada that until comparatively recent years very little public interest was taken in the subject of forest preservation. The earlier efforts of Canadian authorities toward a rational protection of their forest assets are recounted in the chapters devoted to the Provinces of Quebec and Ontario, and in those chapters relating to other provinces these forestry matters find their proper place; but in 1900 was established the Canadian Forestry Association, which since that time has by its educational work among the people and by coöperation with the Government done so much to promote these interests of the Dominion that the organization is deserving of especial attention.

The primeval forests of Canada have been noted for their extent and richness ever since the first explorations were made; and this natural endowment of public wealth has been the source of a large and constant revenue to the Crown and to the Provincial governments, greatly lightening taxation, and in some sections almost obviating the necessity of taxation of any other form. The total value of the export of forest products for the fiscal year ending June 30, 1904, was $36,724,445, while the census of 1901 placed the total value of forest products for the preceding year at $51,000,000. The annual revenue received from the forests of Quebec and Ontario runs well up toward $1,250,000. In 1893 the revenue from this source in New Brunswick totaled $196,500, while in British Columbia an estimate made in 1905 for the year not then completed placed this revenue at $250,000. Thus it will be seen that timber and timber products are of the highest importance not only to the individual operators, but to the welfare of the Dominion as a whole and to the Central and Provincial governments as well. Yet, as in other new countries favored by a heavy natural forest

growth, the Canadians, for a long time, considered their timber supply practically inexhaustible.

One of the most important dates in connection with the Canadian movement for intelligent forest control is 1882, in which year was organized, at Montreal, the American Forest Congress. At this forestry congress was present a large number of prominent representatives of lumber interests of Canada as well as of the United States. Many of them had prepared papers which they read and which led to discussions that attracted a large measure of public attention.

In itself this congress did not accomplish much for the cause of forestry, but it opened the way for a quickening of interest in the subject and helped to make further progress less difficult. Until that time, and indeed later, forestry had to contend with the idea that the forests were inexhaustible and, further, had to defend itself against a widespread charge of faddism. The majority of people totally discredited the idea that the supply of timber would ever be inadequate to the demand, and of those who considered that such a condition was a possibility, there were but few who were not content to let the future take care of itself, believing that if the time ever should come when lumber would be difficult to obtain because the supply of timber had been unduly diminished, that day was so far away from them and their needs that they were not called upon to take any action to prevent its coming.

Operating lumbermen also were to a certain extent offended and alienated from the cause by the radical utterances by most of the few persistent champions of forest preservation. Yet, in the light of later events, it is seen that these radicals, who successively pleaded with, threatened and abused those who did not agree with them, were doing the work of agitation which history has proved to be the forerunner of almost every reform. They stimulated the people to think along forestry lines, so that when facts in their support came to the surface they could be and were assigned to their logical place. And so annually the cause of forestry gained ground, until early in 1900 was organized the Canadian Forestry Association.

To Mr. E. Stewart, Dominion Superintendent of Forestry, more than to any other one man, is due the credit for the formation of the Canadian Forestry Association, for it was he who, on February 15, 1900, called the meeting at which the organization was recommended and as a result of which the organization actually was effected on March 8, 1900, in the City of Ottawa. The following officers were duly elected:

Honorary president, His Excellency, the Governor General; president, Hon. Sir Henri Joly de Lotbinière; vice president, William Little; secretary, E. Stewart; assistant secretary and treasurer, R. H. Campbell. Board of directors: Hiram Robinson, Thomas Southworth, Professor John Macoun, Doctor William Saunders, Hon. G. W. Allan, E. W. Rathbun.

Of the above the president, Hon. Sir Henri Joly de Lotbinière, was Lieutenant-Governor of British Columbia; E. Stewart, Dominion Superintendent of Forestry; Hiram Robinson, president of the Hawkesbury Lumber Company and president of the Canadian Forestry Association in 1903; Thomas Southworth, director of Forestry for the Province of Ontario; Professor John Macoun, of the Dominion Geological Survey, and E. W. Rathbun, member of the Ontario Forestry Commission.

The objects sought to be obtained by the association, as set forth in a statement signed by R. H. Campbell, of the Department of the Interior, were as follows:

"The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; reafforestation where advisable; tree planting on the plains and on the streets and highways; the collection and dissemination of information bearing on the forestry problem in general."

From the beginning the Canadian Forestry Association has been closely in touch with the Dominion and Provincial governments and especially with the Dominion Forestry Branch. The association might almost be said to be a department of the Government, so strong has been its influence upon governmental policies and legislation.

The organization of the American Forest Congress has been spoken of. Following the congress there was distinct advancement, both in the understanding of the necessities of the case and in the advocacy of remedial measures applicable to admitted evils.

The history of the forest had shown that fire was an enemy even more disastrous than the operations of lumbermen and the destruction wrought by settlers, wasteful as both had been, and every system of forestry has of necessity incorporated provisions for protection against this very serious menace. Beginning with Ontario, in 1885, all the Canadian provinces, except British Columbia and Prince Edward

Island, have adopted laws regarding this hazard and have established special fire ranging service. Experience has demonstrated this system to be effective in proportion to the thoroughness with which it has been operated. Before the installation of these fire warden measures hardly a summer passed that the air of the cities in eastern Canada was not fouled by smoke from vast forest fires, which destroyed an almost incalculable amount of valuable timber; but since this system has been followed fires have been comparatively infrequent and isolated. It is not claimed by anyone that perfection has been reached in guarding the forests from their greatest enemy, but certainly enough has been accomplished to make the position taken by those advocating this method of protection, unassailable. Ontario, which expends the greatest amount upon this service, spent in 1903 only $31,237 in this manner, while the revenue derived from the Ontario woods in the same year was $2,307,356. Thus, less than one and one-half percent of the forest revenue was expended for protecting the entire source of that revenue, which certainly is a low rate of insurance.

The growing recognition of the desirability of extending the Canadian forests resulted in the adoption, in the '80's, of the Tree Culture Claim Act. In 1889 experimental farms were established throughout the western country and experiments in tree growing began. From 1889 also dates the inauguration of the Dominion Forestry Branch which gave an added impetus to the forestry movement.

In all of these directions the Canadian Forestry Association has been helpful and influential. It has supplemented the work of public investigators, has upheld the hands of administrators and not only stimulated the Dominion and Provincial authorities, but inspired the people themselves to a quicker and more intelligent interest in the work. Since the organization of the association the protective force employed against fire has been increased and improved methods of management have been put in force. Rangers have been detailed in many sections where previously there were none. The forest reserves have been enlarged and increased in number. Through the medium of the agricultural college a plan has been put into operation in Ontario for aiding farmers to set out wood lots, the work of the experimental farms has been aided and all over the Dominion an interest has been aroused which has resulted in demonstrated benefits.

While the association does not claim that all these things have been done solely through its efforts, it should have part of the credit for

them, inasmuch as it has lent its active support to each and every movement for the furtherance of practical forestry work. The meetings of the associations are held early in each year in the leading cities of the Dominion. The officers for 1905 are as follows:

Patron, His Excellency, The Governor General; honorary president, Aubrey White, Toronto, Ontario; president, E. G. Joly de Lotbinière, Quebec, Quebec; vice president, E. Stewart, Ottawa, Ontario; secretary-treasurer, R. H. Campbell, Ottawa, Ontario.

Vice presidents for the provinces: Rev. A. E. Burke, Alberton, Prince Edward Island; Hon. J. W. Longley, Halifax, Nova Scotia; His Honor, J. B. Snowball, Chatham, New Brunswick; Hon. S. N. Parent, Quebec, Quebec; Lieutenant Governor of Manitoba, Winnipeg, Manitoba; His Honor, A. E. Forget, Regina, Assiniboia; William Pearce, Calgary, Alberta; F. D. Wilson, Fort Vermilion, Athabaska; Hon. H. Bostock, Monte Creek, British Columbia; Hon. J. H. Agnew, Winnipeg, Manitoba; Hon. Nelson Monteith, Ontario.

Board of directors: J. R. Booth, Ottawa, Ontario; Hiram Robinson, Ottawa, Ontario; Monseigneur Laflamme, Quebec, Quebec; William Saunders, LL.D., Ottawa, Ontario; Thomas Southworth, Toronto, Ontario; H. M. Price, Quebec, Quebec; Doctor Robert Bell, Ottawa, Ontario.

Education in forestry has not in Canada, as yet, taken the form of distinctive forestry schools, but, nevertheless, a good deal is being done along that line. Queen's University, at Kingston, Ontario, has of recent years supported a series of lectures on forestry, while the Mount Allison University, of Sackville, has had a course of lectures on forestry incorporated into its curriculum. The project of establishing schools of forestry has been under consideration by the University of Toronto and Queen's University. Perhaps the most practical work has been done by the Ontario Agricultural College, at Guelph, Ontario. Since about 1884 forestry has been taught in that school, there being open a special course in connection with the fourth year. This is a degree course, authorizing the graduates to entitle themselves foresters. The importance of schools devoted especially to forestry was recognized by the Canadian Forestry Association at its 1904 meeting, when the following resolution was adopted:

"*Resolved*, That the Ontario government be, and is hereby, requested to make a proper grant for the operation of a school or schools of forestry."

Perhaps the most practical work has been done in connection with experimental farms and stations. At Guelph, in 1904, was begun nursery work by growing deciduous varieties of trees from the seed. At Ottawa, Ontario, is an experimental farm and arboretum under the auspices of the Dominion government. The first planting of forest trees at this experimental farm was made in 1887. About twenty-one acres have been devoted to the planting of forest trees in belts and clumps and sixty-five acres additional have been used for the arboretum and the botanical gardens.

The Federal government has charge of the forests on Dominion lands proper. These embrace the Province of Manitoba, the Northwest Territories and also that part of British Columbia known as the railway belt, consisting of a stretch of country forty miles wide—twenty miles on each side of the main line of the Canadian Pacific railway—containing altogether about 20,000 square miles. It is estimated that the area of forest lands thus under the Dominion control, not including Indian reserves and the old provinces, is 742,578 square miles, while that under the control of the Provincial governments is 506,220 square miles.

The Dominion Department of Agriculture has a well arranged series of experimental farms, a feature of each of which is the study of tree growth. The central farm is at Ottawa, Ontario. The branches are at Nappan, Nova Scotia; Brandon, Manitoba; Indian Head, Assiniboia, and Agassiz, British Columbia. The most important experiments in some respects have been made at Indian Head. A shelter belt 100 feet wide has been planted along the western and northern boundaries of the farm, extending nearly two miles, while blocks of trees of from two to five acres each have been established. This experiment demonstrated the value of tree planting as a protection to crops and fruit trees and also as to what can be done in the way of growing trees on the open prairie in a comparatively dry climate. Furthermore, from the experiment farms are distributed tree seeds, seedlings and cuttings. The work of distribution to settlers was begun from Indian Head in 1899 and that is the headquarters for general distribution to settlers in the Northwest Territories, while the experimental farm at Brandon supplies those in Manitoba. The distributions up to 1904 to settlers in the northwest have been, from Ottawa, 600,000 seedlings and cuttings; from Indian Head, 290,000, and from Brandon, 610,000.

The Province of Ontario and the Dominion have each established a forestry office as a branch of the public service. The Dominion office

was started in 1899. The officers consist of the superintendent, assistant superintendent, inspector, several supervisors of tree planting and a number of forest fire rangers. Any land owner desiring to avail himself of the coöperation of the Government applies to its forestry branch. The land of the applicant is visited by one of the supervisors the following summer, when a plan of the proposed plantation is made. The next season seedling trees are sent by express from the government nurseries free of charge. The settler enters into an agreement to set aside a certain portion of the land as a permanent tree plantation; to prepare his soil carefully according to the directions of the supervisor; to plant the trees on their arrival and to cultivate them and keep the ground clean until the trees are of sufficient size no longer to need such attention. As stated above, seedling trees have been grown on the various government farms, but in 1904 the policy was inaugurated of centralizing the work, and 160 acres of land were obtained for a forest nursery station near Indian Head and buildings were being erected and preparations were made by which the supply for the whole northwest country would be grown at that place and distributed from thence.

CANADIAN FOREST RESERVES.

Notwithstanding the original immense forest wealth of Canada and the fact that that wealth still remains untouched in many sections, the saw and the ax have so well fulfilled their destructive mission—and that practically within so short a period as a century—that the Canadian government has recognized the necessity of setting apart national parks and forest reserves for the purpose of conserving its forestal wealth.

The denuding of the forests is not only not harmful but is absolutely economic in those sections where the soil is suitable for agriculture and where settlement is desirable; but there are large tracts in Canada, particularly in Ontario, Quebec and British Columbia, that are totally unfit for agriculture, and upon these tracts the timber will reproduce itself if given the opportunity. Therefore by restricting lumbering and permitting the young trees to attain full growth, an almost perpetual supply of timber may be insured. To this end Ontario and Quebec have established provincial reserves, and the Federal government has established national parks and reserves in Manitoba, in the Northwest Territories and in what is known as the forty-mile belt along the main line of the Canadian Pacific railway in British Columbia. This belt was ceded by the Province of British Columbia to the Federal government of Canada as a contribution toward the building of the

Canadian Pacific railway. With the exception of that in these provinces and territories and the Indian reserves all the timber in Canada belongs to the several provinces in which it is located.

The Federal reserves in British Columbia are Long Lake Timber Reserve, Yoho Park and Glacier Forest Park. Long Lake Timber Reserve occupies the central part (considering the east and west direction only) or dry belt of British Columbia, being eight miles southwest of the town of Kamloops, which is situated on the Canadian Pacific railway and the Thompson River. The mountains included in this reserve form a watershed for the numerous small streams which irrigate the farming lands of the surrounding valleys. This reserve contains a good growth of Douglas fir and black pine. It was set apart by order of the Minister of the Interior August 15, 1902, and has an area of 76,800 acres.

Yoho Park is the natural continuation of the Rocky Mountains National Park, in the Northwest Territories, but being on the British Columbia side of the interprovincial boundary, that is, on the western slope of the Rockies, it has a distinctive name. Its area is 530,240 acres. It was set apart December 14, 1901, by order in council.

Glacier Forest Park, a small reservation of 18,720 acres, set apart by order in council October 11, 1888, is located in the Selkirk Mountains, British Columbia, on the main line of the Canadian Pacific railway. Glacier station, a favorite resting place of tourists, is located on this reserve.

The Federal reserves in the Northwest Territories are as follows: Rocky Mountains Park, Foothills Timber Reserve, Waterton Lakes Forest Park, Cooking Lake Timber Reserve, Moose Mountain Timber Reserve and Beaver Hills Timber Reserve.

Rocky Mountains Park is situated along the eastern slope of the Rocky Mountains in Alberta, north of the Foothills Reserve, the southern end being about 120 miles north of the international boundary. This park is in the shape of a triangle, each side of which is about 100 miles in length, with the town of Banff, a well known mountain resort on the main line of the Canadian Pacific railway, in the center. The Bow River runs through the middle of the triangle. When first set apart by special act of the Dominion Parliament in 1887 this park was only twenty-six miles long and ten miles wide; but it was extended by act of 1902 and now contains approximately 2,880,000 acres. Together with Yoho Park, on the western slope of the mountains in British Co-

lumbia, this reservation forms one of the most magnificent forest parks in the world, the combined area being 3,410,240 acres, or over 5,328 square miles.

The Foothills Timber Reserve, containing 2,350,000 acres, set apart by the Minister of the Interior February 21, 1899, embraces the foothills on the eastern slope of the Rocky Mountains, in the southwest corner of Alberta, between the international boundary and Rocky Mountains Park. It stretches northward, from the South Kootenay Pass on the boundary, about 140 miles. The use of this reserve as a watershed is of much more importance than its use for the production of timber.

A foot or projection of 34,000 acres on the southern end of the Foothills Reserve is formed by the Waterton Lakes Forest Park, which was set apart May 30, 1895, as a tourist park, previous to the setting apart of the Foothills Reserve. It forms a square, one side of which is the international boundary.

Twenty miles southeast of Edmonton, northern Alberta, is the Cooking Lake Timber Reserve, having an area of 109,000 acres, and having been set apart June 6, 1899, by the Minister of the Interior.

Still following an eastward course, Moose Mountain Timber Reserve is the next in order. This is a small reservation in southeastern Assiniboia, about fifty miles due north of the town of Portal, which is on the "Soo" railroad at the point where it crosses the international boundary. Moose Mountain Reserve has an area of 103,000 acres, set apart under the same authority as the Foothills Timber Reserve.

In northeast Assiniboia, twenty miles west of the town of Yorkton on the northwestern branch of the Canadian Pacific railway, and about forty-five miles north of Indian Head on the main line of the Canadian Pacific, is the Beaver Hills Timber Reserve, which was set apart August 20, 1901. Its acreage is 170,000.

The Province of Manitoba possesses six timber reserves, namely, Turtle Mountain, Spruce Woods, Riding Mountain, Duck Mountain, Lake Manitoba and Porcupine Mountain.

Turtle Mountain Timber Reserve lies in the southwestern part of the Province, extending about twenty miles along the international boundary, at a distance of twelve miles north of the town of Bottineau, North Dakota, and fifteen miles southeast of Deloraine, Manitoba. It was set apart as a reserve July 13, 1895. Its area is 75,000 acres.

In the central part of the Province, lying for about twenty-five miles

along the south side of the Canadian Pacific main line, between the city of Brandon and the town of McGregor, is the Spruce Woods Timber Reserve, of 190,000 acres. It was set apart January 8, 1898, under the same authority as the Foothills Timber Reserve.

Riding Mountain Reserve is of irregular shape and extends about ninety miles from northwest to southeast, lying southwest of Lake Dauphin and in the fork formed by the main lines of the Canadian Pacific and Canadian Northern railways. It has an area of 1,215,000 acres, and was set apart July 13, 1895.

Directly north of the Riding Mountain Reserve, west of Lake Winnipegosis and lying parallel with the Swan River branch of the Canadian Northern railway, is the Duck Mountain Timber Reserve. It has a length of fifty miles from north to south and contains 840,000 acres. On February 5, 1902, it was set apart as a reserve.

A small reserve of 159,460 acres on the west side of Lake Manitoba is known as Lake Manitoba Timber Reserve. It is situated a couple of miles due west of the Hudson Bay Company's post, Manitoba House, at the narrows of Lake Manitoba, and a few miles northeast of the village of Laurier, which is the nearest railway station and is located on the Canadian Northern railway.

Porcupine Mountain Timber Reserve occupies the extreme northwestern angle of the Province of Manitoba, forming a parallelogram, the adjacent sides of which are about forty and sixty miles, between Lake Winnipegosis and the northwest corner of the Province. On August 24, 1900, it was reserved from settlement only, timber licenses being permitted to be granted. Included within this reserve are 1,382,400 acres.

The national parks above described have been set apart on the lines of the United States national parks for the purpose of preserving the natural beauties intact, no cutting of timber being permitted. The reserves on the watersheds, as Long Lake Timber Reserve, the Foothills Timber Reserve and Waterton Lakes Forest Park, and some of the others to a lesser extent, have been set apart in order to preserve the forest-floor so that the water falling on the mountains may be fed gradually to the rivers below to give them a regular water supply as far as possible the year around. The remaining reserves have been set apart with two objects: First, to keep settlers out of broken and other lands unsuitable for farming, and, second, to preserve a supply of timber for the settlers who will occupy the adjacent prairie lands.

With these objects in view and partly owing to the short time since they have been set apart, no commercial lumbering has been allowed in them and consequently no regulations therefor made. The only existing regulations are those permitting settlers to secure licenses to cut a limited supply of timber for fuel and building purposes. Some of these reserves have been more or less burned and worked over, and the object of the reservation and the employment of fire rangers is to give the timber a chance to start growing again.

Outside of these reservations the Federal government of Canada has large areas of timber in Manitoba, the Territories and British Columbia, which are leased to lumbermen on the usual plan of a bonus and ground rent. The ground rent is $5 a square mile for a year except for lands west of Yale, British Columbia, where the ground rent is five cents an acre. The Crown dues are, on sawed lumber, 50 cents a thousand feet board measure; railway ties, 1½ cents each; shingle bolts, 25 cents a cord, and five percent on the sales of all other products of the berth.

The Provincial governments of Ontario and Quebec have also set apart parks and reserves for the preservation of their forests, the regulations regarding which are made by the Provincial governments.

Sibley Reserve is in the northwestern part of Ontario, on the north shore of Lake Superior, and includes Thunder Cape and a portion of the township of Sibley. It contains about 45,000 acres, and was set apart in 1900 by order in council.

Situated in the district ~~north~~ of Lake Nipissing, Ontario, is Algonquin Park, on the height of land between the Ottawa River and its tributaries and the Georgian Bay waters. This park, having an area of 1,109,383 acres, was created by special Act of Legislature in 1893. It is not, in the strictest sense, a forest reserve, as it was primarily designed for a game preserve and much of its area is under license; but as no settlement is permitted within its limits it largely partakes of the character of a forest reserve. Permission is given to fish in this park, but hunters are absolutely forbidden, the rules in this respect being so strict that no man is even permitted to carry a gun in the park. At the time when this park was set aside game within its area was very scarce, but now it is fast becoming filled with fur-bearing and game animals.

One of Ontario's reserves more recently set aside is Mississaga Reserve, created in 1904. It lies to the north of Lake Huron and comprises an area of 3,000 square miles, or 1,920,000 acres. The policy of

the Government in regard to the administration of this and Temagami Reserve is that timber shall be disposed of by the thousand on the stump and cut under supervision of officials of the Government.

Temagami Reserve, containing 1,408,000 acres, was set apart January 11, 1901. Within its boundaries is a beautiful lake of the same name. Most of this reserve is still covered with virgin pine of great value. On December 16, 1903, an addition of 3,700 square miles was made to the north and west, giving the reserve a total of 5,900 square miles, or 3,776,000 acres.

North of the City of Kingston, Ontario, is the Eastern Forest Reserve, which was formed under the Forest Reserve Act in 1899 and which contains 80,000 acres. This area was lumbered over and afterward burned, but now has a heavy growth of young pine.

The Laurentides National Park, of Quebec, was created by Act of Legislature January 12, 1895, and contains 2,650 square miles, or 1,696,000 acres, lying to the north of the City of Quebec. Its northern boundary is the 48th parallel; its eastern, the St. Urbain road; its southern and southeastern, the rear line of the Seigniory of Beaupré and ranges XI and XII of Stoneham and Tewkesbury; its western, the Fief Hubert and an imaginary line running to a point west of Grand Lake Batiscan, thence skirting the Quebec & Lake St. John railway a few miles east thereof to the intersection of the 48th parallel. This park was formed for the purposes of protecting the forests, fish and game; of maintaining the water supply, and of encouraging the study and culture of forest trees. Over a dozen large rivers rise in this park, and it has been described as being "peppered" with lakes, the waters of which are teeming with fish. A large portion of the timber of this reservation is under license, some of the limits being operated at present. Game is found here in abundance, and hunting is permitted in certain sections, also fishing, both under regulations.

On April 10, 1902, the legislative assembly of New Brunswick passed an act authorizing the setting aside of "a tract of land in some portion of the Province covered with forest, not exceeding 900 square miles in extent," to be known as the Provincial Park of New Brunswick. However, no action has as yet been taken establishing this forest reservation.

The following table contains a complete list of both Dominion and Provincial reserves, whether timber reserves proper or parks, with their respective areas, as they existed at the beginning of 1905:

SUMMARY OF CANADIAN FOREST RESERVATION.

UNDER FEDERAL GOVERNMENT.

Name.	Acres.	
Long Lake Timber Reserve	76,800	
Yoho Park	530,240	
Glacier Forest Park	18,720	
Total, British Columbia		625,760
Rocky Mountains Park	2,880,000	
Foothills Timber Reserve	2,350,000	
Waterton Lakes Forest Park	34,000	
Cooking Lake Timber Reserve	109,000	
Moose Mountain Timber Reserve	103,000	
Beaver Hills Timber Reserve	170,000	
Total, Northwestern Territories		5,646,000
Turtle Mountain Timber Reserve	75,000	
Spruce Woods Timber Reserve	190,000	
Riding Mountain Reserve	1,215,000	
Duck Mountain Timber Reserve	840,000	
Lake Manitoba Timber Reserve	159,460	
Porcupine Mountain Timber Reserve	1,382,400	
Total, Manitoba		3,861,860

UNDER PROVINCIAL GOVERNMENT.

Sibley Reserve	45,000	
Algonquin Park	1,109,383	
Mississaga Reserve	1,920,000	
Temagami Reserve	3,776,000	
Eastern Forest Reserve	80,000	
Total, Ontario		6,930,383
Laurentides National Park, Quebec Province		1,696,000
Grand Total		18,760,003

ADDENDUM.

Since this chapter was prepared a new forest reserve has been set apart by the government of the Province of Ontario in the western part of that Province, called the Nipigon Forest Reserve. It is thus described: "Commencing at the southeast angle of the Township of Ledger, east of the Nipigon River in the district of Thunder Bay, thence due east astronomically twenty-two miles, thence due north astronomically ninety-eight miles, thence due west astronomically seventy-three miles, thence due south astronomically ninety-eight miles, thence due east astronomically to the southwest angle of the Township of Purdom, thence due east astronomically along the south boundary of the Township of Purdom, and along the south boundary of the Township of Ledger, a distance of fifty-one miles in all, to the place of beginning, containing by admeasurement seven thousand one hundred and fifty-four square miles." According to this description the southern boundary of the reserve is eight miles north of Nipigon station, on the Canadian Pacific railway, and Lake Nipigon is included in its area. There are the usual exceptions of lands already patented, Indian reserves, etc. The total area of the reserve, including water, is 4,578,560 acres, making a total reserved area in Ontario of 11,508,943 acres, including the exceptions and the water area contained in the Nipigon Reserve, and increasing the total acreage of forest reserves in Canada to 23,338,563 acres. The land in this new reserve is not especially adapted to agriculture, with the exception of a few tracts situated in the river valleys of the western part of the reserve, but is of value as a timber preserve. Spruce, tamarack, jack pine and birch are the principal trees. Large areas have been devastated by fire, but are being covered by a second growth, which will, in time, be valuable not only as pulpwood but as material for railway ties, which will doubtless be in demand in this section in the near future. On the Ombabika River, which, roughly speaking, bisects the northeastern angle of the reserve, there is still good timber, the pulpwood being estimated at 1,484,000 acres. In the vicinity of this river are to be found birch, spruce, poplar, jack pine, balsam and tamarack.

Numerous rivers flow into Lake Nipigon, which occupies the central part of the reserve, and will furnish power for manufacturing purposes when needed. So also, in larger measure, will the Nipigon River, which has a fall of about 250 feet within the reserve.

Large game is not plentiful in the reserve, owing to the hunting of the Indians and also to the fact that much of the country has been swept by fire. Small fur-bearing animals, such as the mink, beaver, otter, marten, muskrat and fox, are found in abundance.

Also, a reserve, containing about 2,500 square miles, has been set aside by the Province of Quebec in the Gaspé Peninsula.

CHAPTER VI.

CANADA—PRODUCTION AND TRADE.

The figures on record for the Dominion of Canada regarding lumber production differ somewhat from those of the provinces added together because the Federal Parliament itself controls the timber in the several territories which have not yet reached provincehood, and also controls some of the timber in the provinces, such as that on Indian reserves. Besides, the provincial statistics take account of the timber cut on Crown lands only, that is, lands belonging to the province, while the Federal statistics take in the timber cut on private lands as well.

The following tables of production are made up from the most reliable sources obtainable. Owing to the better equipment for taking the census in later years, the later the census the more correct it is likely to be. Thus in some cases what looks like a reduction may really be a more exact census. This must be true in some cases, since Canada's exports were never so large as now, nor was her internal development ever before progressing at such a rapid rate, and yet production in some lines appears lessened. The world's demand for forest products is increasing with the increase of population, and on a per capita basis as well, and Canada is one of the great available sources of supply.

FOREST PRODUCTS OF CANADA FOR THE YEARS STATED.

Square timber, cubic feet.	1881.		1891.	
	Quantity.	Value.	Quantity.	Value.
White pine	19,326,250	$ 3,961,881	9,200,000	$ 2,649,600
Red pine	2,602,500	426,810	1,406,500	276,237
Oak	5,672,900	1,954,420	1,900,000	798,000
Tamarack	4,653,500	558,420	3,665,000	513,100
Birch and maple	4,415,000	604,769	2,508,300	417,255
Elm	3,192,000	733,740	2,965,000	791,655
All other square timber	50,157,800	12,218,440	21,650,000	7,421,620
Logs, feet b. m.				
Pine	2,232,440,700	18,529,258	1,499,052,800	12,741,950
Spruce and others	2,602,558,400	13,012,792	3,353,857,700	20,123,134

FOREST PRODUCTS OF CANADA FOR THE YEARS STATED—*Continued.*

Miscellaneous.	1881.		1891.	
	Quantity.	Value.	Quantity.	Value.
Spars and masts (pieces)	192,241	$ 173,017	323,140	$ 274,669
Staves (M.)	41,881	300,128	92,260	434,868
Lathwood (cords)	98,311	491,598	293,412	1,467,060
Tanbark (cords)	400,418	1,801,881	329,810	1,494,145
Firewood (cords)	10,993,234	22,865,926	10,555,164	22,693,602
Fence posts (cubic feet)	.....	.....	85,089,765	2,836,325
Railway ties (number)	.....	.....	32,054,721	2,136,982
Telegraph poles (number)	.....	.....	3,938,610	333,882
Pulpwood (cords)	.....	.....	261,155	783,465
Shingles (M.)	.....	.....	939,736	1,973,866

The following tables show the kind, amount and value of the forest products according to the census of 1901. The figures given first are for the whole of Canada, and are followed by those for the separate provinces. Newfoundland and Labrador are not included in the statistics for Canada as they are separate and distinct politically from the Dominion.[1]

FOREST PRODUCTS OF CANADA—CENSUS OF 1901.

Number of sawmills, 2,075; value of products, $50,805,084. Capital invested, $55,605,666; number of wage earners, 51,549; wages for labor, $11,113,666.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash	416,308	$ 44,583
Birch	1,203,564	151,281
Elm	1,354,765	147,143
Maple	346,433	37,014
Oak	110,219	19,570
Pine	2,381,310	458,218
All other timber	5,914,314	622,503
Total	11,726,913	$1,480,312

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	82,241,000	$ 658,881
Hickory	1,650,000	19,702
Hemlock	200,778,000	1,126,214
Oak	10,421,000	153,917
Pine	1,533,681,000	15,377,157
Spruce	1,040,676,000	7,345,819
All other logs	787,516,000	5,111,709
Total	3,656,963,000	$29,793,399
Pulpwood (cords)	660,034	2,168,509
Miscellaneous products	.....	19,808,978
Grand total of values		$53,251,198

[1] According to the census of 1901, Newfoundland contained 195 sawmills, valued at $292,790; logs cut, 1,616,449; lumber sawn, 43,648,000 feet, the value of which was $480,555, and 16,197,000 shingles.

ONTARIO.

Number of sawmills, 847; value of products, $25,672,424.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash	231,494	$ 24,662
Birch	78,986	8,554
Elm	1,259,174	136,787
Maple	194,304	21,554
Oak	76,025	13,022
Pine	1,044,439	219,219
All other timber	906,236	94,868
Total	3,790,658	$518,666

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	79,105,000	$ 629,670
Hickory	1,445,000	17,304
Hemlock	84,175,000	482,447
Oak	8,842,000	126,901
Pine	984,352,000	10,116,667
Spruce	8,709,000	71,221
All other logs	167,994,000	1,320,558
Total	1,334,622,000	$12,764,768
Pulpwood (cords)	108,335	304,837
Miscellaneous products	.....	8,068,464
Grand total of values		$21,656,735

QUEBEC.

Number of sawmills, 622; value of products, $10,391,638.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash	175,547	$ 19,028
Birch	556,484	74,115
Elm	82,655	9,061
Maple	80,273	8,585
Oak	10,263	2,122
Pine	1,132,957	212,859
All other timber	3,482,710	353,420
Total	5,520,889	$679,190

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	2,474,000	$ 25,679
Hickory	151,000	1,999
Hemlock	38,121,000	274,218
Oak	595,000	10,080
Pine	445,036,000	4,587,548
Spruce	599,447,000	4,502,102
All other logs	206,031,000	1,445,018
Total	1,291,855,000	$10,846,644
Pulpwood (cords)	526,865	1,777,775
Miscellaneous products	.....	7,443,882
Grand total of values		$20,747,491

NEW BRUNSWICK.

Number of sawmills, 236; value of products, $7,041,848.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash	1,998	$ 209
Birch	153,214	17,010
Elm	1,160	116
Maple	4,722	476
Oak	200	28
Pine	60,009	6,722
All other timber	99,472	9,923
Total	320,775	$34,484

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	491,000	$ 1,560
Hickory	35,000	184
Hemlock	26,696,000	107,571
Oak	25,000	232
Pine	19,166,000	125,213
Spruce	182,759,000	1,099,302
All other logs	61,721,000	333,632
Total	290,893,000	$1,667,694
Pulpwood (cords)	14,486	37,577
Miscellaneous products	.....	1,295,860
Grand total of values		$3,035,615

NOVA SCOTIA.

Number of sawmills, 228; value of products, $2,940,107.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash	3,502	$ 373
Birch	382,126	47,783
Elm	410	38
Maple	46,439	4,124
Oak	22,261	4,164
Pine	98,577	12,923
All other timber	356,371	39,697
Total	909,686	$109,102

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	25,000	$ 233
Hickory	16,000	166
Hemlock	48,877,000	237,814
Oak	881,000	15,207
Pine	18,955,000	144,907
Spruce	198,892,000	1,272,653
All other logs	26,784,000	168,956
Total	294,430,000	$1,839,936
Pulpwood (cords)	18,348	48,320
Miscellaneous products	.....	1,460,490
Grand total of values		$3,457,848

BRITISH COLUMBIA.

Number of sawmills, 75; value of products, $3,985,177.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Elm	11,000	$ 1,100
Oak	890	89
Pine	35,482	4,990
All other timber	827,105	101,591
Total	874,477	$107,770

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	45,000	$ 450
Hemlock	2,490,000	20,750
Pine	63,256,000	373,731
Spruce	23,676,000	153,405
All other logs	285,997,000	1,478,315
Total	375,464,000	$2,026,651
Miscellaneous products	.....	499,736
Grand total of values		$2,634,157

MANITOBA.

Number of sawmills, 37; value of products, $490,628.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Oak	400	$ 120
Pine	6,068	820
All other timber	29,458	3,159
Total	35,926	$4,099

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	96,000	$ 1,241
Oak	73,000	1,459
Pine	7,000	78
Spruce	10,417,000	84,987
All other logs	28,488,000	277,665
Total	39,081,000	$365,430
Miscellaneous products	.....	580,522
Grand total of values		$950,051

THE TERRITORIES.

Number of sawmills, 18; value of products, $247,428.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Oak	180	$ 25
Pine	1,899	445
All other timber	168,429	15,174
Total	170,508	$15,644

LOGS FOR LUMBER.

	Feet b. m.	Value.
Pine	2,880,000	$ 28,636
Spruce	13,728,000	137,299
All other logs	8,126,000	67,202
Total	24,734,000	$233,137
Miscellaneous products	.....	235,482
Grand total of values		$484,263

PRINCE EDWARD ISLAND.

Number of sawmills, 12; value of products, $35,834.

SQUARE, WANEY OR FLAT TIMBER.

	Quantity. Cubic feet.	Value.
Ash	3,767	$ 311
Birch	32,754	3,819
Elm	366	41
Maple	29,695	2,275
Pine	1,379	240
All other timber	44,533	4,671
Total	112,994	$11,357

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	5,000	$ 48
Hickory	3,000	49
Hemlock	419,000	3,414
Oak	5,000	38
Pine	29,000	377
Spruce	3,048,000	24,850
All other logs	2,375,000	20,363
Total	5,884,000	$49,139
Miscellaneous products	.....	224,542
Grand total of values		$285,038

An idea of the importance of the forest wealth of Canada as a source of revenue (the census of 1901 being taken as a basis for the estimation) may be obtained by the following quotation from Mr. E. Stewart, Superintendent of Forestry, in his report upon the forestry work in Canada:

It will be seen from the census of 1901 that an estimate is made of the area of forests and woodlands for each of the provinces and also for the Territories. That of Manitoba and the Territories is placed at 722,578 square miles. Add to this 20,000 square miles of Dominion territory in the railway belt in British Columbia, and we have 742,578 square miles as the total on Dominion lands. Probably about one-fifth of this contains merchantable timber, or say 150,000 square miles, or 96,000,000 acres. After thus reducing the area, and remembering that in addition to the timber suitable for lumber, a large part of it is covered with spruce valuable for pulpwood, it can scarcely be considered an extravagant estimate to place the merchantable timber, including pulpwood, at 2,000 feet board measure per acre, or in all 192,000,000,000 feet. We have thus arrived at a very rough approximation of the quantity of timber now fit for use on the lands owned and controlled by the Dominion.

At the lowest the value of such timber standing in the tree may be put at $1 per thousand feet board measure; that would amount to $192,000,000. This represents only what might be collected by the Government as a royalty, and forms but a small part of its value to the country as a whole. Much of the timber is growing on land unsuitable for agriculture, but where water power is abundant and with the power thus at hand this country should be without a rival in the manufacture of all articles in which timber forms the chief ingredient.

It may be said that a very large percentage of this timber is not at present available, and that consequently its value is overestimated, but when we consider the great appreciation in the value of timber limits within the last ten or twenty years and the scarcity of the world's supply for the future it is almost certain that the enhanced value that will be obtained in the future for what is now inaccessible will more than pay compound interest on the present estimated value.

The above estimate takes no account of the younger growth. In considering the potentialities of our forest areas their capability of affording a continuous crop should be kept clearly in view. Even under the discouraging conditions prevailing in our lumber regions after logging operations have ceased, it will be found in most cases that another crop, either of the original or other varieties, is fast springing up, and in my calculation of the value of a timbered territory, which is to remain permanently in forest, this growing crop should be taken into account.

Without going too minutely into this phase of the subject, I am of the opinion that if we confine our cutting of sawlogs to all trees above 12 inches at the butt and pulpwood to, say, 7 inches, the annual increment of growth fit for use will be not less than 140 feet board measure to the acre, or an annual growth increment equaling 13,440,000,000 feet, which at the above rate of $1 per thousand stumpage, would give a perpetual annual return equal to $13,440,000.

EXPORTS.

The next table, pertaining to exports, is taken from trade and navigation returns, and shows the ups and downs through which the Canadian lumber trade has passed. The figures are given from 1868 only, the year after confederation was formed, to 1903, but, going back a little before that time, it may be said that during the American Civil War there were high prices and a strong demand for Canadian lumber, which had free entry into the United States. About this time a large quantity of the finest white pine still stood on the southwestern peninsula of Ontario and between Kingston and Toronto. Masts, spars and square timber were sent to England and sawn lumber to the United States. About 1870 the trade in Ontario and Quebec became more restricted and centered in the Ottawa Valley, the Trent River and the districts southeast of Georgian Bay. In 1873 the total exports of forest products from Canada were $29,397,534. This was the crest of the wave and a period of world-wide depression set in which lasted until 1879. In 1878 the timber exports stood at $19,820,768 and in 1879

reached the low water mark of $13,562,277. This was at a time when men's hearts failed them; big houses went to the wall and everybody wondered and feared for what might come next. That, however, was the nadir of the panic and by 1881 the timber exports had risen to $25,374,336 where they stood off and on for ten progressive, prosperous years. The granting of free entry into the United States markets in 1894 did not much change things until 1897 when, owing to the duty being restored, $15,435,759 worth of lumber was rushed in to avoid the higher duty. Progress since then has been steady, with the heaviest year on record in 1903.

VALUE OF EXPORTS FROM CANADA OF FOREST PRODUCTS FOR THE YEARS MENTIONED.

Year.	Products of the forest.		Other manufactures of wood not included in preceding columns.	Total of wood products to all countries.
	Raw.	Manufactured or partially manufactured.		
1868	$5,550,694	$12,711,476	$ 551,958	$18,814,118
1871	7,035,159	15,317,052	835,116	23,187,327
1873	8,592,550	19,994,266	810,718	29,397,534
1876	6,005,560	14,122,504	401,352	20,529,416
1879	2,922,272	10,339,187	300,818	13,562,277
1881	7,679,233	17,280,779	414,324	25,374,336
1886	4,909,400	16,125,211	637,591	21,672,202
1891	5,406,345	18,875,670	1,024,448	25,306,463
1896	6,022,173	21,153,513	1,555,108	28,730,794
1897	6,023,211	25,235,518	1,652,317	32,911,046
1900	4,495,786	25,167,879	3,127,242	32,790,910
1901	4,989,004	25,020,853	2,962,688	32,972,545
1902	4,469,489	27,649,940	3,189,843	35,309,272
1903	5,299,552	31,086,463	4,473,952	40,859,967

The value of exports of the products of Canadian forests from 1879 to 1903 was as follows: Lumber, $467,088,774; square timber, $73,299,685; logs, $22,233,758; shingles, $15,443,878; pulpwood, $10,002,346; sleepers, $6,966,198; shooks, $4,216,298; firewood, $6,544,347; bark, $5,388,839; ashes, $3,140,636, and all others, $13,274,914. Total, $627,599,673.

In connection with the above table we may note the relation that exports of forest products bear to the total exports of Canada. During the twenty-five years ended with 1903 the total value of exports of domestic products, not including coin and bullion, was $2,737,658,211. The exports of forest products, therefore, were 23 percent of the total. While exports of forest products have shown a satisfactory increase as the years have gone on, the development of the country in agriculture,

mining and general manufactures has rendered them of less relative importance. The following table shows the percentage of exports of forest products to total domestic exports:

EXPORTS OF FOREST PRODUCTS, TOTAL DOMESTIC EXPORTS AND PERCENTAGE OF FORMER TO LATTER, IN YEARS NAMED.

Year.	Exports of forest products.	Total of all domestic exports.	Percent of forest products.
1868	$18,814,118	$57,567,888	34.4
1871	23,187,327	74,173,613	32.6
1873	29,397,534	89,789,922	32.7
1876	20,529,416	80,966,435	25.3
1879	13,562,277	71,491,255	18.9
1881	25,374,336	98,290,823	25.8
1886	21,672,202	85,251,314	25.4
1891	25,306,463	98,417,296	25.7
1896	28,730,794	121,013,852	23.7
1897	32,911,046	137,950,253	24.0
1900	32,790,910	191,894,723	17.0
1901	32,972,545	196,487,632	16.7
1902	35,309,272	211,640,286	16.6
1903	40,859,967	225,849,724	18.0

The following tables, also taken from trade and navigation returns, show the quantities and values of the forest products exported from Canada during the years mentioned:

QUANTITIES OF FOREST PRODUCTS EXPORTED FROM CANADA.

	1894	1896	1898	1900	1902	1903
Bark for tanning, cords	30,602	37,133	26,493	16,124	34,897	16,769
Basswood, feet	522,000	936,000	1,209,000	*	*	*
Hickory, feet	279,000	365,000	16,000	.....	.....	.....
Firewood, cords	149,078	118,720	79,972	67,203	43,873	48,858
Knees and futtocks, pieces	16,510	14,126	35,742	28,698	21,867	22,514
Logs, cedar, for shingle bolts, cds	355	600	700	5,602	.....	21,032
Logs, elm, feet	23,500,000	18,961,000	8,483,000	10,127,000	6,978,000	1,731,000
Logs, hemlock, feet	5,233,000	4,761,000	1,121,000	1,824,000	5,806,000	4,930,000
Logs, oak, feet	795,000	298,000	120,000	225,000	145,000	119,000
Logs, pine, feet	279,707,000	157,449,000	186,049,000	50,365,000	15,242,000	11,705,000
Logs, spruce, feet	17,930,000	15,182,000	5,526,000	9,711,000	8,275,000	7,142,000
Logs, all other, feet	13,321,000	8,576,000	9,342,000	16,155,000	39,312,000	26,176,000
Lumber—						
Deals, pine, st. hd	65,654	84,194	78,223	71,754	66,191	87,318
Deals, spruce and other, stand	219,724	223,432	292,743	307,637	242,636	251,806
Deal ends, st. hd	16,614	17,911	22,223	19,765	15,273	17,208
Lath, pieces	349,906,000	422,306,000	334,971,000	345,973,000	420,147,000	474,437,000
Paling, pieces	2,567,000	1,633,000	2,855,000	5,066,000	849,000	381,000
Pickets, pieces	4,661,000	3,114,000	1,779,000	4,266,000	59,976,000	7,705,000
Planks and boards, ft	1,134,231,000	818,529,000	514,609,000	842,454,000	934,082,000	954,241,000
Joists, feet	2,215,000	1,782,000	573,000	5,000	236,000	1,100,000
Scantling, feet	20,328,000	43,347,000	31,011,000	26,397,000	37,931,000	43,298,000
Shingles, pieces	388,586,000	465,731,000	565,759,000	609,209,000	781,160,000	798,277,000
Sleepers and ry. ties, pieces	891,254	1,287,661	701,810	1,297,003	868,800	970,007
Stave bolts, cords	31,403	13,635	9,077	8,793	5,034	2,081
Timber, square—ash, tons	5,897	4,509	2,685	11,495	3,065	2,098
Timber sq.—birch, tons	16,808	26,969	16,137	24,750	10,597	19,663
Timber, square—elm, tons	10,478	14,289	12,717	10,554	13,117	14,033
Timber, sq.—maple, tons	273	26	195	480	266	146
Timber, square—oak, tons	25,338	27,706	26,465	13,670	15,310	16,340
Timber, sq.—red pine, tons	6,849	8,845	5,611	5,341	2,280	10,857
Timber, sq.—white pine, tons	109,312	91,280	86,661	73,108	47,686	58,632
Timber, sq.—all other, tons	4,938	4,107	1,084	3,292	3,997	3,812

*Included in lumber.

VALUE OF FOREST PRODUCTS EXPORTED FROM CANADA.

	1894	1896	1898	1900	1902	1904
Ashes, pot and pearl	$ 109,764	$ 110,092	$ 112,305	$ 133,255	$ 133,798	.....
Bark for tanning	148,078	177,010	105,057	61,899	100,361	$ 66,905
Basswood	20,648	35,963	37,044	*	*	*
Hickory	7,364	9,573	437	.....	.....	*
Firewood	287,036	222,389	140,897	117,751	91,507	71,961
Knees and futtocks	11,673	9,816	14,175	19,991	18,540	12,680
Total	$584,563	$564,843	$409,915	$337,896	$344,206	$151,546
Logs, cedar, for shingle bolts	900	3,458	500	18,222	.....	.....
Logs, elm	152,221	124,983	53,784	74,721	54,245	16,519
Logs, hemlock	19,769	18,607	4,030	7,738	32,604	33,392
Logs, oak	16,397	6,627	2,517	3,430	2,783	535
Logs, pine	2,459,354	1,423,989	1,616,671	494,311	175,684	30,306
Logs, spruce	107,282	86,075	33,885	63,078	63,555	69,110
Logs, all other	106,229	71,035	89,430	117,132	237,019	269,771
Total, logs	$2,862,152	$1,734,779	$1,800,817	$778,832	$565,840	$419,633
Lumber—						
Battens	5,152	35,267	20,350	27,811	116,944	39,287
Deals, pine	2,751,069	3,037,791	3,814,947	3,276,516	3,164,552	2,975,614
Deals, spruce and other	5,567,631	5,579,746	7,918,366	8,287,960	7,451,148	7,920,444
Deal ends	484,324	520,646	641,043	564,869	472,015	407,089
Lath	498,755	492,224	343,378	479,391	746,015	} 835,939
Palings	20,262	10,378	14,851	22,272	7,429	
Pickets	33,154	25,793	18,052	30,443	87,207	
Planks and boards	7,947,001	8,513,419	5,611,537	9,611,278	12,568,991	12,707,912
Joists	17,052	14,747	5,229	49	2,848	} 524,838
Scantling	170,386	387,707	241,044	235,615	365,117	
Staves	641,077	701,983	401,083	549,816	301,047	207,490
Other lumber	415,655	653,001	243,672	660,741	336,975	386,705
Total lumber	$18,551,518	$19,972,702	$19,273,552	$23,746,761	$25,620,288	$26,005,318
Masts and spars	7,138	7,800	2,448	3,505	7,965	7,333
Piling	61,815	67,755	135,154	93,346	208,479	91,715
Poles, hop, hoop, telegraph and other	71,789	50,503	36,126	48,872	103,825	35,463
Posts, cedar, tamarack and other	65,717	60,949	23,374	24,893	32,556	24,890
Shingles	754,743	899,541	994,306	1,131,506	1,525,386	1,711,258
Sleepers and railroad ties	131,765	213,622	101,191	221,906	182,198	188,831
Stave bolts	86,296	34,672	20,811	20,673	11,671	3,995
Shooks	105,239	125,610	117,434	251,357	370,405	343,461
Total	$1,284,502	$1,460,452	$1,430,844	$1,796,058	$2,442,485	$2,406,946
Timber, square—ash	70,543	51,391	28,617	39,486	43,934	10,635
Timber, square—birch	127,591	221,715	142,565	228,424	104,867	109,275
Timber, square—elm	140,367	187,278	175,346	160,715	248,253	160,036
Timber, square—maple	3,828	295	2,098	5,832	3,000	.....
Timber, square—oak	570,675	583,951	606,724	280,298	355,952	226,759
Timber, square—red pine	74,453	108,026	59,687	63,295	30,894	33,385
Timber, square—white pine	1,568,835	1,518,042	1,536,067	1,184,962	923,795	1,530,506
Timber, square—all other	34,245	50,719	28,882	50,734	56,884	61,658
Total, timber	$2,590,542	$2,721,417	$2,579,986	$2,013,746	$1,767,579	$2,132,254
Wood, blocks and other for pulp	393,260	627,865	912,041	902,772	1,315,083	1,788,049
Other articles of the forest	85,911	87,623	104,384	137,803	63,930	86,311
Grand total	$26,352,448	$27,166,686	$26,511,539	$28,763,668	$32,119,366	$32,990,057

* Included in lumber.

The preceding table shows the change by which less quantities of what may be called the raw products of the forests are exported, and larger quantities of the products of mills and factories. The effect of the prohibition of the exportation of logs cut from Crown lands in the eastern provinces is displayed in the figures on pine logs, while the wonderful growth in the pulpwood business is also potent in its effect on the reports.

The exportation of wood from Canada into the United States is increasing rapidly. The value of these exports during recent years was:

During the fiscal year ending June 30, 1898	$ 9,840,524
During the fiscal year ending June 30, 1899	10,511,019
During the fiscal year ending June 30, 1900	14,087,088
During the fiscal year ending June 30, 1901	13,176,717
During the fiscal year ending June 30, 1902	16,682,183
During the fiscal year ending June 30, 1903	18,823,878

This shows an increase in 1903 over that of 1898 of $8,983,354, even surpassing the export for the same period to Great Britain by $30,001; and this in the face of the American duty. This certainly indicates the great market for wood material that the United States alone will afford Canada in the future.

During the year 1902 the pulp output of Canada decreased by 24,613 tons. There were thirty-five mills engaged in the industry, the output of which was 240,989 tons, of which 155,210 tons were mechanical pulps, 76,735 sulphite, and 9,044 soda. The value of the pulp in 1902 was $4,383,182, of which there was exported $2,511,644, as follows: To Great Britain, $976,192; United States, $1,598,139, and other countries $17,333. The mills were operated chiefly by water power.

The following shows the exportation of wood goods from British North America to the United Kingdom during the years named:

Year.	Timber. Loads.	Sawn and planed lumber. Loads.
1895	124,936	1,167,947
1896	151,102	1,456,179
1897	157,432	1,979,155
1898	108,554	1,644,830
1899	114,794	1,751,453
1900	113,843	1,688,033
1901	90,042	1,517,194
1902	78,917	1,639,668
1903	66,559	1,507,530

Notwithstanding the enormous wealth of Canada in forest resources and the heavy exports of forest products, the Dominion does, nevertheless, find it convenient to import no small amount of material, most of which comes from the United States. The following table shows the importations of wood and wood products for 1904:

IMPORTS INTO CANADA, BY COUNTRIES, 1904, FREE OF DUTY.

Articles.	Great Britain.	United States.	All countries.
Corkwood	$ 4,250	$ 54,419	$ 78,357
D shovel handles	110	45,776	45,886
Fellies, hickory	.....	27,610	27,610
Bolts, heading, etc.	.....	29,376	29,376
Billets, hickory	.....	4,007	4,007
Spokes, sawn to shape	.....	2,612	2,612
Spokes, rough turned	.....	178,603	178,603
Hubs for wheels	3	24,071	24,074
Railroad ties	.....	202,887	202,887
Logs, round	.....	395,984	396,348
Lumber—			
Cherry, etc	.....	456,479	457,419
Mahogany	11,494	126,894	138,388
Oak	41	1,492,536	1,492,577
Pitch pine	5	302,370	302,375
Walnut	.....	57,770	57,770
Ash	.....	97,479	97,479
Timber, hewn or sawn	419	324,864	326,760
Boards, planks, etc., partly dressed	155	2,658,006	2,663,571
Lath	.....	58,779	59,691
Shingles	.....	22,141	22,141
Staves	.....	146,566	146,580
Firewood	.....	112,631	112,631
Total	$16,477	$6,821,860	$6,877,142

It will be noted in the above that the importations have been of hardwoods, in the form of lumber, timber and partially manufactured materials and of miscellaneous lumber not clearly specified.

The importations of hardwoods are due to the partial denudation of the hardwood districts of the Dominion spoken of previously. Many of the hardwood importations are of materials for manufacture. In addition, considerable quantities of ordinary building lumber are imported, owing to the fact that for some sections the American sawmills furnish a convenient and economical supply. Such has been the case in Manitoba and the Canadian Northwest, which have drawn heavily upon United States mills, especially upon those in Minnesota and, in recent years to some extent, upon those in the far northwestern states, for the construction of houses, barns and business buildings in the development of that comparatively new country. In the older provinces it has been found desirable to import from the United States such items as pitch pine, used where a wood of strength is desired, and house finish, such as flooring. Therefore, while the exports of Canada are much heavier than its imports, it has imported material from the United States to the value of $6,820,000. This heavy importation is made possible by the fact that the products of the forest are on the Canadian

free list; but in recent years, and especially in 1904, an agitation began for an imposition of duty upon sawed lumber, with particular reference to supplying the needs of Manitoba and the Canadian Northwest from Canadian mills in western Ontario and in British Columbia, to the exclusion of the mills of Minnesota and of Washington and other far western states.

CHAPTER VII.

CANADA—COOPERAGE STOCK INDUSTRY.

Almost since the beginning of timber and lumber exportations from Canada the manufacture of cooperage stock or material therefor has been one of the leading of the minor forest industries. Easily accessible to waterways, all the way from Quebec to Lake Huron were originally immense quantities of timber suitable for this purpose. The oaks, and other woods used in the manufacture of cooperage stock, which grew in Canada compared very favorably with those of the United States, and, as intimated above, they were for the most part more accessible, though for scores of years the industry in the United States has been growing to magnificent proportions, feeding upon the resources reached not only by river, but by railroads. The Canadian cooperage stock industry, however, antedated that of the United States and was maintained in large proportions until the cutting away of timber compelled a reduction in its magnitude.

The more recent history of the Canadian industry is indicated to some extent in the figures of production contained in the preceding chapter, but a more reliable measure of its importance and fluctuations is found in the export statistics, out of which the following brief table has been compiled. The maximum of exportations, and presumably of manufacture likewise, was reached about the middle of the last decade, since when there has been an almost uniform decline, until, in 1904, the total exports of staves, heading and stave bolts were valued at only $211,485.

EXPORTS OF STAVES AND STAVE BOLTS FROM CANADA.

Year.	Staves and heading. Value.	Stave Bolts.	
		Cords.	Value.
1881	$300,128	.....	.....
1891	434,868	.....	.....
1894	641,077	31,403	$86,296
1895	638,272	24,167	64,802
1896	701,983	13,635	34,672
1897	699,381	13,827	38,634
1898	401,083	9,077	20,811
1899	527,131	5,328	12,372
1900	549,816	8,793	20,673
1901	438,973	3,223	7,217
1902	301,047	5,034	11,671
1903	284,462	2,081	5,337
1904	207,490	.....	3,995

The cooperage stock industry of Canada is not of sufficient importance to demand much space in this work, but a few pages may well be devoted to a review of the industry from historical and technical standpoints, prepared by a man who is one of the leading exporters of this class of material either in Canada or in the United States. His review of this subject[1] occupies the remainder of this chapter:

A great many years ago, when the principal exports from Canada to the old country consisted of furs and timber, some enterprising Frenchman (or possibly Scotchman), who had come from the motherland, being employed in the manufacture of barrels and casks, conceived the idea of getting out staves and heading in Canada for export to Great Britain. In those days the forests contained a great deal of fine white oak all the way from Quebec to Windsor, but more especially in the western peninsula, and those trees were cut down, squared up with a broad-ax and shipped to England, the consequence being that only the finest trees were used and only part of them, namely, the part that could be put into square timber.

This square timber was floated down to Montreal, loaded on vessels there for the old country, where it was used for the manufacture of lumber, and, I presume, staves also. This enterprising Frenchman or Scotchman no doubt saw the terrible waste which occurred by only using certain parts of the trees, and also saw the trees which were passed as not fit for square timber, but which would make excellent staves and undoubtedly this was the commencement of the cooperage industry in Canada.

Staves were taken out for the wine casks of France and Spain, and the whisky casks of Great Britain and Ireland, and before long "Canada butts" and "Quebec pipe staves" became standard grades in Great Britain and on the Continent.

At that time all of the sugar used in England came from the West Indies and was shipped in hogsheads, and the West Indies hogshead staves were also manufactured in Canada, shipped to England, where they were made into shooks and sent over to the West Indies to be filled with sugar, molasses and rum.

As the oak got scarcer in the east, the hewers and stave makers drifted west, until Chatham, Ontario, became one of the great centers of the stave industry.

The old residents here have told the writer that years ago McGregor

[1] James Innes in the *Canada Lumberman*, January, 1905.

Creek and Thames River, which converge at Chatham, would have its waters covered for miles every spring with square oak, walnut timber, Canada butts, Quebec pipe staves and West India hogshead staves, and the smaller and shorter pieces of oak, utilized for barrel keg staves and heading. These were loaded on vessels in the Thames River, sent down to Montreal, and in some cases sent direct to England from Chatham. This, of course, was entirely tight barrel stock, as in those days no slack barrel stock was exported from Canada, as being all made by hand it was too expensive to send over to the old country, which at that time was almost entirely supplied with norway fir staves and beech staves made from the timber growing in England, Ireland and Scotland.

Mr. Neil Watson, of Mull, Ontario, now a manufacturer of slack barrel stock, hauled staves from Harwick township to Buckhorn Beach for years and sold his pipe staves, 60x5x2, at $25 per thousand, and West India staves, 44x4½x1, at $5 to $8 per 1,200 for shipment to England.

Tight barrel stock in Canada is now almost a thing of the past, the oak having been almost exhausted, and what staves are made here now are used entirely for local consumption, either being made in the old way, which I will describe, or being sawed on a drum saw.

The method of manufacture in the early days, in fact it is still in use, was to cut the trees up into bolt lengths, according to the quality of the tree, whether suitable for long or short staves or heading, then to split these bolts with a frow knife, and in some cases, such as "Canada butts," dress them with a draw knife and ship them in the rough, sometimes taking the sap off, but other times shipping them with the sap on. Now most of the oak staves are sawn on a drum saw, which does away with a great deal of waste, on account of the slips on the part of the workman with the frow, and also enables the manufacturers to use tougher oak and timber which would not split freely with a frow, in fact, work up everything very close. The bucker, for bucking staves, never got much of a foothold in Canada, as the timber was practically exhausted here before buck staves were salable on foreign markets.

Oak heading, instead of being split now, is sawed, and while in the old days the head used to be split, finished off with a draw knife, marked off with a compass and sawed out by hand, the bevel also being put on with a draw knife, the heading is now sawed on a swing saw, piled in the yard to dry, put through a kiln when partially seasoned, run through

a planer and turned up with a rounding machine, which puts on the bevel and turns the head at the same time. As already stated, the manufacture of tight barrel stock in Canada from oak is now almost a thing of the past, and does not figure very much in the export trade of Canada.

We will now turn to the manufacture of slack barrel stock. Years ago when the manufacturing industries in Canada were in their infancy and the consumption of barrels was a very minor matter, coopers made their staves and heading for flour and other slack barrels in the same manner as they used to make their tight barrel stock, in fact the same as a great many tight barrel staves and heading are still made in the United States.

The cooper would get his bolts in the winter, haul them to his cooper shop, split out his staves with his frow, and in the winter make the staves with a draw knife, jointing them on a planer jointer, in some cases even putting on the joint with his draw knife. At that time slack barrel staves were made almost entirely from red oak and basswood, the cooper making his staves during the winter months in his shop, seasoning them inside his barn or cooper shop, and making up his barrels as required, and after the staves were seasoned selling them from seventy-five cents to $1 each. Coopering at that time was simply a side issue, the cooper being also a farmer, carpenter, or some other tradesman, and making all kinds of barrels and casks from a flour barrel to a water tank.

Years rolled on, the red oak forests of Canada became a thing of the past—what oak was left would bring very much higher prices for lumber or bending purposes, sawn timbers, etc., than it would bring for staves, and the same applied to the States of New York, Ohio and Indiana, which at that time were large stave producers. Some Yankee genius (sad to say, unknown), possibly a man who thought there was a great waste of energy in making staves by hand, got his brains to work and invented the modern stave knife for cutting slack barrel staves from steamed bolts. The machine as at first invented is practically the same as is in use at the present time, the only improvements that have been made being that the machine is made twice as heavy as formerly, so as to be rigid and do away with the cutting of thin staves, and a balance wheel was put on so as to make the strokes more regular, and the speed increased from fifty revolutions per minute, which was the original cut of the machine, to 150 or 160 revolutions per minute, which is the speed at which the modern stave knives are run.

When this machine was first in use the staves were made entirely from red oak and basswood, the bolts being split out with a frow or ax, brought to the mill in this way and cut into staves. Immense elm forests then attracted the attention of some of the stave manufacturers and they experimented with making elm staves. It is not a great many years ago, only since I came to this country, that red oak staves were the principal kind used on the Minneapolis market, now elm is almost entirely used, in fact red oak staves are not liked on account of being so hard to work.

For a great many years nothing but split bolts were used, until some manufacturer, with a sawmill attached, conceived the idea of sawing his bolts, but until fifteen years ago staves made from sawn bolts commanded a lower price than staves from split bolts, as the coopers were of the opinion that staves could not be made straight grained unless the bolts were split, and it took a great many years to remove this erroneous idea. Now there is hardly a mill in the country making staves from anything but sawed bolts, and elm is the principal timber used, in fact is considered always desirable to any timber at the present time, although birch, beech, maple and southern woods are now crowding elm by degrees off the market, on account of the high price of elm stumpage.

We will now turn to the hoop industry. Until about twenty years ago all of the barrels were hooped with what is known as half-round hoops. The cooper cut these hoops in the winter, hauled them to his cooper shop, and spent the long winter months when not making staves in making hoops for his summer trade. Then the racked hoop made from black ash came into vogue, this being the precursor of the modern patent cut elm hoop. For a great many years the hoops were made either racked or split from elm, and finished with a draw knife, until the idea was conceived of cutting the hoops the same as staves from elm plank, and this hoop was found, when it was perfected, to be superior in every way to the racked or bark hoop. It is still the principal hoop on the market, although on account of the scarcity of elm a great many wire hoops are being used to supplement the elm hoops on the barrels. The iron hoop alone does not give sufficient rigidity to a barrel, and if not supplemented with the patent hoop, the barrels when stored on the bulges would collapse without the assistance of the elm hoop.

Heading, which formerly used to be made in the same way as

staves, split from bolts, dressed off with a draw knife, in fact the same as tight barrel heading, are now sawed on a swing saw, kiln dried and turned on a turning machine, at the rate of 3,000 sets per day to one machine, whereas formerly it was a very good cooper who would turn out twenty-five heads in a day.

While the tight barrel cooperage industry of Canada has declined, the slack barrel industry has leaped up until it is one of the most important industries in Canada, millions of dollars being invested in stave, hoop and heading mills all over the country from Nova Scotia to Ontario, and barrels being used for almost every conceivable purpose, as they are the handiest, strongest and best package that has yet been invented by man.

There is no doubt but there is timber in parts of Canada which are yet undeveloped to continue this industry for a number of years, and no doubt before the supply is exhausted methods of reforestry will be inaugurated by the Canadian government the same as are in vogue in Norway and Sweden. It is one of the greatest industries we have in Canada and should be fostered so as to continue in perpetuity.

CHAPTER VIII.

QUEBEC—TIMBER HISTORY AND ADMINISTRATION.

Though the lumber industry in the Provinces of Quebec and Ontario in the Dominion of Canada is, so to speak, a double tree, growing from one root, it may be well to consider them separately, passing lightly over that part in each which more fully describes the other. The history of the industry could not be otherwise than interwoven in these two Provinces because from the beginning of things[1] until 1791, whether under French or British rule, they constituted one colony, and from 1841 to 1867 they were again united in the Union of Upper and Lower Canada. In the latter year these two Provinces, so different in language, religion, thought and habits, were the basis of that confederation which bound all the scattered colonies of Great Britain in North America (excepting Newfoundland) into an independent auxiliary nation, with complete self-government, with national responsibilities, and national aspirations; as Kipling sings

> Daughter am I in my mother's house,
> But mistress am I in my own.

That confederation would have been impossible but for the mutual forbearance—the give-and-take—between these two great Provinces which now, after a generation of expansion in greater Canada, still contain about seven-tenths of the total population of the country, a forbearance whereby the solid, Protestant, English-speaking Ontarian and the dashing, Catholic, French-speaking Quebecer have, as in a marriage contract, agreed to take each other for better or for worse, for all time; and, having made up their minds to it, find each other not such bad partners after all—in fact, preferable to any other of whom they know.

Moving across the stage of Canada's history, crowded with com-

[1] In 1534 Jacques Cartier entered the Gulf of St. Lawrence, visited different coasts around the Gulf, and took possession of the country in the name of "the most Christian king," Francis I., King of France. In the same year Cartier was appointed Captain General of Canada, which title he held for six years. In 1535 he explored the Gulf of St. Lawrence, landed at Quebec and sailed as far as the Indian village of Hochelaga, now Montreal, which he visited. After unsuccessful attempts at colonization by the French under Cartier, Roberval, La Roche and others, the first permanent settlement was effected at Port Royal under the direction of Champlain, in 1605. The City of Quebec was founded in 1608 by twenty-eight settlers, including Champlain. Montreal was founded by Champlain in 1611, the site being chosen by him as a favorable place for a new settlement higher up the river than Quebec.

manding figures, there is none more picturesque than that of the lumberman, beginning with the cavalier seigniors of New France, continuing with the haughty admiralty officers of old England, with their retainers singing French-Canadian boat songs, or fighting and praying as became good Glengarry covenanters, on through the stirring times of the rebellion of 1837 to the present time when, in the midst of a world of timber dues and percentages, the successful lumberman still builds his palace in the wilderness and becomes known as the King of the Gatineau or the Prince of Petawawa.

Nothing comes out more clearly in the early history of colonization in Canada than that the tree was considered man's enemy, and only valuable as a barricade against other enemies, climatic or human.

The idea of those who colonized New France was to reproduce the conditions of lord and vassal, which they thought to be eternal but were only accidental and were passing away in the old France even while they were vainly striving to reproduce them in the new. By this system the land was divided into large blocks, as large as a modern township, or small county, and each block given to a scion of a noble house who colonized his tract with tenants or retainers. These, in return for occupancy of the land, not only paid rents but performed many personal services, while the seignior on his part was invested with many privileges; among others, that of hunting over the retainer's land and of administering justice.

The place which timber occupied in this system may be best seen by examining one of the old seigniorial grants made in 1683 by the governor and indendant of Quebec, which embodies the usual conditions. No excuse is made in presenting it because it is a land grant, for from the beginning to the present time land and timber regulations have gone hand in hand:

We, in virtue of the power intrusted to us by His Majesty [the King of France] and in consideration of the different settlements which the said Sieur de la Valliere and the Sieur de la Poterie, his father, have long since made in this country, and in order to afford him the means of augmenting them, have to the said Sieur de la Valliere given, granted, and conceded the above described tract of land, to have and to hold, the same himself, his heirs and assigns forever, under the title of fief, seignory, high, middle and low justice and also the right of hunting and fishing throughout the extent of the said tract of land; subject to the condition of fealty and homage which the said Sieur de la Valliere, his heirs and assigns shall be held to perform at the Castle of St. Louis in Quebec, of which he shall hold under the customary rights and dues agreeably to the Custom of Paris; and also that he shall keep house and home and cause the same to be kept by his tenants on the

concessions which he may grant them; that the said Sieur de la Valliere shall preserve and cause to be preserved by his tenants, within the said tract of land the oak timber fit for the building of vessels; and that he shall give immediate notice to the King or to Us of the mines, ores and minerals, if any be found therein; that he shall leave and cause to be left all necessary roadways and passages; that he shall cause the said land to be cleared and inhabited, and furnished with buildings and cattle, within two years from this date, in default whereof the present concession shall be null and void.

This extract shows that the only interest the Crown took in the matter was the securing of an ample supply of oak for building ships for the royal navy. Later grants reserved timber for spars and masts, doubtless pine timber. From time to time, as war vessels were built or repaired at Quebec, permits were issued to parties to cut the oak timber reserved as above and regulations were made for rafting it to Quebec. Again, when new districts were opened in which oak timber was reported to be abundant, regulations were issued forbidding anyone cutting it until it had been examined and suitable trees had been marked for the navy. The penalty for violation of this regulation was confiscation of the timber and a fine of ten livres for each tree.

These first reservations caused trouble between the cultivator and his over-lord or the Government, as similar arrangements have done ever since in every part of the continent. If oak trees were numerous the tenant had either to destroy them or fail to fulfill his obligations to clear the land in a given time. The usual way of cutting the Gordian knot appears to have been to burn the timber; but after suits by seigniors against settlers who made the trees into boards for their own use, it was ordained by the governor that the tenant should be unmolested where the timber was cut in the actual extension of his clearing; but where the trees were cut for timber without the intention of clearing the land the party should be fined.

When the land became a little more cleared, trespass by settlers upon adjoining lands to cut suitable sticks or easily reached timber became more common and was punished by confiscation of the trucks and horses used to transport the wood and by a fine of fifty livres. In the district about Quebec City, one-half the fine and confiscation went to the proprietor of the land and the other half to the Hotel Dieu (hospital) of Quebec City.

At first the Crown reservation of timber was solely for naval purposes, and timber taken for military purposes, such as the building of casemates, was paid for by the Crown; but later the reservation was

extended to include all timber the King might require. While the right of the King was thus defined, the rights of the seignior were undetermined and continued to be exercised conformably to Old World custom, with more or less exactness, according to the strength of mind of the seignior and the power of resistance of his retainers. These seigniorial rights lasted long after British occupation and were extinguished only by compensation, by the Seigniorial Tenures Act, of 1854. The court which heard the claims decided that the seignior had no right to timber for firewood for his own use, or to merchantable timber or timber for churches; as to whether he had the right to timber for manor house and mills, the court was divided. So that in the closing years of the French regime the Crown reserved the timber it required for its own use, and prohibited trespass, while the seignior reserved what timber he could for himself by the exercise of his will power over the tenant.

With the beginning of British occupation, in 1763, the policy of reserving timber for naval and military purposes inaugurated by the King of France was continued by the King of England, and somewhat extended. The first governor under the new regime, John Murray, was instructed to make townships containing about 20,000 acres, and in each township he was to reserve land for the erection of fortifications and barracks, where necessary, and more particularly for the growth and production of naval timber. He was further instructed to make reserves about Lake Champlain and between that lake and the St. Lawrence, because it had been represented to the King that the timber there was suitable for masting and other purposes of the royal navy and because it was conveniently situated for water carriage. He was to prevent waste and punish any persons cutting the timber and to report whether it would be advisable to prevent any sawmills being erected in the colony without license from the governor or the commander-in-chief. The modern school of forestry experts is inclined to regret that these instructions as to reservations in each township and permanent pine reserves on lands suited to pine were not carried out, the reason being that other urgent matters occupied the governor's attention and subsequent exploration showed the so-called illimitable extent of the pine forests.

In 1775 Guy Carleton, captain general and governor in chief, received like instructions, and in 1789 fuller regulations for the conduct of the land office were made, preserving the timber to the Crown, confining grants to individuals to lands suited to agriculture, and preventing

individuals from monopolizing such spots as contained mines, minerals, fossils and water powers, or spots fit and useful for ports and harbors and works of defense. These were to be reserved to the Crown.

If these regulations had only been carried out, how much would posterity have been saved! The seignior, with his plumed hat, his ruffles, his sword and turned-down top boots, as the sculptor represents him on the public squares of Montreal, had disappeared and his place was taken by a less artistic but more active individual, the royal admiralty contractor. Licenses to cut timber were granted by the British government to contractors for the royal dockyards, and these, in addition to getting out timber to complete their own contracts, took advantage of the opportunity to do a general business in supplying the British markets. The timber was still considered of such small value, above the cost of transport, that these were apparently not felt to be serious abuses by the colonists of that day.

EFFECT OF BRITISH IMPORT DUTIES.

A new era dawned for the Canadian timber industry with the close of the Napoleonic wars. In 1787, by a consolidation of the duties on timber coming into Britain, the rate was fixed at six shillings and eight pence per "load" of fifty cubic feet upon foreign timber imported in British ships, with an addition of two pence in case the shipment was made in a foreign ship. With the increased taxation necessary to carry on the wars to checkmate Napoleon's ambitious schemes, the duties rose steadily until, in 1813, they were £3 4s 6d a load, with 3s 2d additional when imported in a ship flying a foreign flag. The decline in the duties began again in 1821 when they were fixed at £2 15s a load, with 2s 9d additional for importation in a foreign vessel. Then for the first time a duty of 10s a load was imposed upon colonial timber, which had been theretofore free. However, as the colonies still enjoyed a preference of 45s a load, that did not stop the progress the colonial timber trade was making. This was shown by a report presented to a British parliamentary committee in 1833, to which was submitted the whole question of timber duties. This report shows that the earlier duties levied were not sufficiently large to overcome the prejudice which existed in favor of Baltic timber.

The first noticeable change was in 1803, when the imports from British North America reached 12,133 loads, compared with 5,143 loads the previous year. How small was the colonial trade is shown by the fact that the importations of European timber amounted to 280,550

loads. In 1807 the colonies supplied 26,651 loads as against 213,636 from Europe, and in 1809, for the first time, the colonial product exceeded that from Europe, the figures being 90,829, and 54,260 loads respectively.

The War of 1812 had a depressing effect upon colonial trade and Baltic timber again took the lead until 1816, when the colonies supplied twice the quantity sent by Europe. This was a period of expansion in Britain, so that the total trade as well as that with Canada shows great growth. In the five years from 1819 to 1823 the average annual import into Great Britain was 452,158 loads, of which 166,600 came from Europe and 335,556 from the colonies. The succeeding five years showed still further growth to a total yearly average of 602,793 loads, of which 410,903 came from the colonies, although in 1821 the duties on foreign timber were reduced and a duty of ten shillings a load imposed on colonial timber.

This is the first place where we hear of the United States. In 1819 duties were imposed by Canada upon goods coming from the United States, but flour, oak, pine and fir timber for export were allowed to come in free. The meaning of this was that a good deal of timber was brought in from the United States and reshipped from Quebec to the British market in order to obtain advantage of the preferential tariff in favor of the colonies. The extent of this trade attracted the attention of the British authorities, who had no intention that United States producers should avail themselves of a preference intended to help the colonies.

In 1820 an official inquiry was instituted by the British House of Commons which showed that the timber imported into Lower Canada from Lake Champlain from 1800 to 1820 included 10,997,580 feet of red and white pine, 3,935,443 feet of oak timber, 34,573,853 feet of pine plank and 9,213,827 feet of pine boards. As a result of this condition, by an imperial act duties were imposed upon lumber brought in from the United States as follows:

	£	s	d per M
Shingles under 12 inches	..	7	" "
Shingles over 12 inches	..	14	" "
Red oak staves	1	1	" "
White oak staves or headings	..	15	
White or yellow pine (1 inch)	1	1	per M feet
Pitch pine lumber	1	1	" " "
Other kinds of wood and lumber	1	8	" " "
Wood hoops	..	5	3 per M.

This growth in the use of the colonial product was made in the face of a very strong prejudice in favor of the Baltic product. The select

committee of the House of Lords which heard evidence on the subject in 1820 was furnished with evidence on the part of timber experts as to the inferiority of timber from British America which today not only excites wonder and ridicule, but which demonstrates what an important bearing sentiment has upon trade. One timber merchant and builder examined by the committee said the timber of the Baltic in general was of quality very superior to that imported from America, which latter was inferior in quality, softer, not so durable, and very liable to dry rot. Its use was not allowed by any professional man under the Government, nor in the best buildings in London. Speculators alone used it and that because the price was lower. Two planks of American timber laid upon one another would show evidence of dry rot in twelve months, while Christiania deals in like situation for ten years would not show the like appearance. There was something in American timber, he thought, which favored dry rot unless there was air on all sides.

In spite of this prejudice[2] the lower duty caused colonial timber to be extensively used and once given a fair trial the prejudice gradually disappeared. Fifteen years after the investigation just recorded another was held by a House of Commons committee, in 1835, which showed the change in opinion. One of the witnesses here gave as a reason for the former prejudice against colonial timber that while low grades were brought in by "seeking" ships, the high duty on Baltic timber kept all but the best grades of that timber out, so that the British builder was acquainted with the better grades only. A Liverpool ship owner and timber merchant said that, if duties were equal, he could get from three pence to four pence a foot more for a particular description of colonial timber than he could for any Baltic. With this change of opinion there had gone another, by which red pine, formerly preferred to white, was dropped to second place, where it has ever since remained. A Manchester builder declared that white pine in bricks and mortar was less liable to decay than red pine or Baltic.

Canadian timber, which thus got a foothold through a preferential tariff, continued to hold its own in the years when the preference was gradually reduced and finally abolished altogether in the adoption of

[2] This prejndice still persists. As late as 1893 John Nisbet, in his work entitled "British Forest Trees and Their Sylvacultural Characteristics and Treatment," in speaking of Weymouth, or white pine (*Pinus strobus*), said: "In prodnction of timber it is second in rate of growth only to the poplar, but its timber, known as American *white pine*, is neither so durable nor so remunerative that its production is likely to become as inviting as would undoubtedly be the case if it could command an easy and good market. As, according to Gayer, it is the lightest of all our acclimatised exotics, its cultivation may be recommendable wherever there is any fair demand for timber for packing cases or similar requirements."

free trade. Nevertheless, while the trade grew, there is no doubt that Canada felt the withdrawal of the preference not only upon lumber but upon all her products severely, and it was this, more than anything else, that caused the feeling of despondency and doubt which preceded confederation, a depression from which it required all the genius of Sir John Macdonald and the coöperation of his associates to arouse the people with the vision of a self-contained country stretching from the Atlantic to the Pacific.

In 1850 the timber exports from Canada (Quebec and Ontario) amounted to £971,375 and in 1857 the value had grown to £2,044,178. This had been accompanied by a growth in exports to the United States. In 1867, the year when confederation went into force, exports to Britain were $6,889,783 and to the United States $6,831,252.

CANADIAN LEGISLATION AND LATER HISTORY.

In the preceding pages has been recounted the effect of the laws of parliaments outside of Canada upon the timber trade. Now it will be advisable to consider the effect of the laws and regulations made in the country itself.

The first enactment of a Canadian legislature was passed in Lower Canada in 1805 to prevent accidents in navigating the rapids of the St. Lawrence, which, owing to the increasing shipments by that river to Montreal, had become frequent. The act provided for the appointment of an inspector and measurers of scows and rafts between Chateauguay and Montreal and for the regulation of pilots. These officials, who were to reside in the parish of Chateauguay, were from time to time to take the depth of water of the rapids and determine what water scows and rafts might draw in order to pass the rapids in safety. They were, upon application, to measure the draft of each scow and raft and to cause the former to be lightened to the draft determined as the limit of safety. Pilots were to be licensed yearly by the justices of the peace for Montreal, upon recommendation of the inspector, for which license a fee of two shillings and sixpence was charged. The pilots' fees for taking rafts and scows through the rapids were: Scows, 30 shillings; rafts consisting of two cribs, 12 shillings and 6 pence. After October 1 to the end of navigation these were increased by one-fifth.

Fines up to forty shillings were imposed upon measurers or pilots neglecting their duty and upon unlicensed persons acting as pilots. A pilot who, without the consent of the owner, left a raft or scow stranded in the rapids was fined the loss of his fees and 20 shillings. The pilot

was allowed 5 shillings a day while he remained with the wreck and assisted in saving the property and in clearing the rapids of the obstruction. The fees for measurements were: Scows, 6 shillings; crib and rafts 2 shillings and 6 pence, and rafts of firewood 1 shilling 6 pence. These fees, by an act of 1808, were applied to the improvement of the rapids.

In the same year an even more important measure affecting the industry was passed. This provided that no lumber should be exported until it had been culled, measured and certified as to quality. The governor was authorized to appoint master cullers at Quebec and Montreal who were to ascertain the quality and dimensions of the articles submitted to them and to give a true and faithful account of those found merchantable, which was to be final and conclusive between buyer and seller. The act laid down the standards for square oak and pine, planks, board, etc. It was reënacted in 1811 and 1819 and made more stringent in its provisions. At the same time in all these acts there were most contradictory clauses. In some the shipment of unstamped timber (as having passed the culler) was prohibited, while in others it was stated that second or inferior grade lumber might be exported. The cullers were apparently governed by the contract between the buyer and seller, and the rigid definitions of what constituted merchantable timber were only to apply where no specific agreement between the parties existed. After being put beyond question upon a voluntary basis in 1829, it was finally allowed to expire by lapse of time, in 1834.

There was no further legislation on this point until after Quebec and Ontario were united in 1841 (Ontario having been created a separate province, called Upper Canada, in 1791). In 1842 an act was passed, further amended by an act of 1845, which got over the previous difficulties by creating three grades for timber and deals.

As in Ontario, the Crown first began to collect timber dues in 1826, and the regulations in this respect followed those of Ontario until the union of the two Provinces. As a rule, however, Ontario, by reason of greater facility in getting lumber to market, has charged dues a little higher than her sister province. As in Ontario, from the first the Crown adopted the plan of not selling timber lands but of granting a license to cut timber upon Crown lands within a certain specified time, at the end of which the land returned to the Crown either to be granted to the settler for agricultural purposes or to be held until the timber grew again. The way in which these wise provisions were evaded for many years was this:

Since the timber cost money and the land was free or sold at a very low price on easy terms to the settler, men who never intended to farm the land, or to settle farmers upon it, got areas large or small granted to them and, having stripped them of their timber, allowed them to go back into the hands of the Government. Where they had made a small first payment they either let that go as a fine or endeavored to sell out to a bona fide settler.

Quebec, or Lower Canada, passed through the same period of wasteful granting away of Crown lands as did Upper Canada, and this period culminated in a like rebellion in 1837 and the granting of responsible government, when the two Provinces were united in 1841. The two Provinces then for over a quarter of a century, until 1867, enjoyed laws common in nearly every respect. The timber question was one of the first taken up and the regulations made at the first session of the united parliament laid the foundation of all subsequent progress in forestry.

The orders in council of 1842 limited the period for which the license was granted, and introduced the plan of putting the berths up at auction where there was more than one applicant. The rule had been that the applicant simply paid the dues; and there had been much Crown land covered with timber in regard to which lumbermen did not clash or compete. Now, however, the easily reached limits began to grow scarcer and the applicant who offered the highest "bonus" or lump sum for the limit, in addition to the dues, was awarded it. In all these cases the timber only was sold, the land being reserved on the general principle that it would be taken up by the settler after the timber was taken off. The ignoring of the fact that much of the land was not fit for settlement was the chief fault in these regulations, because the idea of the time limit seems to have been handled chiefly in such a way as to insure that the operator would at once proceed to work his limit. The consequence has been that where the land is not fit for settlement some firms that got their licenses in the early days have continued holding and cutting over limits for many years, whereas, had the lease terminated absolutely on a certain date, the berths would have gone back into the hands of the Government, which, after allowing them to rest for a few years, might have resold them for a greatly increased bonus. As it is the Government secures only the ground rent of about $3 a mile per annum and the dues on the timber cut. Later regulations have been more definite and the worked limits are now year by year falling back into the possession of the Crown.

Further regulations made in 1846 restricted the size of the limits to five miles frontage along the stream and five miles inland, or half way to the next river. The licensee bound himself to cut 1,000 feet a mile yearly on his limit.

The season of 1845 was a prosperous one in the trade, and 27,702,000 feet were brought to Quebec and 24,223,000 feet exported. This good trade caused an over-production in the next year, and as the British trade fell off there was a serious depression. This was accentuated by the provision that the operators must cut 1,000 feet a mile each season on their limits regardless of the conditions of the trade.

The inevitable parliamentary committee of inquiry appeared in 1848, before which W. W. Dawson, a leading Bytown (Ottawa City) lumberman, stated that in 1847, including the quantity in stock and that brought to market, there was a total supply of 44,927,000 feet to meet a demand for 19,060,000 feet. The next year the supply was 39,447,000 feet and the demand 17,402,000 feet. He attributed the decreased demand to the commercial depression in Europe and the unprecedentedly large supply thrown upon the European market from the Province of New Brunswick. As to the over-supply he gave three reasons: The regulations requiring the manufacturing of a large quantity per mile; the threatened subdivision of limits, and the difficulties regarding boundaries.

The threatened reduction or subdivision of limits in three years to the size of five by five miles caused operators to endeavor to clear off their big limits before being compelled to hand them back to the Government. The lumbermen accused the Government of inaction in regard to their boundaries, and in consequence, in order to defend their limits, they had resort to physical force. This meant that the operator trebled or quadrupled his men to be superior in numbers to his opponent, and, as the men were on the ground, this meant the trebling or quadrupling of the output.

The chief remedy suggested by the lumbermen to the committee was that, instead of endeavoring to prevent the holding of limits for speculation by compelling the cutting of a certain amount of timber a year, an annual ground rent of two shillings six pence a square mile should be levied, which should be doubled in case of nonoccupation, and the doubling continued every year the limit remained unoccupied. They also suggested that the dues be collected upon actual measurement instead of upon a count of sticks. For instance, red pine was

figured on an arbitrary average of thirty-eight feet a stick, whereas the sticks ran from twenty-six to sixty feet, and a spar or mast worth £10 paid only the same duty as a small stick available for building.

The committee reported recommending such action, and as a result the first Crown timber act was passed in 1849. This cleared up many points in dispute. Under the regulations accompanying the act the size of berths permitted was doubled; that is, ten miles along the river by five miles deep, or fifty square miles, but only half that size was permitted in surveyed townships. The dues imposed were: White pine, square timber, ½d a foot; red pine, square timber, 1d; basswood and cedar, ½d; oak, 1½d; elm, birch and ash, 1d; cordwood, hard, 8d a cord; soft, 4d; red pine logs, twelve feet long, 7d a log; white pine logs twelve feet long, 5d; spruce, 2½d. Each stick was to be computed as containing cubic feet as follows: White pine, 70 cubic feet; red pine, 38; oak, elm, ash, birch, cedar and basswood, 34. Statements under oath were to be made of the kinds and quantities of timber cut. The ground rent plan was not adopted, but the minimum quantity to be cut on each mile was reduced to 500 feet a year.

There was one clause which gave rise to a great deal of trouble in after years. This provided that squatters were liable to the penalties for cutting timber without license, but the dues on timber cut on land purchased but not all paid for were to be collected by the Government as part payment for the land. The arbitrary regulation as to the quantity in each stick was made elastic by providing that the operator could have the timber counted or measured as he chose. The regulations also gave the limit holder a preferential claim above all others to a renewal of his license, and thus gave greater permanence to the lumbering business.

In the regulations of 1851 a ground rent of two shillings six pence a mile was introduced, which rent doubled and increased annually in that proportion, when the limit was not worked. It was provided also that, where expenses of surveys made it advisable, licenses might be disposed of at an upset price fixed by the Commissioner of Crown Lands; and, in case of competition, awarded to the highest bidder. Owing to the representations of mill owners and municipalities in western Ontario, chiefly about London, the dues were doubled when the logs were destined for export. This was to protect manufacturers against the practice by American citizens of procuring lands at a low rate for the purpose of cutting timber to be manufactured in the United States.

The good effect of these new regulations was at once seen. The revenue had been £22,270 in 1848; £24,198 in 1849; £24,728 in 1850 and £30,318 in 1851. In 1852, the first year the new regulations went into force, the receipts rose to £53,013, of which £7,656 was for ground rent, and this in spite of the fact that dues on red pine had been cut in two. Up to this time red pine bore a penny a foot, while white pine bore only a half-penny; but, owing to the decline in the British preference for red pine, it had gone down in price and white pine had gone up. This seems to have been a case where prejudice backed by higher import duty gave red pine a fictitious value for years. A memorial of manufacturers showed that the price of red pine decreased from one shilling in 1844 to eight pence in 1851. The duty was accordingly reduced to one-half pence a foot. The ups and downs of the trade are shown in the returns of timber measured by the supervisor of cullers at Quebec during 1845-52:

Year.	White pine (feet).	Red pine (feet).
1845	19,141,982	4,444,515
1846	24,662,815	5,183,307
1847	12,074,708	6,516,922
1848	7,132,127	4,223,952
1849	11,924,198	3,797,584
1850	14,388,593	2,121,316
1851	15,487,180	3,189,657
1852	26,364,464	1,857,333

From 1841 to 1867 Quebec and Ontario constituted one province, and the regulations, with some exceptions to meet local needs, were the same in both sections. These are set out at considerable length in the chapters on Ontario and need not be repeated here. In general it may be said that the plan of selling the rights to cut timber under license, allowing the land to remain in the possession of the Crown was developed, the bonuses paid at the auctions held growing larger and the dues and ground rent heavier as the timber increased in value.

The original export trade of Canada in timber looked wholly to Europe as its market, and of this trade Quebec City was the center. This trade appears to have reached its zenith about 1864 when 1,350 square rigged ships entered the St. Lawrence to load lumber, and when 20,032,520 cubic feet of white pine timber was shipped. The wastefulness of the square timber trade, the decline of wooden ship building and the rise of the new export trade with the United States all operated against Quebec's preëminence, and the trade declined, much of it going to Montreal. Of late years, however, new railways, the bringing in of spruce as a valuable wood, and above all the ambition and energy of the citizens of the old capital of Canada, have set it on the up grade

again. Since 1867, when Quebec became a province in the Dominion and separated from Ontario, the provincial revenue derived from the forests has steadily increased, with slight fluctuations showing the effects of world-wide depression or prosperity.

The following table, by fiscal years ending June 30 of each year named, shows the amounts collected from Crown lands, as timber dues, ground rent, timber limits sales, etc.:

Year.	Interest, trespass penalties and fire tax.	Ground rent.	Timber limits sales.	Transfer fees.	Timber dues.	Total.
1868	$ 3,404.66	$ 22,401.03	$ 3,928.50	.....	$165,381.77	$ 195,115.96
1869	2,823.27	55,055.06	74,894.97	....	198,977.82	331,751.12
1870	7,208.37	64,089.20	22,518.37	$ 1,584.00	267,468.08	362,868.02
1871	3,122.68	63,297.43	62,437.34	4,790.00	272,833.12	406,480.57
1872	4,102.44	86,783.01	56,191.81	4,686.00	292,989.42	444,752.68
1873	3,186.67	90,950.84	68,941.18	9,242.66	346,361.27	518,682.62
1874	32,906.06	97,220.37	31,385.93	5,384.00	361,080.51	527,976.87
1875	15,380.21	90,565.04	3,259.50	15,361.00	408,169.12	532,734.87
1876	11,025.65	96,881.82	572.00	3,764.07	274,530.64	386,774.18
1877	10,686.72	94,588.07	.....	16,658.82	269,685.24	391,618.85
1878	10,915.20	85,385.12	.....	6,410.00	248,612.84	351,323.16
1879	8,684.01	87,558.04	448.00	526.00	217,664.04	314,880.09
1880	12,065.94	96,157.86	.....	3,219.75	231,437.89	342,881.44
1881	7,611.48	94,633.90	132,774.25	4,548.88	303,950.25	543,518.76
1882	12,069.09	111,113.78	26,921.25	4,239.70	514,252.57	668,596.39
1883	17,006.21	94,424.68	2,055.00	3,441.48	567,815.97	684,743.34
1884	13,363.26	83,399.92	246.27	910.75	562,836.93	660,757.13
1885	9,449.77	99,884.86	68,145.61	2,565.25	350,070.28	530,115.77
1886	13,047.63	100,548.76	112.00	3,646.09	411,220.32	528,574.80
1887	12,427.56	90,684.83	470.00	3,418.28	475,617.40	582,618.07
1888	7,597.91	141,549.88	.....	2,315.03	447,200.87	598,663.69
1889	7,293.81	124,314.09	118,253.65	1,719.25	707,357.20	958,938.00
1890	12,380.96	147,208.72	17,646.04	2,062.31	626,753.66	806,051.69
1891	11,185.81	125,141.77	9,023.12	2,516.25	498,370.30	646,237.25
1892	12,641.42	132,984.95	.....	3,470.53	474,900.79	623,997.69
1893	19,293.97	152,664.67	68,822.10	4,989.04	642,952.63	888,722.41
1894	11,171.82	147,660.59	18,549.70	2,008.12	644,516.69	823,906.92
1895	15,713.15	147,203.51	9,388.05	2,378.25	597,672.60	772,355.56
1896	14,858.21	143,485.73	83,255.20	4,239.47	705,260.31	951,098.92
1897	11,317.41	155,572.54	4,025.75	3,522.50	607,865.33	782,303.53
1898	15,045.53	148,935.18	30,110.48	3,561.25	713,435.86	911,088.30
1899	21,708.96	166,338.50	129,023.34	7,508.50	569,710.18	894,289.48
1900	13,947.61	170,508.71	339,748.06	2,819.25	585,505.89	1,112,529.52
1901	14,958.50	178,250.71	403,197.72	4,435.00	633,230.12	1,234,072.05
1902	8,406.94	163,983.00	201,483.39	11,871.74	669,292.41	1,055,037.48
1903	14,895.70	187,206.25	352,004.58	20,076.00	667,631.96	1,241,814.49
1904	16,988.03	176,226.41	252,554.01	6,575.06	715,134.02	1,167,477.53

As to the quantities of timber cut in Quebec, this is not easy to ascertain, since different methods have been adopted at different times and the products of private lands are not included, except in the decennial census. This is particularly the case with pulpwood, which has become an article of great importance in the last few years. The following tables are of timber cut on Crown lands:

SAWLOGS.

Year.	Red and white pine (feet b. m.).	Spruce and hardwood (feet b. m.).
1867	151,837,800	29,389,800
1870	221,854,400	29,301,800
1880	246,930,800	95,764,400
1890	304,508,200	188,517,400
1895	207,195,800	270,156,800
1901	107,206,880	319,866,256

SQUARE TIMBER.

Year.	Red and white pine (cubic feet).	Birch, elm and hardwood (cubic feet).
1867	4,892,699	71,916
1870	3,983,458	33,199
1880	1,596,243	144,617
1890	3,145,687	2,955,799
1895	1,443,942	40,785
1901	635,621	129,004

Year.	Small tamarack, spruce and pine (lineal feet).	Knees, shingles, ties, pickets, etc. (pieces).
1867	.....	6,308,000
1870	.....	9,713,000
1880	582,949	209,202,000
1890	422,041	216,959,000
1895	620,209	340,431,000

A review of the area of Crown lands in Quebec under license to cut timber and the quantity of sawlogs produced from such lands is interesting as showing the changes in areas so held, the gradual decline in the pine trade, due to the diminishing supply of pine timber, and the rapid growth in recent years of the spruce industry. Such a table, covering the twenty-five years ended with 1903, has been compiled[3] from the reports of the Commissioner of Crown Lands. It is as follows:

PRODUCTION OF PINE AND SPRUCE SAWLOGS FROM CROWN LANDS OF QUEBEC.

Year.	Area under license (square miles).	White pine sawlogs (pieces).	Spruce sawlogs (pieces).	Small pine sawlogs (pieces).
1879	42,631	1,032,880	797,440	.....
1880	47,185	1,179,045	655,857	.....
1881	46,278	1,791,873	1,208,184	.....
1882	48,494	2,418,958	1,308,315	.....
1883	43,489	2,611,986	1,418,635	.....
1884	41,260	2,642,658	1,311,382	.....
1885	45,249	1,703,874	723,679	.....
1886	46,078	2,187,098	1,038,957	.....
1887	42,440	2,386,614	1,344,477	.....
1888	41,584	2,295,012	959,703	.....
1889	41,569	2,959,675	1,407,141	.....
1890	44,201	2,802,073	1,324,872	.....
1891	45,190	2,137,938	2,613,907	.....
1892	42,965	2,297,814	2,522,781	.....
1893	46,006	3,212,956	2,740,496	152,469
1894	44,384	2,441,434	2,759,594	648,654
1895	46,397	2,063,951	3,281,590	961,688
1896	42,728	1,535,978	4,317,945	1,496,874
1897	46,155	2,151,949	4,594,830	1,650,827
1898	46,863	2,008,866	5,992,214	1,048,327
1899	45,889	1,483,041	5,431,789	883,576
1900	51,194	1,768,231	5,505,070	989,314
1901	48,818	1,879,793	6,136,799	1,520,497
1902	62,952	2,479,197	7,186,041	406,488
1903	62,730	1,786,263	5,858,143	1,307,942
	.....	53,259,157	72,439,841	11,066,656

[3] The *Canada Lumberman*, January, 1905, page 61.

It is only within the last few years that pulpwood has become of consequence, but in 1903 the Government reported a total of 259,231 cords cut on Crown lands. There were also in that year 94,079 lineal feet of poles, 780,960 railway ties, 9,174 pickets, 2,424,500 shingles, 426 rails, 23½ cords of hemlock bark and 11,710 cords of white birch spool wood.

The most important point at the present time is the outlook for the future. It may be said that, whereas ten years ago very pessimistic views were entertained as to the quantity of timber left standing in Quebec, today the views are much more hopeful. There are two reasons for this: First, the development of the use of other woods, particularly of spruce; and, second, the realization that if fire is kept out and the fake settlers stopped, the forests will reproduce themselves much more rapidly than formerly supposed. Besides, people are realizing that much of Quebec is unsuited for agriculture, whereas these districts are eminently suited for the perpetual growth of timber. The Government and the lumbermen are coöperating in the preservation of the forests by a system of fire ranging and by leaving the young timber to attain its full growth. Senator Edwards, of Ottawa and Rockland, one of the largest limit holders in Quebec, in speaking recently on this subject said that his candid opinion was that Quebec possesses today the best asset in America. Ontario has timber larger and of better quality, but Quebec has the young and growing timber. The pine in sight, Mr. Edwards was inclined to think, might last, with care, fifty years, but if fires (which have destroyed ten times as much as the ax) are kept out and settlement prohibited on the small areas of good land occurring in the forest regions, the trade might be continued indefinitely.

As Quebec is the largest eastern province and also the greatest forested province in the Dominion, with a land area of 341,756 square miles, and reaches back into the unexplored north, it is likely that it will continue to be the great source of timber production in Canada.

During the spring of 1904 a commission reported to the Quebec government against indiscriminate settlement, with the result that the Government and the lumbermen are nearer together and working more in harmony than ever before. The commission favored an increase in the numbers and joint control of the fire rangers; and, seeing that a million dollars a year of the provincial revenue comes out of forests, the legislators can be relied upon to be anxious to preserve the goose which lays this golden egg.

Both Quebec and Ontario have been fortunate in the supply of right kind of labor for this trade. The cheerful, fun-loving, hardy French-Canadian takes to lumbering like a duck to water. His skill in handling the ax, in driving, in walking on floating logs and in jam-breaking, have a world wide celebrity; while the songs with which he lightens his labors with the oar or on snowshoes are a national inheritance and pride. Curiously enough from the other side of the great river, from the Ontario shore, have gone with him the men of a supposedly antithetical race, the canny, dour Scots of Glengarry County, men who knew no language but Gallic and no law but the strong hand. Although they have fought for their masters over disputed lines and fought for themselves out of sheer prowess so as to make "The Man from Glengarry" one of the most picturesque of modern novels, yet these deeds of daring have served only to unite the two sides of the Ottawa in firmer bonds of respect and admiration.

CHAPTER IX.

QUEBEC—PRESENT CONDITIONS.

According to an estimate published in 1895 by the Dominion statistician, there were then in Quebec 116,521[1] square miles of forest and woodland. This, however, included a considerable area unfit for lumbering and covered with a small growth of little merchantable value. That portion of the Province extending north of the Ottawa River to the Height of Land, and the districts watered by the Saguenay, the St. Maurice and their tributaries were originally covered with forests of great value, with pine their most important component, though now much depleted by fire and by lumbering operations—especially in the Saguenay and Lake St. John districts. North and east of this region there are considerable areas of spruce suitable for pulpwood. South of the St. Lawrence from the Gaspe Peninsula to the boundary only small and scattered pine forests remain. Spruce is the dominant tree, but owing to the demand for pulpwood the supply is rapidly diminishing. Much hemlock is cut for tan bark, and maple, birch, cedar and tamarack are largely cut throughout the Province.

Much of the present area of Quebec is still largely unexplored. The territory embraced within the provincial lines prior to 1895 has been largely surveyed but the additions made as a result of the legislation which then took place included territory that previously had been designated as a part of Labrador. The present northern boundary of the Province, beginning at the west, follows the East Main River, which empties into the James Bay, a branch of Hudson Bay, nearly one hundred miles north of its southern extremity. From the headwaters of the East Main River at Lake Patamish, just south of the fifty-third degree of north latitude, it runs due east until it strikes the Hamilton River, which at that point runs almost due north. The Hamilton River is followed thence throughout its entire course and through Rigolet Bay to about the head of Hamilton Inlet, on the Atlantic, from which the boundary sweeps in a long curve a little east of

[1] The total area of the Province of Quebec, according to the "Statistical Year Book of Canada," is now 351,873 square miles, of which 341,756 square miles are land. The above estimate of wooded area does not agree with that given on page 61—225,552 square miles—the latter and later estimate applying to the increased area of the Province since 1896, though the remarks as to quality apply with even more force to the larger area.

south to the Strait of Belle Isle, striking it a short distance west of the fifty-seventh degree of west longitude. Exploration of the country north of the Height of Land and of the eastern part, except along the shore of the Gulf of St. Lawrence, has been confined to the principal rivers and lakes, many of which have not yet been defined as to their entire length or exact boundaries.

An enormous field for lumbering operations has been opened up of late years in the region made accessible to shipping ports by the Quebec & Lake St. John railway. In 1904 between twenty-five and thirty sawmills were in operation in this territory. Of a total of 19,200,000 acres in the Lake St. John district less than 500,000 are under cultivation or cleared, and the remainder is all wooded. Of the timber about seventy-five percent is spruce, and the remainder is made up of balsam, fir, white birch, cypress and a little pine. Fire has ravaged the forests in some places, but the effects of fires of thirty years ago are hardly visible, as there is a fine second growth.

The pulpwood supply in this district is very extensive. An official estimate places the first cut of pulpwood at one hundred million cords, which would give over sixty-five million tons of pulp. The water power of the principal outlet of the lake and of several large rivers by which it is fed is calculated at over 650,000-horse power. Pulp mills have been established at Chicoutimi and Jonquies on the Saguenay, at Shawenegan on the St. Maurice and at other points.

TIMBER LICENSES AND DUES.

The timber lands of Quebec are leased by the Provincial government to operators, the right to cut being disposed of by public auction, subject to the payment of dues on the cut in addition to a yearly ground rent. By far the larger portion of the lands under license to cut timber in the Province of Quebec is found between the Quebec & Lake St. John railway on the east and the Ottawa and the provincial boundary on the west, and between the Ottawa and St. Lawrence rivers on the south and the forty-eighth degree of north latitude on the north. With the exception of a strip of country north of the St. Lawrence and Ottawa rivers from the City of Quebec to just above the City of Ottawa and some unlicensed territory in the north, this immense tract of country, 350 miles long by an average of 125 miles wide, is all under license. South and north of Lake St. John and the Saguenay River are also large bodies of land under license, and smaller and scattering tracts are found all along the north shore of the St. Lawrence to its mouth

opposite the west end of the Island of Anticosti. The land under timber license extends almost unbroken all along the provincial boundary from New Hampshire to the Gulf of St. Lawrence, but the St. Lawrence River shore is open, as is the country surrounding Quebec and Montreal.

In 1903 there were 64,979 square miles under license, the receipts from which form a considerable portion of the revenue of the Province. During the year ended June 30, 1904, $252,554 was realized from sales of limits, $715,134 from dues, $176,226 from ground rents and $23,563 from fire tax, transfer fees and other sources, making a total of $1,167,477.

The dues payable on timber are as follows: Square and waney timber, per cubic foot, oak and walnut 4 cents, all others 2 cents; sawlogs, boom and dimension timber, per 1,000 feet b. m., white pine $1.30, red pine 80 cents, spruce, hemlock, balsam, cypress, cedar, white birch and poplar 65 cents; pulpwood, 65 cents a cord, with a rebate of 25 cents if manufactured in Canada.

The following is the cut upon which government dues were paid during the year ended June 30, 1903: Square timber, hardwood, 150,919 cubic feet; square pine, 950,451 cubic feet; spruce, hemlock, etc., sawlogs and boom timber, 377,219,740 feet b. m.; white pine sawlogs and boom timber, 175,072,927 feet b. m.; red pine sawlogs and boom timber, 33,101,822 feet b. m.; white pine sawlogs eleven inches and under, 69,286,889 feet b. m.; poles, 94,079 lineal feet; pulpwood, 259,231 cords; fire-wood, 1,612½ cords; railway ties, 780,960; pickets, 9,174; shingles, 2,424,500; rails, 426; hemlock bark, 23½ cords; lath wood, 31 cords; white birch for spool wood, 11,710 cords, and posts, 1,255.

THE EXPORT TRADE.

As has been indicated, the City of Quebec was, until comparatively recent years, the center of the timber and lumber export trade, but Montreal now holds that position. This change has been largely coincident with the growth of the trade in sawn lumber and the decline in square timber shipments. The first timber shipped from Canada to Europe was exported under the French regime in 1667. The export to England began in the early days of the Nineteenth Century when the continental ports were closed against British trade by Napoleon. The trade grew rapidly, and when at its height as many as 1,350 square-rigged ships entered the port of Quebec yearly to load timber. It reached its climax about 1864, in which year 20,032,520 cubic feet of

square timber were exported, and since then it has gradually declined. Formerly, shipments of pine deals were extensively made from Quebec. In 1880 5,823,263 standards were shipped, but the bulk of this trade has now gone to Montreal.

The palmy days of Quebec City as a timber port were also characterized by much activity in shipbuilding, forty or fifty ships sometimes being built in a year. At one time the timber trade at this port gave employment to 5,000 or 6,000 laborers. The timber coves there extended for a distance of ten miles on both sides of the river. Now hardly a mile on the Quebec side is so occupied, with but two or three coves across the river.

The lumber export trade of Montreal dates back about forty years. It was commenced by Dobell, Beckett & Co. and has increased from year to year until Montreal has become the transshipping port for all the pine product of the Ottawa Valley that is sent over seas. During the season of navigation the deals are conveyed in barges, carrying an average of one hundred and forty-five standards each, down the Ottawa River and the Lachine Canal and transferred directly to the steamer. The forest product, at one time shipped in the form of square timber, is now manufactured into deals and boards, and Montreal has become the leading port of export, as the tendency of modern shipping operations is for vessels to load at the head of navigation. Montreal is practically a free port for shipping, and it is frequently the case that freights are obtainable there on lower terms than in Quebec. In 1879 the lumber shipments from Montreal amounted to 10,499,951 feet; in 1877, to 32,920,390 feet; in 1888, to 117,329,721 feet; in 1895, to 175,372,976 feet; in 1898, to 335,429,190 feet; in 1900, to 239,686,145 feet, and in 1904, to 153,989,912 feet.

The decrease shown of late years in these figures is due not to decline in the export business, but to the route which it takes. Montreal is a summer port only, as all the St. Lawrence ports are handicapped by ice during the winter and early summer so that insurance rates are usually higher from the St. Lawrence than from ports on the open Atlantic. This has led to a considerable shipment of lumber and other forest products in bond to Portland, Boston and New York, Portland being especially favored because it is a terminus of the Grand Trunk railway; while open Canadian ports, like Halifax, take some of the business which otherwise would go by vessel from the St. Lawrence. Much progress, however, has been made in the improvement of

navigation on the St. Lawrence up to Montreal, the channel admitting vessels drawing thirty feet of water, and while the ice will always form a hindrance to winter business, the liberal policy of the Canadian government and the great improvements that have been made on the St. Lawrence are fast increasing the popularity of that route, so that it is not improbable that shipments of forest products from Montreal, and perhaps from Quebec, will in the future be larger than in the recent past.

The St. Lawrence is a tidal river as far as Three Rivers, about midway between Quebec and Montreal. In the original state of the river vessels drawing eleven to twelve feet of water could under careful pilotage reach the latter city. Dredging at bars and over shallow stretches so improved the channel that, as stated above, vessels drawing thirty feet of water can now dock at Montreal. Until a few years ago, however, navigation of the river was rather difficult, and was attempted by vessels of heavy draft only by day. A thorough system of buoys and channel lights has now made passage unimpeded during the season of navigation.

In 1868 the relative values of shipments of forest products were: Quebec, $6,659,686; Montreal, $631,239. In 1903, the value of forest products shipped from Quebec was $4,022,346, and of those from Montreal, $5,121,472. The trade of the former port has revived somewhat of late years under the stimulus of railway connection with the Lake St. John district, and other enterprises, but it is hardly likely to regain its supremacy.

The shipments of forest products from Montreal for the fiscal year 1903 included pine deals, $3,147,150; spruce and other deals, $684,070; planks and boards, $650,008 and pulpwood, $131,152. Those from Quebec City in the same year comprised pine deals, $122,960; spruce and other deals, $1,270,325; planks and boards, $68,539; pine (white, square) $1,297,427; oak (square), $411,313; red pine, $212,634, and elm, $296,496.

SHIPPING INTERESTS.

It is of interest to note the decrease in the number of sailing vessels clearing at Quebec, as the traffic is now almost entirely carried on by steamer. The following table shows the lumber laden sailing vessels cleared at the port of Quebec for sea between the opening and close of navigation in the years 1874 to 1904, inclusive, with their tonnage:

SAILING VESSELS CLEARED FROM THE PORT OF QUEBEC.

Year.	Vessels.	Tons.
1874	854	636,672
1875	642	478,441
1876	786	624,110
1877	796	670,627
1878	476	399,833
1879	433	364,628
1880	634	555,451
1881	459	380,186
1882	426	359,925
1883	487	416,169
1884	366	291,398
1885	369	294,789
1886	325	250,635
1887	271	206,172
1888	227	195,928
1889	275	240,892
1890	250	238,162
1891	205	182,615
1892	244	225,008
1893	177	146,970
1894	136	115,639
1895	86	70,960
1896	103	82,622
1897	147	90,381
1898	121	70,588
1899	80	50,242
1900	99	43,036
1901	69	37,171
1902	93	33,534
1903	53	25,141
1904	46	19,126

The extent to which steam tonnage has replaced sail, is shown by the fact that in 1902 the number of steamers entering the port of Quebec for part or entire cargoes was 186 of an aggregate of 507,097 tons; in 1903, 185 of 538,672 tons, and in 1904, 165 of 506,702 tons.

The premier position of Montreal as a St. Lawrence port, due to its being the head of navigation for ocean-going vessels, is shown by the following table which gives the number and tonnage of sea-going vessels entered at that port for the years named:

Year.	Ships.	Tonnage.
1901	707	1,438,081
1902	728	1,530,023
1903	797	1,991,272
1904	796	1,856,697

Quebec is to be reached by sailing vessels, while Montreal is, for all practical purposes, available only to steam—and this is the age of steam navigation.

EXPORTS AND STOCKS.

The most recent available figures concerning exports from Quebec are those for the year 1904, and these show a decrease in exports from River St. Lawrence points to Great Britain in comparison with the year 1903. The total exportations amounted to 302,932,776 feet, a decrease of 142,408,833 feet from the figures of 445,341,609 feet recorded in 1903. Quebec is a heavy manufacturer of spruce clapboards, and

there was a decided reduction of export of this material, due to the stagnant condition of the spruce market.

The principal article of shipment from Montreal is pine in the form of deals and boards, while other St. Lawrence ports ship principally spruce deals and square and waney timber. Exports for trans-Atlantic markets during 1903 and 1904, by ports and shippers, were as follows:

FROM MONTREAL.

Shippers.	1903 Feet b. m.	1904 Feet b. m.
Watson & Todd	51,801,668	38,028,601
W. & J. Sharples	41,845,282	23,016,516
R. Cox & Co	24,162,470	21,207,452
Dobell, Beckett & Co	35,594,600	18,387,510
J. Burstall & Co	22,105,969	13,040,437
McArthur Export Co., Ltd	15,412,412	8,929,166
Cox, Lang & Co	8,941,100	8,697,827
Charlemagne & Lac Ouareau Lumber Co.,Ltd.	10,289,247	5,067,412
McLaurin Bros	7,478,000	4,600,000
E. H. Lemay	1,815,000	1,916,000
Railways, small shippers, etc	11,442,596	11,098,991
Total	230,888,344	153,989,912
Decrease in 1904		76,898,432

Other St. Lawrence ports, including the City of Quebec, make the following showing for 1904:

FROM QUEBEC.

Shippers.	Feet.
H. R. Goodday & Co	20,075,000
Dobell, Beckett & Co	13,872,800
W. & J. Sharples	11,703,600
McArthur Export Co., Ltd	7,370,664
Harold Kennedy	7,047,352
J. Burstall & Co	5,913,305
King Bros., Ltd	1,499,400
Total 1904	67,482,121
Total 1903	109,688,817

FROM THREE RIVERS AND PIERREVILLE.

Shippers.	Feet.
Dobell, Beckett & Co	18,406,600
W. & J. Sharples	6,600,700
Total 1904	25,007,300
Total 1903	44,601,070

FROM OTHER PORTS.

Shippers.	Feet.
Price Bros. & Co	46,653,833
Dobell, Beckett & Co	4,870,400
King Bros., Ltd	4,929,210
Total in 1904	56,453,443
Total in 1903	60,163,378
Total trans-Atlantic shipments 1903	445,341,609
Total trans-Atlantic shipments 1904	302,932,776
Decrease in 1904	142,408,833

While white pine and spruce make up the great body of the export of lumber from the Province of Quebec, other woods, including hardwoods, still figure in an important way in the trade of the Province. To show the volume of this business and the conditions surrounding it at the latest date available for this work, we give the following quota-

tions from an annual trade circular, issued by J. Bell Forsyth & Co., of Quebec, bearing date of January 9, 1905:

White Pine.—The stock of waney pine shows considerable increase in recent years, while that of square pine is the lightest on record. The continued advance in price of both waney and square pine has at last told on the export. As the manufacture this winter will not exceed half the past season's supply, and as makers seem unable to reduce their prices without actual loss, it seems evident present values must be maintained or manufacture cease.

	Supply.	Export.	Stock.
1904	Square 240,176 Waney 2,256,352	1,491,843	347,067 Square 1,268,937 Waney
1903	Square 419,600 Waney 1,865,560	2,181,961	413,469 Square 406,038 Waney

Red Pine.—The smallness of both supply and stock shows the approach of the end of business in this wood as square timber.

	Supply.	Export.	Stock.
1904	15,920	12,598	55,561
1903	57,360	84,292	53,225

Spruce Deals.—The export from Quebec and the lower St. Lawrence has been restricted by absence of demand and the inadequate prices obtainable. The cost of production has materially increased owing to advanced cost of labor, enhanced value of limits, and other causes. The demand in the United States for spruce boards being good at fair prices, the tendency is for Canadian mills to send their production very largely in that direction.

	Supply.	Export.	Stock.
1904	3,927,270	3,319,121	822,575
1903	4,919,710	5,060,053	157,213

Pine Deals.—The ruling prices in the United Kingdom, especially in the third and fourth qualities, have materially declined instead of meeting the ten percent advance paid by shippers for past season's production. Ottawa mill owners can readily obtain from United States markets figures at least equivalent to those paid for deals. It is clear that export business can not continue under present conditions.

	Supply.	Export.	Stock.
1904	110,358	97,310	15,518
1903	41,890	49,730	2,570

Sawn Lumber.—The demand from the United States has been good at fair prices, and in spruce the Canadian mills have cut boards for that market in preference to deals for export in many instances.

Oak.—The exports show a marked decrease, and the wintering stock a corresponding increase. The manufacture of this wood has entirely stopped, and will not be resumed until justified by demand, as western oak can not be profitably delivered at Quebec at present current prices.

	Supply.	Export.	Stock.
1904	328,360	201,767	665,670
1903	926,680	651,969	491,851

Elm.—The supply continues to diminish and price to advance, which will probably be the case year by year till the wood becomes too expensive for export or can not be obtained at all. The stock of rock elm is very small, the figures largely rep.esenting soft elm.

	Supply.	Export.	Stock.
1904	262,800	310,546	322,778
1903	417,800	477,217	419,659

Ash.—Will not be made this winter, as demand seems to have disappeared. The stock is ample for probable requirements.

	Supply.	Export.	Stock.
1904	14,640	26,192	25,145
1903	57,200	59,441	47,035

Birch.—The export of this wood continues to diminish from Quebec owing to reduced supply, the most accessible wood having been cut away, and the less accessible requiring prices that are not yet obtainable to induce manufacture.

	Supply.	Export.	Stock.
1904	125,920	127,882	1,027
1903	196,240	201,521	11

Through the courtesy of Messrs. Walcot, Limited, of London, we are able to present herewith a comparison of the square and waney supply (equivalent to production), exports and stocks of Quebec each year from 1850 to 1904, inclusive. There has been a marked change in the character of the forest exports sent by Quebec to the mother country. In the early years shipments of boards from Quebec to England were almost unknown, the entire export being in the shape of logs, which were sawed into planks and boards by English sawmills or part sawed to meet the needs of the purchasers. In 1861 a distinction became necessary, the history of the development being thus stated:[2]

Previous to 1861 the timber shipped was square and of large average, beautifully hewn by the lumbermen in Canada; but board pine—that is, short logs of large girth—were sent down the drives with the other timber, and soon found their way into the market. Being cut from the lower part of the tree accounted for the waney character of the logs, but the quality of the timber was excellent. The loss in girthing them for conversion was considerable, but this was allowed for in the price to the importer. The decline in the quantity of square and waney pine made for the Quebec market is altogether due to the increase of the deal and board trade, and to some extent to the scarcity of suitable trees to manufacture into timber. A large proportion of the trees are still suitable to make into deal logs, but would not be sufficiently large to be made into waney board pine. This is exemplified by the smallness of the square pine that is now brought down from Ottawa. In former days square pine used to be made 70 and 80 and even 100 feet cube average; in the present day it is with difficulty that 40 feet average cube is procurable in square pine, and waney board pine is decreasing in girth annually. Formerly 20-inch and over average cube was easily

[2] In the *Timber Trades Journal*, of London, England.

procurable; today 17-inch is as large as most of the manufacturers will undertake, and they frequently fall below this average on delivery of the timber at Quebec. These changes are graphically portrayed in the following table:

PROVINCE OF QUEBEC—STATISTICS OF SQUARE AND WANEY WHITE PINE TIMBER. IN CUBIC FEET.

	SUPPLY.			EXPORT.	STOCKS.		
Year.	Square.	Waney.	Total.	Square and waney.	Square.	Waney.	Total.
1850	14,398,000	.....	14,398,000	13,040,000	5,046,000	.....	5,046,000
1851	15,418,000	.....	15,418,000	15,941,000	2,366,000	.....	2,366,000
1852	27,631,000	.....	27,631,000	15,691,000	12,711,000	.....	12,711,000
1853	17,487,000	.....	17,487,000	17,399,000	9,846,000	.....	9,846,000
1854	19,648,000	.....	19,648,000	19,612,000	7,537,000	.....	7,537,000
1855	13,575,000	.....	13,575,000	10,843,000	9,513,000	.....	9,513,000
1856	18,000,000	.....	18,000,000	13,993,000	11,776,000	.....	11,776,000
1857	19,618,000	.....	19,618,000	19,246,000	11,259,000	.....	11,259,000
1858	14,328,000	.....	14,328,000	13,388,000	11,290,000	.....	11,290,000
1859	16,531,000	.....	16,531,000	14,822,000	12,284,000	.....	12,284,000
1860	18,564,000	.....	18,564,000	18,253,000	11,390,000	.....	11,390,000
1861	15,731,000	6,735,000	22,466,000	19,448,000	7,971,000	6,347,000	14,318,000
1862	21,628,000	748,000	22,376,000	15,493,000	15,355,000	3,950,000	19,305,000
1863	21,617,000	186,000	21,803,020	23,147,000	13,998,000	1,224,000	15,222,000
1864	23,737,000	735,000	24,472,000	20,032,000	17,600,000	331,000	17,931,000
1865	17,620,000	1,247,000	18,867,000	19,008,000	12,427,000	348,000	12,775,000
1866	14,386,000	2,245,000	16,631,000	15,541,000	10,875,000	763,000	11,638,000
1867	16,740,000	2,799,000	19,539,000	14,774,000	13,001,000	1,905,000	14,906,000
1868	10,029,000	2,158,000	12,187,000	15,279,000	7,648,000	1,715,000	9,363,000
1869	14,055,000	1,973,000	16,028,000	14,673,000	9,263,000	1,607,000	10,870,000
1870	12,616,000	1,504,000	14,120,000	14,142,000	8,877,000	620,000	9,479,000
1871	17,367,000	3,418,000	20,785,000	14,673,000	14,001,000	1,739,000	15,740,000
1872	11,151,000	4,450,000	15,601,000	15,515,000	11,065,000	3,618,000	14,683,000
1873	10,443,000	3,966,000	14,409,000	10,580,000	12,794,000	4,655,000	17,450,000
1874	7,364,000	1,829,000	9,193,000	13,514,000	8,211,000	4,053,000	12,264,000
1875	9,246,000	1,644,000	10,890,000	10,099,000	8,716,000	2,684,000	11,400,000
1876	15,994,000	3,249,000	19,243,000	13,883,000	12,167,000	2,502,000	14,669,000
1877	14,850,000	3,630,000	18,480,000	14,898,000	13,804,000	2,634,000	16,438,000
1878	7,917,000	1,847,000	9,764,000	8,194,000	15,114,000	3,180,000	18,294,000
1879	2,511,000	1,600,000	4,111,000	5,300,000	12,140,000	2,218,000	14,358,000
1880	4,244,000	2,236,000	6,480,000	11,553,000	6,197,000	797,000	6,994,000
1881	6,029,000	3,065,000	9,094,000	9,102,000	4,526,000	1,520,000	6,046,000
1882	8,053,000	3,127 000	11,180,000	7,912,000	6,532,000	3,355,000	9,887,000
1883	7,412,000	3,787,000	11,190,000	10,427,000	7,781,000	2,759,000	10,540,000
1884	3,707,000	2,200,000	5,907,000	6,048,000	7,502,000	2,399,000	9,901,000
1885	2,802,000	2,877,000	5,697,000	6,758,000	6,651,000	2,588,000	9,239,000
1886	3,033,000	3,077,000	6,110,000	4,526,000	6,573,000	3,267,000	9,840,000
1887	1,169,000	2,060,000	3,229,000	5,127,000	4,295,000	2,450,000	6,745,000
1888	1,791,000	2,029,000	3,820,000	6,020,000	2,580,000	1,227,000	3,807,000
1889	4,224,000	3,771,000	7,995,000	6,873,000	3,147,000	1,914,000	5,061,000
1890	5,083,000	3,695,000	8,778,000	5,498,000	4,800,000	3,528,000	8,328,000
1891	1,072,000	1,731,000	2,803,000	4,715,000	2,944,000	2,049,000	4,993,000
1892	2,380,000	2,740,000	5,120,000	5,300,000	2,835,000	1,618,000	4,453,000
1893	1,121,000	3,117,000	4,238,000	4,092,000	2,134,000	1,628,000	3,762,000
1894	838,000	2,289,000	3,127,000	3,469,000	1,657,000	1,611,000	3,268,000
1895	274,000	3,086,000	3,360,000	2,838,000	1,091,000	2,255,000	3,346,000
1896	316,000	2,871,000	3,187,000	4,252,000	537,000	1,474,000	2,011,000
1897	833,000	4,311,000	5,144,000	3,773,000	483,000	2,288,000	2,771,000
1898	1,062,000	1,903,000	2,965,000	3,015,000	1,354,000	2,452,000	3,806,000
1899	592,000	1,793,000	2,385,000	3,085,000	1,148,000	1,014,000	2,162,000
1900	571,000	1,505,000	2,076,000	2,755,000	805,000	506,000	1,301,000
1901	585,000	1,447,000	2,032,000	2,317,000	590,000	361,000	951,000
1902	384,000	1,830,000	2,214,000	2,445,000	396,000	261,000	657,000
1903	420,000	1,865,000	2,285,000	2,182,000	413,000	406,000	819,000
1904	240,000	2,256,000	2,496,000	1,492,000	347,000	1,269,000	1,616,000

CHAPTER X.

QUEBEC—QUEBEC CULLING.

From an early period in the development of industry and commerce in Canada the timber trade has been an important element in the activities of the people. There was a demand in Great Britain and other European maritime countries for ship timber and timber for other structural purposes, which material was sent abroad in the squared form. There was also a call for spars or masts, bowsprits, booms and yards, and there was an extensive manufacture of boards, deals, planks, lath, staves, etc. Much of the cooperage stock went to the West Indies to supply the demand for sugar, tobacco and other packages. The forest products handled were white pine, red or norway pine, elm for ship timber, oak for the same purpose, squares of ash, basswood, butternut and birch. All of the woods mentioned were shipped to foreign ports in the form of square timber largely, much of it being resawed after it reached destination. There were also hickory handspikes, ash oars, "lathwood," as lath were called in the culling rules, and other forms. "Deals" were, as they are now, an important item in Canadian mill output. The word "deal" is synonymous with the word "cant," as applied to lumber—that is, a piece sawed to dimensions suitable for resawing. The standard Quebec or English deal was twelve feet long, eleven inches wide and two and one-half inches thick. A "standard hundred" of deals was one hundred of these pieces. Deals were a favorite form of lumber production, and much of the good white pine and norway pine of Canada was cut into deals.

The Quebec market in the early days, down to 1840 or 1850, was not only the gateway for the foreign distribution of forest products of all Canada, but also that market drew much from the Lake Champlain region of Vermont and New York, and all portions of the last named State which had access to the navigable waters of the St. Lawrence River and Lake Ontario. The rich pine of northern Vermont to a large extent went down the Sorel River to the St. Lawrence River and thence to Quebec. The forests of northern New York were extensively drawn upon for elm timber, which was hauled for twenty to forty miles by ox teams, in the winter, to the St. Lawrence, and on that stream was rafted

to Quebec. This elm timber business was carried westward until in recent years a supply has been drawn from as far west as Wisconsin. Pine deals have also been furnished the Quebec market from all the old white pine states of the United States, though, of course, in later years the Dominion has been about the only source of supply.

The export trade has always been so important a factor in the Canadian lumber industry, and the production of lumber has been to so large an extent from Crown lands, that the industry has been peculiarly subject to official regulation. One of the important phases of these regulations has been that relating to qualities of lumber and the upbuilding of a system by which relations between buyer and seller, producer, exporter and importer might be officially established. Thus has arisen the system of measurement and inspection known as Quebec culling. It is, perhaps, the most widely used of any system of lumber inspection in the world and, perhaps, of the widest reputation. It seems well, therefore, to give space for the more important provisions of this measure which has back of it the authority of the Dominion of Canada.

Survey, or inspection, is called "culling" in the Quebec market. Authority for the enforcement of the culling rules was derived from an act[1] of the Dominion Parliament, entitled "An Act Respecting the Culling and Measuring of Lumber in the Provinces of Ontario and Quebec." The application of this act is thus defined in section 3: "The provisions of this act apply only to the Provinces of Ontario and Quebec and do not apply to any place below the eastern end of the Island of Orleans."

The important portions of this act are as follows:

Square timber shall be measured only in some one of the three modes following, that is to say:—

First.—Measured off, in the raft or otherwise, giving the full cubic contents without any allowance or deduction;

Second.—Measured in shipping order—which shall mean sound, fairly made timber—gum seams closed at the butt and sound knots not to be considered unsoundness—lengths under the merchantable standard hereinafter mentioned and not less than twelve feet long to be received, if, in the opinion of the culler, the same is fit for shipment;

Third.—Culled and measured in a merchantable state, in accordance with the rules, standards and limitations hereinafter described.

In measuring timber, the culler employed for that purpose shall measure not only the girth of each piece of timber, but shall also measure, personally, with the aid of one competent assistant, the length of each piece of timber, in all cases

[1] Chap. 103—49 Vict.

where such measurement is practicable with the aid of only one assistant; and in the event of any case arising in which, in the opinion of the supervisor, or of any deputy, such measurement cannot be effected with the aid of one assistant only, such culler may employ an additional competent assistant for that purpose, who, as well as the assistant first above mentioned, shall be approved of by the supervisor or deputy.

Every culler shall be provided with such measuring rods, tapes and other measuring instruments as are prescribed by departmental regulations, all of which shall be in accordance with the standard measures of Canada, and shall bear the verification marks of the Department of Inland Revenue:

Every culler shall also be provided with such scribing knives and such stamps as are necessary for marking the articles culled by him with the initials of his name, and with the capital letters distinguishing the quality, as follows:—

M. Which shall denote what is merchantable;

U. Which shall denote what is sound and of merchantable quality, but under merchantable size;

S. Which shall denote what is of second quality;

T. Which shall denote what is of third quality;

R. Which shall denote what is rejected and unmerchantable:

Such marks shall be indented or stamped on the end of each article of lumber culled in terms of the merchantable standard hereinafter prescribed, except as to West India and barrel staves, boards, deals, lathwood and handspikes.

Every culler shall check and examine the entry of his measurements and of culling and counting on the books of the supervisor, and sign such entry and calculations on the said books.

A copy of every agreement as to the adoption of any of the modes of measurement or culling mentioned in this Act, signed by the seller and buyer, shall be lodged in the office of the supervisor, or deputy supervisor, at the same time that a requisition is made to him for a culler to measure or cull any lumber, for the guidance of the supervisor, or deputy supervisor, and culler, in the performance of their duty,—and such requisition shall state the river and section of the Province wherefrom such lumber is produced; but the owner of any lumber, or his agent, may cause it to be measured, culled or counted before any sale, in which case the specification of such lumber shall set forth the mode in which the measurement, culling or counting has been performed.

QUALITIES OF LUMBER.

In all cases the supervisor, deputy supervisor and cullers, respectively shall, in ascertaining and certifying the merchantable size and quality of lumber submitted to their culling, be governed by the descriptions, rules, standards and limitations following, that is to say:—

White Oak.—Square white oak timber, first quality, shall be free from rot, rotten knots affecting the surrounding wood, open rings and grub or large worm holes, but small worm holes and shakes shall be allowed according to the judgment of the culler;

Second quality shall be oak not coming within the definition of first quality, and which, in the judgment of the culler, is not culls;

Rock Elm.—Square hard grey or rock elm shall be free from rot, open rings

and rotten knots affecting the surrounding wood, but shakes and slivers shall be allowed according to the judgment of the culler;

White or Yellow Pine.—Square white or yellow pine timber shall be free from rot, rotten knots affecting the surrounding wood, worm holes, open shakes and open rings, but sound knots shall be allowed according to the judgment of the culler;

Red Pine.—Square red pine timber shall be free from rot, rotten knots affecting the surrounding wood, worm holes, shakes and splits, but sound knots shall be allowed according to the judgment of the culler;

Ash, Basswood and Butternut.—Square ash, basswood and butternut shall be of the same quality as white or yellow pine square timber;

Birch.—Square birch shall be free from rot, rotten knots, splits and shakes, and shall be allowed two inches wane;

Masts, Bowsprits and Red Pine Spars.—Masts, bowsprits and red pine spars shall be sound, free from bad knots, rents and shakes, and the heart shall be visible in spots at or near the partners;

Hickory Handspikes.—Hickory handspikes shall be six feet long, and three and a half inches square at the smaller end;

Ash Oars.—Ash oars shall be three inches square on the loin, and five inches broad on the blade, the blade shall be one-third of the length of the oar, and such oars shall be cleft straight on all sides, and free from large knots, splits and shakes;

Lathwood.—Lathwood shall be cut in lengths of from three to six feet, and measured by the cord of eight feet in length by four feet in height; and, to be merchantable, shall be free from rot, shall split freely, and each billet may contain to the extent of three or four open case knots, provided they run in line or nearly so, and it shall not have more than one twist;

Pine or Fir Boards.—Pine or fir boards shall not be less than ten feet in length, one inch in thickness and seven inches in breadth, equally broad from end to end, edged with a saw, or neatly trimmed by a straight line, and shall be free from rot, bad knots, rents and shakes, and of equal thickness on both edges from end to end; the color alone of any board shall not be a sufficient cause for its rejection, if it is in other respects sound and merchantable, and of the dimensions required by this Act;

White or Yellow Pine Deals.—White or yellow pine deals, to be merchantable, shall be free from rot, rotten knots, grub-worm holes, open case knots, shakes and splits (a slight sun crack excepted), and sound knots and hard black knots shall be allowed as follows: If they do not exceed three in number, and do not exceed on the average one inch and a quarter diameter; if they exceed three and are not more than six in number, and do not exceed, on the average, three-quarters of an inch in diameter; such proportion of knots shall be allowed for a deal eleven inches in width and twelve feet in length, and deals of greater or less dimension shall be allowed for in proportion, according to the judgment of the culler; wane equal to half an inch on one edge, if running the whole length of the deal, shall be allowed, and if not exceeding half the length of such deal, three-quarters of an inch wane shall be allowed; the deals shall be free from black or dead sap, with a slight exception, in the discretion of the culler;

Red Pine Deals.—Red pine deals, to be merchantable, shall be free from rot, rotten knots, grub-worm holes, open case knots and splits; several small sound

knots shall be allowed, according to the judgment of the culler; heart shake shall be allowed, if it does not run far into the deal or form a split through at the ends; they shall be free, or nearly so, from black or dead sap, but sound sap on the corners or on a portion of one face of a deal shall be allowed, according to the judgment of the culler;

Spruce Deals.—Spruce deals, to be merchantable, shall be free from rot, rotten knots, grub-worm holes, open case knots, splits and shakes,—a heart shake not exceeding one-fourth of an inch to half an inch in depth excepted; several small sound knots and hard black knots shall be allowed, according to the judgment of the culler, and in the exercise of such judgment he shall keep in view the peculiar nature of the wood, and govern his judgment accordingly; wane equal to half an inch on one edge, if running the whole length of the deal, shall be allowed, and if not exceeding one-quarter the length of such deal, three-quarters of an inch shall be allowed;

White or Yellow Pine, Second Quality Deals.—White or yellow pine second quality deals shall be free from rot, rotten knots and splits, with slight exceptions, at the discretion of the culler, and sound knots and hard black knots shall be allowed as follows: If they do not exceed six in number and, upon the average, one inch and a half diameter; if they exceed six and are not more than twelve in number, and do not exceed, upon the average, one inch and a quarter in diameter, —but small knots under half an inch diameter shall not be counted or considered; such proportion of knots shall be allowed for a deal eleven inches in width and twelve feet in length, and deals of greater or less dimensions shall be allowed for in proportion, according to the judgment of the culler; heart shakes and sun cracks not exceeding three-fourths of an inch to one inch in depth shall be allowed, as also worm holes, according to the judgment of the culler; wane of half an inch to one inch shall be allowed according to the quality of the deal in other respects, according to the judgment of the culler; deals rejected as not coming within the standard of merchantable or second quality shall be classed as culls,—except that the culler may, if requested by buyer and seller, select and classify, as third quality, the best of the deals so rejected;

Spruce and Red Pine, Second Quality Deals.—Spruce and red pine second quality deals, shall be deals not coming within the definition of merchantable, and which, in the opinion and judgment of the culler, are not culls, and shall be classed as second quality; and the culler, if required by seller and buyer, may select and classify as third quality the best of the deals unfit to be seconds;

Quebec Standard Hundred of Deals.—The Quebec standard hundred of deals shall be one hundred pieces twelve feet long, eleven inches broad, and two and a half inches thick; and deals of all other dimensions shall be computed according to the said standard; deals of all qualities shall be not less than eight feet long, seven inches broad and two and a half inches thick; deal ends shall be not less than six feet long and shall be computed according to the Quebec standard;

Merchantable Deals.—All merchantable deals shall be well sawn and squared at the end with a saw, and the color alone shall be no objection to their being merchantable;

To be Stamped.—All deals when culled shall, in all cases, be stamped with the initials of the culler, and the capital letter denoting their quality as such;

Marking of Spruce and Other Deals.—Spruce deals, if not sawn at the ends prior to or at the time of culling, shall be marked with the capital letter, denoting their respective qualities, with red chalk, in large bold letters; and to prevent mistakes in piling, all other deals shall be marked with bold strokes in red chalk as follows:—

Merchantable shall be marked, I;
Second quality shall be marked, II;
Third quality (if made) shall be marked, III;
Rejected or culls shall be marked, X;

STANDARD OR MEASUREMENT STAVES.

Standard or measurement staves shall be of the dimensions set forth in the words and figures following:—

5½ feet long, 5 inches broad, and from 1 to 3 inches thick.
4½ do. 4½ do.
3½ do. 4 do.
2½ do. 5 do.

HEAD STAVES.

Head staves, five and a half feet long, and four and a half inches broad, shall be received as if of merchantable dimensions;

STANDARD MILLE.

The standard mille shall be twelve hundred pieces of five and a half feet long, five inches broad, and one and a half inches thick; and standard or measurement staves of other dimensions shall be reduced to the said standard by the tables of calculation now used;

WEST INDIA OR PUNCHEON STAVES.

West India or puncheon staves shall be three and a half feet long, four inches broad, and three-fourths of an inch thick;

QUALITIES REQUISITE IN ALL STAVES.

All staves shall be straight grained timber, properly split, with straight edges, free from the grub or large worm holes, knots, veins, shakes and splinters; and small worm holes which do not exceed three in number, shall be allowed according to the judgment of the culler, provided there are no veins running from or connected therewith, and the culler shall measure the length, breadth and thickness of standard staves at the shortest, narrowest and thinnest parts; and the thickness of West India and barrel staves exceeding the standard breadth shall be measured at such standard breadth, to wit: Four and three and a half inches respectively, provided the thinnest edge is not less than half an inch;

DIMENSIONS OF MERCHANTABLE TIMBER.

The dimensions of merchantable timber shall be as set forth in the following words and figures:—

Oak.—Oak shall be at least twenty feet in length and ten inches square in the middle;

Elm.—Elm shall be at least twenty feet in length and ten inches square in the middle;

White Pine.—White pine shall be at least twenty feet in length and twelve inches square in the middle, and fifteen feet and upwards in length, if it is sixteen inches square and upwards in the middle;

Red Pine.—Red pine shall be at least twenty-five feet in length and ten inches

square in the middle, and twenty feet and upwards in length, if it is twelve inches square and upwards in the middle;

Ash, Basswood and Butternut.—Ash, basswood and butternut shall be at least fifteen feet in length and twelve inches square in the middle, and at least twelve feet in length, if it is fifteen inches square and upwards in the middle;

Birch.—Birch shall be at least six feet in length and twelve inches square in the middle;

TAPER OF MERCHANTABLE TIMBER.

Taper of merchantable timber:—

Oak,	3 inches,	under	30 feet,	and	in proportion	for	any greater length.
Elm,	2 do.	for	30	do.	do.	do.	do.
White pine,	1½ do.	for	20	do.	do.	do.	do.
Red pine,	2 do.	for	25	do.	do.	do.	do.

Ash, basswood and butternut, 1½ inches, under 20 feet, and in proportion for any greater length.

Bends or twists not to exceed one in number;

HOLLOW ALLOWED.

Hollow allowed on merchantable timber:—

Oak, 3 inches for every 20 feet in length, and in proportion for any greater length;

Elm, 3 inches for every 20 feet in length, and in proportion for any greater length;

White pine, 2½ inches for every 20 feet in length, and in proportion for any greater length;

Red pine, 3 inches for every 20 feet in length, and in proportion for any greater length;

Ash, basswood and butternut, 2½ inches for every 20 feet in length, and in proportion for any greater length;

DIMENSIONS OF MASTS, BOWSPRITS AND RED PINE SPARS.

White pine masts of 23 inches and upwards at the partners, shall be 3 feet in length to an inch in diameter;

22 inches do. 3 feet do. do. and 2 feet extreme length;

21 do. do. 3 feet do. do. and 3 feet do.

20 do. and under 3 feet do. do. and 4 feet do.

Hollow or bend not to exceed six inches for seventy feet, and in proportion for any greater length;

Bowsprits shall be two feet in length for every inch in diameter at the partners, adding two feet for extreme length;

Red pine spars shall be three feet to the inch in diameter at the partners, and nine feet extreme length; hollow not to exceed seven inches for sixty feet, and in proportion for any greater length.

REWORKING.

Whenever it appears that timber, masts, spars, boards, planks, deals, staves, oars or any other description of lumber, are not properly hewn, squared, butted or edged, but are merchantable in other respects and sold as such, the supervisor, deputy and culler, respectively, shall order or cause the same to be properly dressed and chopped, at the expense of the seller or the buyer, as the case may be, previ-

ously to their being respectively received and certified to be merchantable; and such dressing and chopping shall be done under the direction of the culler in charge of the measuring or culling.

SURVEY IN CASE OF DISPUTE.

If any dispute arises between the first buyer or seller, or the person making the requisition, and the culler employed to cull or measure any article of lumber, with regard to the dimensions or quality thereof, the supervisor or deputy shall, as soon as possible, upon a written complaint thereof being made, demanding a survey, cause a board of survey to be held for examining the quality and dimensions of such lumber; and such board shall take into consideration the position of such lumber when measured or culled, and all other circumstances and considerations connected therewith, in reporting thereon; and such board shall consist of three persons,—one to be appointed by the culler whose decision is disputed, one by the person complaining, and one by the supervisor or deputy,—and their determination shall be final and conclusive; and if the opinion and act of the culler is confirmed, the reasonable costs and charges of re-examination shall be paid by the person complaining, but if otherwise, by the culler:

WHEN SURVEY MUST BE DEMANDED.

Such survey shall be demanded when the culling or measuring is completed, or within two lawful days after the person demanding the survey has been furnished with the specification thereof; and such right of survey shall cease on and after the fifteenth day of November in each year:

APPOINTMENT OF CULLER.

The supervisor or deputy, for the more expeditious settlement of disputes, may, with the consent and at the request of buyer, seller and culler concerned, name one culler to act as surveyor; and if the culler so named is not objected to by any of the persons interested, he shall act in the capacity of a board of survey, and his determination shall be final and conclusive.

COLLECTION OF FEES AND CHARGES.

The fees and charges fixed by the Governor in Council shall be charged and collected by the supervisor and deputy supervisor, as the fees and charges for culling, measuring or counting off each description of lumber, and for making out specifications, and shall include all charges and expenses against such lumber, except in cases where extra labor for canting, dressing, butting, chopping and piling is necessary and required:

BY WHOM AND WHEN PAYABLE.

One-half of such fees and charges shall be paid by the buyer, and the other half by the seller; but the whole of such fees and charges shall, in all cases, be paid to the supervisor or deputy, on the delivery of the specification or on the presentation of an account thereof, by the person, or by the persons jointly or severally, who filed a requisition or order for such measuring, counting or culling, whether such person or persons are buyers, sellers, owners, or possessors of such lumber.

CULLING NOT COMPULSORY IN CERTAIN CASES.

Nothing in this Act shall make it compulsory to have any article of lumber measured, culled or assorted, under this Act, if such lumber is shipped for exportation by sea for account, in good faith, of the actual and *bona fide* producer or

manufacturer thereof; but all other lumber shipped for exportation by sea, shall be either measured, culled or counted, at the option of the persons interested, by a licensed culler, under the control and superintendence of the supervisor or deputy; and the owner or shipper of such lumber, or the proprietor or lessee of the premises from which such lumber is so unlawfully shipped, shall incur a penalty equal to the market value of any article of lumber so unlawfully shipped.

CHAPTER XI.

QUEBEC—PERSONNEL.

Previous chapters have dealt with physical features, with forests, with history of development and administration and with statistics, but no history can be complete without reference to the men who have done the things recorded. It has not seemed necessary or advisable to make the personal element prominent in a work of this character, but in order to link the past with the present and to indicate the forces which are still carrying ahead the lumber development of the Province of Quebec the following brief sketches of individuals, firms or companies that once were or are now prominent in the industry are presented. Some of them were pioneers; some of them are occupying a growing place either in lumber manufacture or in lumber commerce; but all are deemed worthy of mention in a work of this character.

THE MONTMORENCY MILLS.

Early in the Nineteenth Century the English government sent several practical men to Canada to procure timber for shipbuilding. One of these men was Peter Patterson, who, later, in connection with Henry Usburne in the year 1811, purchased the site of the famous Montmorency sawmills, at the foot of the Falls of Montmorency, near the City of Quebec. Subsequently Mr. Patterson conducted the business on his own account for a period of forty years, when he died. He was succeeded by the late George Benson Hall, who conducted six mills at the same place until his death in 1876, after which the mills were operated by Andrew Thomson, Patterson Hall and George Benson Hall, under the firm name of G. B. Hall & Co., until 1884, when Patterson Hall and H. M. Price, under the name of Hall & Price, leased the mills and continued them until 1892, when they were shut down. In 1894 the buildings were bought by Mr. Price and pulled down by him. The Montmorency Cotton Works now occupy the site.

H. M. PRICE.

H. M. Price, after the Montmorency mills were closed, bought the Whitton, East Broughton and Lyster mills, which he continued to operate until about twenty-four years ago, when he sold out to his manager, D. H. Pennington, an old Montmorency man who has since built

another mill in the same neighborhood, all now being operated to their full capacity. Mr. Price, though still in the deal business, is largely engaged in the production of pulpwood, and is president of the Pulpwood Association of Quebec Province.

HAMILTON BROS.

George Hamilton, one of the earliest in the trade, bought the Hawkesbury mill property, on the Ottawa River, in 1811, and at his death the business—a general deal and lumber business—was carried on by his three sons, Robert, George and the Hon. John Hamilton. The business became one of the most extensive on the Ottawa River, and the whole of the mill's cut was brought to the Quebec market for exportation to Great Britain. Some years before the firm retired from business, John, the son of the late Robert Hamilton, became a partner. He is still living in Quebec and is chancellor of the University of Bishop's College, Lennoxville, Quebec, where he graduated with the degrees of master of arts and doctor of civil law.

HENRY ATKINSON.

In the early part of the Nineteenth Century, Sir John Caldwell, the Receiver General of Lower Canada, opened two lumbering establishments—one on the Etchemin River and the other on the St. Nicholas. For the double purpose of bringing down logs and for an additional supply of water for his mills, at the foot of the St. Nicholas Falls he constructed a canal about five miles long from a tributary of the Chaudiere to the St. Nicholas River. In 1821 Charles King, father of the members of the present firm of King Bros., Limited, came over from England and took charge of the St. Nicholas establishment for Sir John, and at about the same time John Thomson, father of Andrew Thomson, now president of the Union Bank of Canada, came from Boness, Scotland, and took charge of the Etchemin establishment. After the return of Sir John Caldwell to England, the St. Nicholas mill fell into the hands of the late William Gerrard Ross, and the Etchemin mill into the hands of the late Henry Atkinson, uncle of the present proprietor, Henry Atkinson, who still conducts that valuable property.

JOHN BREAKEY.

The St. Nicholas mill, like the Montmorency mills, has long been dismantled, the tendency at present being to take the mill to the logs instead of, as in the past, bringing the logs to the mill. Following up this practice, Charles King, in partnership with H. D. Breakey, father of the present owner of this property, John Breakey, built in 1846 the

existing mills on the Chaudiere River, several miles south of the St. Lawrence River (at a point about six miles from Quebec City), whence the deals were started down to the Chaudiere Basin on the St. Lawrence for shipment. Subsequently the property became that of Henry King and John King, and upon the death of the former, Mr. Breakey succeeded to the ownership, which he still maintains. This mill is one of the largest if not the largest spruce deal mill in the Province of Quebec.

THE THOMSONS.

Some time after John Thomson, before referred to, left Etchemin, he took two of his sons into partnership with him—Andrew and John Thomson—under the firm name of Thomson & Co., and they purchased the Buckingham mill property in conjunction with the Hamilton brothers, and conducted on a large scale a pine deal business. These deals were taken down to Quebec in moulinettes and piled or shipped from the river at the New Liverpool cove. When the partnership between the Hamiltons and the Thomsons was dissolved, the Thomsons bought Victoria cove, on the north side of the St. Lawrence, where they carried on business until they retired over a quarter century ago.

KING BROS., LIMITED.

King Bros., Limited, with headquarters at Quebec City, are extensive manufacturers of spruce and pine, and have been in the trade for many years, the firm having been established in 1829 by the late Charles King, who erected his first mill at St. Antoine de Tilly in the Province of Quebec. At present there are two partners in the firm—Edmund Alexander King and Charles King, with W. S. Thomas as vice president and general manager of the business. King Bros. are noted for their careful and reliable selection of shipments, and their operations have been carried on over a large area and in various localities of the Province of Quebec. The late James King, who was a partner up to the time of his death about ten years ago, was a member of the Provincial Legislature for Megantic for several years, and was well known to the trade both at home and abroad.

W. & J. SHARPLES.

W. & J. Sharples (Hon. John Sharples) is one of the oldest firms in the Quebec square timber trade, having been established in 1830 by William Sharples, of Liverpool. The business was afterward taken over by his son, Henry Sharples, about 1840. Richard Wainright and Charles Sharples, and afterward the late Hon. John Sharples, next conducted the business and subsequently the latter's sons,

only one of whom remains in the timber export trade, the Hon. John Sharples, who is the sole proprietor of the business carried on under the style of W. & J. Sharples. He was born in Quebec in 1847. He entered the firm in 1871, and under his management the business has been greatly extended.

The firm ships about 2,000,000 cubic feet of square and waney timber of all kinds during the season of navigation, and about 50,000,000 feet board measure of pine deals and sidings. The firm possesses two coves at Quebec—the Sillery cove, which is devoted to the shipment of square and waney timber, and Bridgewater cove, where there are large piling grounds for deals and lumber.

The name of Sharples has been prominently before the public in connection with the timber and lumber export trade of Canada for nearly three-quarters of a century. The development of the business of this concern from comparatively small beginnings has been something phenomenal. The establishment transacts the greater part of its trade with the United Kingdom, but business relations are maintained also with certain commercial centers in continental Europe. There are branch offices at Montreal and Ottawa, and the firm has agencies in Glasgow, London and Liverpool.

The Hon. John Sharples is a member of the Legislative Council of the Province of Quebec, to which he was nominated in 1893, and of the Quebec Board of Harbor Commissioners; vice president of the Union Bank of Canada and of the Quebec Auditorium; a director of the Quebec Bridge Company; president of The Chronicle Newspaper Company; mayor of the suburban town of Sillery, and was, until he resigned recently, vice president of the Great Northern railway of Canada.

J. BURSTALL & CO.

J. Burstall & Co. is one of the oldest Quebec firms engaged in the export of wood goods from Canada, having been established in the City of Quebec by the late Henry Burstall, in the year 1832, nearly three-quarters of a century ago. He came from Hull, England, and was shortly afterward joined by his brother Edward. The business was carried on for many years under the style of H. & E. Burstall. On the retirement of Henry Burstall in 1856, it was changed to E. Burstall & Co. In 1857 John Burstall, a nephew of the brothers, was admitted as a partner, and when a few years afterward Edward Burstall retired, it was again changed to J. Burstall & Co., and has so remained ever since.

About the year 1863 Stanley Smith, of Liverpool, joined the firm and continued as a partner for ten or twelve years, when he retired. W. H. Robinson then became a member, as representing Harrison, Robinson & Co., of Liverpool. Mr. Robinson died in 1876, and the following year F. Billingsly, for many years in the employ of the firm, was admitted into partnership, along with H. T. Walcot. The latter remained in the firm fourteen years, and the former until his death in 1903. John Burstall, who had been head of the firm for about thirty-five years, died in England in 1896. The business is now conducted by John F. Burstall, his son. The firm has a branch office in Montreal and another in London, England. It has for more than a half century done a large annual export trade, and before the development of the steam carrying trade, for a long period of years, exported annually to Great Britain from 120 to 200 cargoes of timber and deals.

NICHOLAS FLOOD.

One of the oldest living operators in the timber and deal trade of the Province of Quebec is Nicholas Flood, a resident of the Ancient Capital, who, in the successive capacities of culler and manufacturer, has been identified with this industry for more than a half century. Mr. Flood was born in Wexford, Ireland, and immigrated to Canada with his parents at the age of eight years. A year later, at the tender age of nine, he began his apprenticeship as a culler's assistant at Walker's cove, Quebec. His unusually active career covers the most prosperous period of the Quebec export timber trade. For many years he received for the owners at Cape Rouge cove, at Quebec, from 7,000,000 to 13,000,000 feet of board pine each season, and about twelve years ago succeeded to the management, which office he still holds.

PRICE BROS. & CO., LIMITED.

Price Bros. & Co., Limited, of Quebec, are the largest lumber operators in spruce in the Province of Quebec, having sawmills in all the principal lumbering districts east of the Ottawa, and are also the largest individual limit holders in Canada. The company has a paid up capital of $2,000,000. The total appraised value of the assets of the company is $4,500,000. The value of the freehold lands, seigniories and timber limits alone is in excess of $3,000,000. These lands schedule over 100,000 acres. The limits operated under license schedule over 6,000 square miles. The timber consists principally of spruce, balsam, cedar, birch and a small amount of pine, poplar and hemlock. The

predominating wood is spruce, a large part of the limits being included in the great spruce belt of Canada. The timber is located in a district where the rapidity of growth is probably greater than anywhere else in North America, so that a tract may be gone over again in fifteen or twenty years. The company has mills at the following places, all in the Province of Quebec: Batiscan, St. Thomas, Cape St. Ignace, Rimouski, Matane, Salmon Lake, Metabetchouan, Chicoutimi, L'Anse au Cheval and St. Catherine's Bay. In addition to the sawmills, the company owns one of the largest pulp mills in Canada, located at Rimouski.

The founder of this business, the late William Price, in 1840 established the mills at Chicoutimi, St. Alexis, L'Anse St. Jean and St. Etienne, on the Saguenay, and at Metis, Matane, St. Thomas, Batiscan and other places, leaving an immense business to his sons, the last of whom, Hon. E. J. Price, died about six years ago, at which time his nephew, William Price, succeeded to the business, which, during the latter part of 1904, was converted into a limited stock company, with Mr. Price as president.

On the far famed Saguenay the company has four mills, from which it ships its well known spruce deals. This remarkable river is navigable for ships of the deepest draft for sixty miles. On account of the swift current, a powerful tug is provided for the convenience of ships coming up to load, there being no possible anchorage on the river except at the mills. The Chicoutimi mill is situated in the town of that name at the head of navigation. The mill at Grand Bay (or Ha-Ha Bay) is driven by water power. The other mills on the Saguenay, as already stated, are situated at L'Anse St. Jean and St. Etienne. The total capacity of these mills is 20,000 standards per season. The Metis steam mill is about two hundred miles below Quebec, on the south shore; the Matane mill, about two hundred and thirty miles; these and the Salmon Lake mill, on the Matapedia River, have a capacity of about four thousand standards each. A few years ago a new steam mill was built at Trois Pistoles, about one hundred and thirty miles below Quebec, on the south shore of the St. Lawrence. The capacity of the mill is from 2,000 to 3,000 standards. The mill at Cape St. Ignace (steam power) and the mill at Trois Saumons have a joint capacity of about two thousand standards. The shipments of the company are chiefly to Great Britain, the Continent, South America and Australia, and its agents in the United Kingdom are Price & Pierce, of London.

William Price takes an active interest in all commercial matters relating to the development of Canada. He has been president of the Quebec Board of Trade, is honorary commodore of the Quebec Yacht Club, vice president of the Quebec Steamship Company and was a candidate in the Conservative interest for the county of Rimouski in the general elections for the Dominion of Canada in 1904.

William Price succeeded his uncle, the Hon. E. J. Price, as president of the A. Gravel Lumber Company, Limited, which has a large modern mill on the south shore of the St. Lawrence River, a few miles from Quebec City. It manufactures all kinds of lumber, including spruce, birch, etc., and box boards for the English market and all kinds of joinery for local consumption. Agencies are maintained in Boston, New York and London.

G. B. SYMES & CO.

The well known firm of G. B. Symes & Co. was established in Quebec about the year 1840, and was composed of George Burns Symes and D. D. Young, both of whom were English born. They were shippers of all kinds of timber and lumber, and operated largely in the shipping interests of the port. Upon the death of Mr. Symes, A. F. A. Knight, the firm's bookkeeper, became a partner with Mr. Young under the name of D. D. Young & Co. This firm was succeeded, upon the retirement of Mr. Young, by A. F. A. Knight & Co., which firm went out of business over a quarter century ago.

THE BENSONS.

The name of Benson has long been familiar in connection with the timber and shipping interests of the port of Quebec. W. J. C. Benson, came to Canada from London, England, about sixty years ago, and began a business career which, though brief, was extraordinarily active. He was one of the largest if not the largest shipper in the port for five years, when he died at the early age of thirty-three years. He shipped from 100 to 110 cargoes each season during this period. He built several ships at New Liverpool cove, Quebec, which property he owned, in the palmy days of the wooden ship industry. His cargoes of wood goods embraced square pine, deals, staves and lathwood. At the time of his death, about 1850, Joseph Roberts, who had been Mr. Benson's agent both in Quebec and in England, entered into partnership with Thomas Benson (a brother of the former) and R. H. Smith, under the firm name of Benson & Co. The new enterprise was very successful, and the firm's cargoes reached the extraordinary number of 140 in a

single season. The business continued until the retirement of Thomas Benson, when the two remaining partners continued the business under the name of Roberts, Smith & Co., their operations being extensive for upward of twelve years, when Mr. Roberts retired and returned to England in 1880. At this time E. Harper Wade (now manager of The McArthur Export Company, of Quebec) became a partner with Mr. Smith under the style of Smith, Wade & Co. Mr. Smith retired after six years, and H. T. Walcot (now representing The McArthur Export Company in London, England) joined Mr. Wade under the old firm name, and the business was continued until 1890, at which time it was wound up.

DUNN & CO.

The business of Dunn & Co. was established over a half century ago by the late Timothy Dunn, who was the doyen of the timber trade of the port of Quebec. Stuart H. Dunn, his oldest son, is now the sole proprietor of the firm. This concern draws its supplies of timber from Ohio and West Virginia, and is agent for certain hardwood lumbermen of the United States whose makes are of standard excellence and in good repute abroad. Dunn & Co. are probably more largely interested in the oak timber trade than any other firm in the City of Quebec.

The late Timothy Dunn was born at St. Ursule, Quebec Province, in 1816. In 1841 he entered the Quebec office of the great timber firm of Calvin, Cook & Counter, and later became the head of the firm of Dunn, Calvin & Co. Afterward, in conjunction with the late Thomas Benson, he transacted business under the name of T. H. Dunn & Co., and in 1860 formed a new partnership with the late William Home, the firm being Dunn & Home. The firm was succeeded by his two sons, the late Logie H. Dunn and Stuart H. Dunn, under the present name of Dunn & Co.

HENRY FRY & CO.

A notable firm closely associated with the commercial life of the port of Quebec for over a half century is that of Henry Fry & Co. The firm was established by Henry Fry in 1854, as timber merchant and ship owner. The founder having been joined by his brother in 1861, both continued to carry on this business on an extensive scale. In 1877 it happened, however, that, owing to ill health, Mr. Fry was prevented from taking an active part in the operations of the firm, and from that date until 1882 the management and direction of the business was in the hands of E. C. Fry. In the year last mentioned it was deemed

advisable for the senior partner to retire for a much needed and well earned rest, and, in consequence, the firm was dissolved. At about this time Robert Stanley, who had been associated with the business since 1862, was admitted as a partner, and, with E. C. Fry, has since successfully conducted the present business of general commission merchants. E. C. Fry was appointed a member of the Transportation Commission created by the Canadian government in 1903.

THE WILSONS.

Matthew Isaac Wilson and his brother, Charles William Wilson, formed a partnership under the firm name of Wilson Bros. & Co., on March 7, 1854. This partnership was formed in Liverpool, and a business in timber, deals, staves and general cargoes was conducted in both Liverpool and Quebec, with C. W. Wilson in charge of the Canadian branch. The firm acquired Dalhousie and Glenburnie coves in Quebec, and built several ships. About a year afterward the partnership was dissolved, when C. W. Wilson continued as agent in Canada for his brother in Liverpool until 1866, when the former went into the business on his own account, retaining the coves mentioned, building ships and carrying on a general export business, the cargoes embracing largely timber, deals, staves, etc. The Wilsons have loaded as many as 140 cargoes in a single season. J. P. Bickell, who was a clerk in the firm's offices, became a partner with M. I. Wilson and represented the business as selling agent in England. The business of C. W. Wilson in Quebec was wound up in 1885, and that of the Liverpool house in 1895. The brothers were among the best known merchants and shipbuilders in the history of these important industries. W. H. Wilson, oldest son of C. W. Wilson, in the year in which his father retired formed a partnership with John S. Murphy as J. S. Murphy & Co., which continued up to 1895, when the senior partner died, and W. H. Wilson, with his brother Fred, formed a partnership in a commission and agency business, which is still in existence, having headquarters in Quebec City.

DOBELL, BECKETT & CO.

Among the notable firms that have long held a prominent place in the Canadian timber export trade, that of Dobell, Beckett & Co. is most familiar. The Quebec house was founded nearly a half century ago by the late Hon. R. R. Dobell and the late Thomas Beckett. The firm has branch offices at Montreal and Ottawa and representatives in Great Britain. Its annual shipments from the ports of Quebec and Montreal amount to, in timber and lumber, hundreds of millions of

feet. The Quebec establishment is one of the leading commercial inheritances of the port.

The late Hon. R. R. Dobell was senior member and active head of the enterprise, and to his personal activity and commercial ability the firm in a large measure owes its prominence, stability and wide spread reputation. In the partnership were, in more recent years, T. Stevenson, Lorenzo Evans and W. Molson Dobell. Since the death of the two principals a few years ago, the Canadian business has been carried on by L. Evans, W. M. Dobell and R. W. Beckett, and the London, England, business by Mr. Stevenson.

Hon. R. R. Dobell represented Quebec West in the Canadian House of Commons for several years, and was also a minister of the Federal government. His absorption in the duties of state as well as those of membership of the Quebec Harbor Commission and Board of Trade, latterly placed the firm's business, to a large extent, in the hands of his associate partners in Quebec.

The firm possesses some fine cove property at Sillery, where, during the season of navigation, much activity prevails in connection with the dressing and loading of timber.

SIR HENRI JOLY DE LOTBINIÈRE.

The seigniory of Lotbinière, in the Province of Quebec, is one of the oldest in Canada, having been in the possession of the de Lotbinière family since the year 1673. The seigniory is situated on the right bank of the St. Lawrence River, about forty miles west of the City of Quebec, and embraces an area of 87,000 acres of forest. It is the ambition of the de Lotbinières to work this forest in a scientific and conservative manner so as to secure its perpetuity for many years to come. Their contention is that any one holding freehold or patented timber lands should work them simply for the revenue and not with the idea of converting them, with as short delay as possible, into cash; that no better investment can be found at the present time than timber lands, particularly when easy of access and exploitation; that a timber limit if properly managed should have no finality; that conservative felling will ensure the perpetuity of a forest, be it large or small; that a strict attention to a rational felling diameter and careful supervision against the lumberman's greatest enemy, fire, constitute the two essential features necessary to perpetuate the existence of a forest.

Henri Gustavus Joly de Lotbinière built a mill and began operations on the property in the year 1830, taking large quantities of pine and

spruce deals to the Quebec market. His son, Sir Henri Joly de Lotbinière, continues the business with the assistance of his son, E. G. Joly de Lotbinière.

Sir Henri Joly de Lotbinière, present head of this house, and one of the most distinguished public men of Canada, is widely known as a zealous and practical advocate of forestry. Sir Henri was born in France in 1829 of Huguenot ancestry, and came to Canada when a young man. He was admitted to practice at the Quebec bar in 1855, and was returned as a Liberal to the Canadian Assembly in 1861 for the county of Lotbinière. He took a prominent part in the agitation preceding the confederation of the provinces, to which measure he was strongly opposed. For a number of years he was a member of the Quebec Legislature, and in 1878 became Premier of that Province but was defeated the following year. After a protracted retirement from public life, he reëntered the field in 1896, and was elected to the House of Commons as a supporter of Sir Wilfrid Laurier. He was made Lieutenant Governor of British Columbia in 1900, which position he now holds.

Sir Henri has written and spoken frequently in connection with forestry, horticulture and kindred topics, displaying a knowledge largely based upon practical experience and personal research, and has taken an active part in connection with organizations for the promotion of these objects.

E. G. JOLY DE LOTBINIÈRE.

The active connection of E. G. Joly de Lotbinière, son of the above, with the lumber industry covers a period of barely ten years. Prior to that time he practiced law at Quebec. When, in 1896, his father accepted a seat in the Laurier cabinet, he gave up law and devoted himself to the management of the seigniory of Lotbinière. He has also taken an active interest in the work of the Canadian Forestry Association for several years past, and has the honor of representing the association as president for the current year (1905). He was born November 12, 1859. His mother's name was Margaretta Gower. He was married in 1885 to Lucy Geils Campbell, eldest daughter of the late W. D. Campbell, N. P., of Quebec.

He maintains the traditions of his family in the management of the family property, the seigniory of Lotbinière, and in his public capacity suggests regarding Crown land forests that a rigid enforcement of the existing rules and regulations, the setting aside of extended areas as

perpetual forest reserves and a vigorous fire protection service should ensure for posterity the advantages which are yet happily enjoyed in the Province of Quebec.

D. R. M'LEOD.

D. R. McLeod has been in business as a broker between manufacturers and shippers of timber for nearly a half century. He was at one time a shipper and is still largely interested in the trade at Quebec.

WILLIAM POWER, M. P.

Canada allows no adventitious circumstance of birth or fortune to be a bar to the progress of her deserving sons. A notable example of this is the career of William Power. He was born in 1849 at St. Colomb de Sillery, a suburb of Quebec City, and was educated at the parochial school of his native parish and at the Quebec Commercial School. When but a lad he entered the offices of W. & J. Sharples, the well known lumber merchants. Here he displayed such business ability that at the age of seventeen he was promoted to a more important position in the company's employ, and is now, as he has been for several years, manager of the Sharples business. Mr. Power has been identified with the timber trade of Quebec for nearly forty years. He is a practical lumberman, having spent several years in the pine forests of Canada and of Michigan, supervising the work there carried on by the Sharples employees. He visits the timber markets of Great Britain each year in the interest of his firm.

It would hardly be expected that a man who has shown so many excellent business qualities would be allowed to remain altogether in the comparatively quiet sphere of a business life, and so, not only has he been for many years a member of the parish Municipal Council of Sillery, but, on the death of Hon. R. R. Dobell, member of Parliament for the city district of Quebec West and a prominent timber merchant, Mr. Power was elected as his successor. He has since been reëlected by his constituency at the general elections for the Dominion Parliament in 1903.

Mr. Power is associated with Mr. Sharples and Harcourt Smith in an important business known as the River Ouelle Pulp & Lumber Company, which owns two mills on the River Ouelle, on the line of the Intercolonial railway below Quebec City.

E. HARPER WADE.

Edward Harper Wade, who arranged the formation, a few years ago, of the McArthur Export Company, Limited, in the City of Quebec, and

now holds the position of general manager of this concern, is a native of Liverpool, England. In 1862 he entered the offices of Sharples & Co., in his native city of Liverpool. In 1870 he was transferred to Quebec, Canada, and remained with the Sharples firm in that city until the end of 1877, visiting England each winter and taking an active part in the timber business as a salesman. He then accepted a similar position with Roberts, Smith & Co., of Quebec, and remained with them until the retirement of Joseph Roberts, in the year 1880, when he was taken into partnership by R. H. Smith, of the same city, and for six years carried on business under the style of Smith, Wade & Co. On Mr. Smith's retiring, H. T. Walcot, who had been a partner in the business of J. Burstall & Co., joined the firm. Subsequently, in 1890, Mr. Walcot became agent in England of the McArthur Bros. Co., Limited, and Mr. Wade the manager of the Quebec and Montreal business of the same concern.

CARBRAY, ROUTH & CO.

Carbray, Routh & Co., of Quebec and Montreal, have been engaged in the business of general commission and shipping for nearly forty years. They are also selling agents for several important sawmills, and have done a large business with Great Britain, France, Portugal, Australia and South America. Mr. Carbray is a prominent man in public life, and for many years represented the business division of the City of Quebec in the Parliament of the Province of Quebec. He is also consul for Portugal at Quebec, while Mr. Routh fills the same position as Portuguese representative in Montreal.

THE EDSON FITCH COMPANY.

Edson Fitch & Co. was established at Montmorency, a few miles east of the City of Quebec, in 1867. In 1869 the plant and works were moved to Etchemin, on the south shore of the St. Lawrence River about four miles west of Quebec, where the establishment has steadily grown in importance. Mr. Edson Fitch is an American and has invested the industry with a spirit of enterprise so characteristic of his nationality. In 1886 Edson Fitch & Co. was converted into The Edson Fitch Company, and has so continued ever since. The specialty of the works is the manufacture of match splints, shooks and match blocks. Enough splints and blocks are manufactured daily to produce 80,000,000 matches, and in the manufacture of splints and cases about 20,000,000 feet of lumber are used a year. The company maintains business relations with the United Kingdom, the West Indies and South America.

BENNETT & CO.

Bennett & Co., manufacturers' agents, have been in business in the City of Quebec for over thirty years. The two partners are sons of the late Benson Bennett, who was well known as the largest mill owner and manufacturer of pine and spruce deals in Quebec. Among the various mills for which Bennett & Co. have acted as agents are those of Sir Henri Joly de Lotbinière, in the seigniory of Lotbinière, and the Hon. J. K. Ward, of Montreal, for both of whom they have been agents for many years.

HAROLD KENNEDY.

Harold Kennedy, who has been established in the port of Quebec for nearly a quarter of a century, is identified with the timber export trade. He is the owner of Indian cove, one of the best properties of the kind in the port, which was occupied at one time by the Gilmour Company. Mr. Kennedy came to Quebec from his native city of Liverpool to represent Taylor, Pierce & Co., of that place, who were the successors of James Bland & Co. He is a manufacturer and shipper of pine and spruce deals and pine and birch timber, and an owner of large limits in the Province of Quebec. He has for his Montreal agents McLean, Kennedy & Co. As ship owners' agent he acts for the following well known lines of steamers: Head Line, Belfast and Dublin; Moss Line, Liverpool; Malay & McIntyre, Greenock and Glasgow; Holme Line, of Maryport, and represents many owners of tramp steamers trading with the St. Lawrence. Mr. Kennedy is a member of the Quebec Harbor Commission, president of the McArthur Export Company, Limited, and vice president of the Quebec-Jacques Cartier Electric Company. He was appointed by the Federal government in 1903 as a member of the Dominion Transportation Commission, but, owing to business engagements, was obliged to decline the honor.

H. R. GOODDAY & CO.

Nearly twenty years ago H. G. Goodday, of London, England, engaged in the lumber export business with E. W. Benson. The firm of Goodday, Benson & Co. was dissolved in 1894, when H. R. Goodday, a son of the senior member of the firm, continued the business under the firm name of H. R. Goodday & Co. In 1899 he entered into partnership with H. C. Foy, who is a son of the head of the well known firm of Foy, Morgan & Co., of London, England, under the style of H. R. Goodday & Co. The specialty of this firm is spruce deals, getting its supplies from Canadian forests. It also handles hardwoods and

other lumber. Its trade is principally in the United Kingdom and the chief centers of business on the Continent. Foy, Morgan & Co., London, England, are the firm's agents in London and on the Continent.

J. BELL FORSYTH.

J. Bell Forsyth is a name well known in Canada from the publication for so many years of the annual statistics of the timber and lumber trade of Quebec by the late firm of J. Bell Forsyth & Co., who were for many years engaged in the commission business in lumber. The annual statement is still continued under the old name, but Mr. Forsyth is now the collector of customs for the port.

ALEXANDER BAPTIST.

About half way between Quebec and Montreal, at Three Rivers, are the well known mills of Alexander Baptist, who, on account of the extensive limits he has owned, has been styled the "Lumber King of the St. Maurice." His father was one of the pioneers of the trade. His usual cut is about 300,000 logs per season of pine and spruce, most of the product reaching the English market.

THOMAS MALONE.

Thomas Malone, of Three Rivers, Quebec, has been prominent for over a quarter of a century in the lumber trade of Quebec Province, though his operations have extended over a much wider field. Born in Quebec City in 1856, he began active operations, before reaching his majority, as a shipper of deals to the British market. Under his energetic management the business rapidly developed until he handled a large proportion of the output of the Ottawa Valley going to Quebec. Between the years 1876 and 1880 he operated in Michigan and Wisconsin, shipping direct to Britain. In 1884 he removed from Quebec to Three Rivers, in the neighborhood of which place he owns extensive limits in addition to conducting a lumber agency. Mr. Malone has bought and sold timber limits on a large scale, and has done much to develop the trade of Three Rivers.

THE WARREN CURTIS MILL.

At Three Rivers is also the Warren Curtis mill, which has a capacity of 100,000 feet per day of ten hours. The logs are principally spruce, and number about 200,000 per year.

ST. MAURICE LUMBER COMPANY.

One of the leading institutions of the St. Maurice River district is the St. Maurice Lumber Company, of Three Rivers. Its ownership is

largely American, and it operates the pulpwood part of its business in connection with pulp and paper mills at Glens Falls, New York. It owns extensive limits on the St. Maurice River. A large sawmill at Three Rivers produces pine and spruce deals for the English market and inch lumber for the United States, while during the working season about 100,000 feet of spruce timber is cut into pulpwood daily for shipment by the Richelieu Canal and Lake Champlain for the Glens Falls plant.

THE LAURENTIDE'S PULP MILL.

On the St. Maurice River is situated the Laurentide's pulp mill at Grand Mere, manufacturing about one hundred tons a day. Three hundred thousand spruce logs are cut yearly.

THE TOURVILLE LUMBER MILLS COMPANY.

A little higher up the St. Lawrence than Three Rivers, the river widens out and is called Lake St. Peter, near the shores of which the Tourville Lumber Mills Company has three mills—one on the north shore at Louiseville and two on the south shore at Pierreville and Nicolet. The office of the company is at Montreal.

THE CHARLEMAGNE & LAC OUAREAU COMPANY.

The limits of the Charlemagne & Lac Ouareau Company's mills are situated in the counties of Joliette, Montcalm and Berthier, in the Province of Quebec, and are composed largely of spruce, pine, birch, hemlock and ash. The output of the mill is about 30,000,000 feet, the bulk of which is shipped to Great Britain and the United States. The principal mill is located at Charlemagne, about twelve miles below Montreal, at the junction of the L'Assomption, Ottawa and St. Lawrence rivers. It is operated by steam and has a capacity of about 2,000 logs per day. The president of the company is Robert Reford, of Montreal, senior member of the firm of Robert Reford & Co.

HON. JAMES LITTLE.

The Hon. James Little, of Montreal, one of the pioneer lumbermen of Canada, died in October, 1883, being over eighty years of age, and held in the highest esteem not only in his own country but in the United States as well.

He was born near Londonderry, Ireland, emigrating to Canada in 1823, at the age of nineteen years. He passed through Montreal and went to Niagara, Ontario, then the wholesale market for that part of Canada. Toronto at that time was known as the village of York, and Hamilton was not in existence. In 1833 Mr. Little married and moved

to the township of Seneca, on the Grand River, Ontario. The place where he settled is now the town of Caledonia, which is surrounded by a country that is cleared and settled, but at the time of his first residence there the entire section was an unbroken forest wilderness, the home of the Indians.

Upon the building of the first dam in the river, Mr. Little began a lumber manufacturing business, which he carried on upon a large scale for over a quarter of a century. His operations extended over almost the entire peninsula between Lake Erie and Lake Ontario, and at one time numbered twelve different concerns. Later he operated in the counties of Brant, Wentworth, Norfolk and Elgin, and in the Georgian Bay district, Ontario, and finally in the St. Maurice River district, Quebec, after 1873 making Montreal his home. He was among the first to send lumber to the United States, Albany being his chief market.

Mr. Little was a public spirited and farseeing man, being often in advance of his fellows. This frequently caused opposition to his views, but he continued to fight for them until his object was gained. This was especially true of his labors in the interest of forestry. Seeing the rapidity with which commercial woods were being cut away with but small return to the country for their loss, and having a thorough knowledge of the subject, he became an earnest and persistent writer on the subject of forest protection at a time when the popular belief was that there was no need of any such protection. His efforts were at last rewarded. The American Forestry Congress, in recognition of his services, accorded him a vote of thanks; the first forestry association of Canada, that of Ontario, made him its honorary president, and the Government showed its recognition by establishing "Arbor Day." The United States, as well as his own country, honored James Little for his valuable work for forest protection.

Since the death of James Little his work has been successfully continued by his son, William Little, of Montreal, who seems to hold by natural heritage the same views as did his father. Following in his father's footsteps, William Little has for many years been a foremost advocate of forestry preservation, and has devoted much time and attention to the study of the relations of Canada with the United States.

J. K. WARD.

A fine type of the pioneer lumberman is J. K. Ward, of Montreal, Quebec, a Manx by birth. He migrated to the United States, and leased and operated a sawmill at Troy, New York. He bought a saw-

mill and stumpage on Maskinonge River, in Quebec in 1853, largely increasing his operations as time went by. In 1863 he located at Three Rivers, Quebec, and operated a mill, which he subsequently sold to an American concern. He then leased a larger area of timber land from the Province of Quebec on the Rouge River, and built an extensive sawmill on the Lachine Canal. He operated this mill, which had an annual cut of approximately 15,000,000 feet, until 1900, when he sold the property to a company headed by his oldest son.

THE MACLARENS.

The MacLaren family, of Buckingham, Quebec, noted for its extensive and widely scattered lumbering interests, traces its connection with the industry back to the early days of the pioneers of the Ottawa Valley. David MacLaren, a Scotchman, migrated to Canada in 1824, and took up land in the township of Torbolton, Carleton County, Ontario. He was a man of strong, energetic character and earnest religious convictions. James MacLaren, his eldest son, was six years of age when the family emigrated. On attaining the age of eighteen he engaged in lumbering, and in 1842 conducted a general store at Peche on the Gatineau River, Quebec. He subsequently built a small sawmill, and in 1853, in partnership with J. M. Currier, leased an extensive sawmill at the mouth of the Gatineau. He rapidly enlarged his enterprises and in 1864 purchased mills and timber limits on the Riviere du Lievre, Quebec. He built an immense sawmill of the modern type at Buckingham, Quebec, on the Ottawa River, at the mouth of the Lievre, about fifteen miles below Ottawa, where, for over a quarter of a century, he engaged in the manufacture of lumber on a large scale. He subsequently operated on the North Nation River, on the Upper Ottawa and in Michigan, being at one time the most extensive operator in America. He died in 1892.

David MacLaren, of Ottawa, eldest son of James MacLaren, was born in 1848. In 1874 he became manager of the Gatineau and Ottawa branches of his father's business, which at times employed over one thousand men. The business was subsequently incorporated as the James MacLaren Company, Limited, David MacLaren becoming one of the directors, a position he still holds. He is interested in many other large corporations.

Albert MacLaren, son of James MacLaren, born in 1870, is president and managing director of the company, which now operates two extensive sawmills with planing mills, etc., at Buckingham, having an output

of from 25,000,000 to 30,000,000 feet of lumber annually, and employing from 1,200 to 1,500 men in the winter and 400 during the summer months. The company has 2,600 square miles of timber limits in Quebec Province, and owns a pulp mill which began operations in 1902 and produces seventy tons of wood pulp daily.

Alexander MacLaren, another son of James MacLaren, born in 1860, has been an active participant in the affairs of the James MacLaren Company, but is, perhaps, more prominently connected with other enterprises. He is president of the North Pacific Lumber Company, Limited, organized in 1890, with mills at Barnet, British Columbia, having 90,000 acres of cedar and fir limits. Over 25,000,000 feet of sawn lumber is shipped annually from this mill, which also manufactures about 30,000,000 shingles a year. Alexander MacLaren is a director of the Keewatin Power Company, Limited, and is concerned in other industrial undertakings.

John MacLaren, son of James MacLaren, died May 29, 1903, at Kamloops, British Columbia, from injuries sustained by being thrown from a horse. As a young man he was associated with his father in the lumber business. He spent several years at New Westminster, British Columbia, and for a time lived at Windsor, Ontario. He owned a large sawmill at East Templeton, Quebec. At the time of his death he was about fifty years of age.

EZRA B. EDDY.

Ezra Butler Eddy, of Ottawa, was born near Bristol, Vermont, August 22, 1827. He engaged in the business of match manufacturing in Burlington, Vermont, in 1851, and three years later established himself at Hull, Quebec, where he erected extensive mills and workshops. He obtained large timber limits and began the manufacture of lumber, engaging also in subsidiary industries, on a large scale, availing himself of the splendid water power of the Ottawa River. In 1856 he added to his enterprise the manufacture of woodenware, and in 1892 erected a paper mill. In the meantime the business had been turned into a joint stock company under the name of The E. B. Eddy Company, of which organization Mr. Eddy is president. The establishment is one of the largest of its kind in the world, the output of the match factory being 50,000,000 matches daily. The total number of employees is over 2,000. Mr. Eddy has been mayor of Hull and represented Ottawa County for a term in the Quebec Legislature.

HON. GEORGE BRYSON.

Hon. George Bryson, who died at Fort Coulonge, January 14, 1900, was one of the pioneer lumbermen of the Province of Quebec. He was born in Paisley, Scotland, December 13, 1813, and came to Canada in 1821, when eight years of age. During the early part of his life he worked on a farm in the summer and in the winter season he got out cordwood under contract. He was one of the first to engage in lumbering in his district, and at twenty-two years of age, in company with his brother-in-law, the late Hiram Colton, of Litchfield, Pontiac County, Quebec, he began lumbering operations on the Coulonge River above Ragged Chute, Quebec. He took many rafts of square timber to Quebec, and was a well known figure in the commercial as well as the political life of Canada for more than a half century.

Mr. Bryson was a promoter of the Pontiac & Pacific Junction railway, a member of the Upper Ottawa Improvement Company for several years and was one of the founders and a director of the Bank of Ottawa. The town of Bryson, formerly known as Havelock, was renamed after the Bryson family. In politics he was a Liberal, and his parliamentary career began in 1857, when he was elected to represent Pontiac County in the old Canadian Assembly. He was called to the Legislative Council of Quebec in 1867, and occupied a seat there for twenty years, when he retired in favor of his second son, George Bryson, Junior.

EUGENE ETIÈNNE TACHÉ.

Eugene Etiènne Taché, Deputy Minister of Lands and Forests, Province of Quebec, is the eleventh child of Sir E. P. Taché and was born at St. Thomas de Montmagny October 25, 1836. He was educated at the Seminary of Quebec and at the Upper Canada College, Toronto. He is a civil engineer and land surveyor for the Provinces of Quebec and Ontario. In 1862 he received the brevet of captain in the Chasseurs Canadiens, of Quebec. He was also a member for several years of the Civil Service Rifle Corps, at Ottawa. On September 20, 1869, Mr. Taché was appointed Deputy Minister of Crown Lands, for the Province of Quebec. The department has been known for several years past as that of Lands, Forests and Fisheries, but quite recently it has assumed the title of Lands and Forests simply, the other branch having been added to another department of the government service.

As a land surveyor Mr. Taché has had wide experience, among other important works, having been engaged in the location of the

Ottawa Canal. The maps of the Province which have been drawn by him are models of exactitude and clearness. The plans of the legislative buildings and the courthouse, as well as other notable civic and military edifices in the City of Quebec, were made by him, and in these he has shown great taste and originality.

Mr. Taché has given loyal and active service to the Province for thirty-six years. He has worked conscientiously and assiduously and has shown himself to be a thorough master of all the intricate details of the most important department of the government service. He is the author of the beautiful and patriotic device, "Je me souviens," which accompanies the arms of the Province of Quebec. His Majesty, King Edward, recognizing the official merit of Mr. Taché, has created him a Companion of the Imperial Service Order.

He has been married twice—on the first occasion to Olympe Eleanore, daughter of Louis Albert Bender, who died in 1878; and subsequently to Maria Clara, daughter of the Hon. E. L. A. C. J. Duchesnay.

CHAPTER XII.

ONTARIO—EARLY HISTORY.

As the early history of the Ontario lumber trade goes back to the time when this great section of Canada formed a part of Quebec, any time selected for its beginning, save that time when the pioneers of New France began to sell timber to their neighbors, must be purely arbitrary. This is true for two other reasons also: First, because the great avenue of the lumber trade, the Ottawa River, is the boundary line between the two Provinces; and, second, because Upper and Lower Canada, after being separated in 1791, were again united under one legislature from 1840–1 to 1867. While the public records were in a measure kept separate they operated under the same laws, while the capital city changed every four years from Toronto to the fortress of Quebec. Some things which equally affected the trade in Ontario have been described in dealing with Quebec and are only touched on here, while other things, which it has been deemed advisable to treat in connection with this Province, were matters of momentous importance to the lumbermen of Quebec. However, for the purpose of this description of the lumber trade, Ontario history may be considered to begin with the setting apart of Upper Canada as a separate province in 1791. This was the period when the only persons authorized to cut timber in the King's forests in Canada were the contractors for the royal navy, who, under their licenses, managed to cut a good deal for the general market without returning any revenue to the Crown. As a part of Quebec, Ontario had part and lot in the regulations regarding the running of the rapids in the St. Lawrence and the preferential duties granted by Great Britain.

The lumber industry was one of the first mechanical activities established in Ontario, and dates back to the early days of the settlement of the country shortly after the American Revolution. At that time the entire country now embraced within the limits of the Province was densely wooded. In the southern portion, where the first settlements were made, the hardwood varieties predominated, largely interspersed in some localities with the white pine and other coniferous trees. In the more northerly sections, however, and especially in the

Ottawa Valley, the pine, hitherto the main factor in the forest wealth of Canada, and its kindred species grew in profusion and at an early date became a valuable and much appreciated source of revenue to the pioneers, who depended largely on the means realized from the timber export trade to procure the supplies they required.

Incidental to the work of clearing the land, the settlers in many localities where small sawmills were established were enabled to procure supplies of lumber for local consumption, but the Ottawa Valley, with the means of transportation furnished by the Ottawa and St. Lawrence rivers, early attained that preëminence as a source of the export trade on a large scale which it has since maintained.

In treating of this phase of the subject it is difficult to confine this account strictly to the trade of Ontario, as the industry in the early days developed simultaneously upon both sides of the river, some of the largest mills drawing their supplies from Ontario being located on the Quebec side.

The watershed of the Ottawa embraces a region of about 80,000 square miles, much of it good agricultural land, and producing originally some of the finest pine timber in the world. Two hundred and fifty miles to the northwest of the City of Ottawa the river expands into a long and narrow sheet of water known as Lake Temiscamingue, which presents sixty miles of unbroken navigation and receives numerous important tributaries—including the Blanche, the Montreal and the Quinze rivers. Navigation on the Ottawa is interrupted by numerous rapids and falls, the most notable being the grand falls of the Chaudiere, immediately above Ottawa City, which furnish the power for many extensive mills and factories. The territory drained by the numerous tributaries of the Ottawa before its confluence with the St. Lawrence includes some of the richest and most valuable timber yet remaining unexploited.

THE PIONEER OF THE OTTAWA VALLEY.

The pioneer in the timber trade of the Ottawa Valley was Philemon Wright, an adventurous American, whose descendants have occupied prominent positions in the Ottawa district. Mr. Wright was a citizen of Woburn, Massachusetts, and the first man to appreciate the natural wealth and advantages of the Ottawa Valley as a field for colonization. His first visit was made in 1796. In the following year he returned and, in the face of many hardships and difficulties, explored the country on both sides of the river as far as the Chaudiere Falls. He was

particularly impressed with the value of the timber ("sufficient," as he afterward reported, "to load a thousand vessels") and with the possibilities of the Chaudiere Falls, or the Asticou, as the Indians called them. This cataract, or Chaudiere (caldron) as the French-Canadian lumbermen christened it, is situated at the place where the mighty Ottawa, contracted from the width of over a mile to a few hundred feet, pours itself over rocks thirty feet high, into a boiling, steaming pot with force sufficient to drive all the busy wheels of a great modern city. This fall represents the point where, for four hundred miles in the course of the Ottawa, the shores of the Provinces of Ontario and Quebec approach most nearly to each other.

Mr. Wright left Woburn February 2, 1800, with five families, and had in his train fourteen horses, eight oxen and seven sleighs. His destination was what was then a wilderness inhabited by a few Indians only. He settled opposite the present City of Ottawa, having obtained an extensive grant of land from the Government. Mr. Wright, like the patriarch, had the whole land before him and could choose either the right hand or the left. He chose the Quebec side and founded the city of Hull, doubtless without dreaming that on the high, rocky cliff on the other shore would within a century be seen the Gothic spires and turrets of the "Washington of the North," the capital of a country stretching from the Atlantic to the Pacific. The first tree was felled on the site of his homestead March 7 of the same year.

In 1807 Mr. Wright took the first raft of square timber down the Ottawa to Quebec. The few settlers declared such an undertaking to be impossible on account of the obstructions in the river, but Mr. Wright was determined to make the attempt and, in the face of gigantic difficulties, accomplished the trip. It required thirty-six days, as the venturesome pioneer and his assistants were unacquainted with the river and had to proceed with great caution. He continued, during subsequent years, floating to Quebec white oak and the finest qualities of pine. The squared oak was withed up by the ends with lighter material to keep it afloat, or loaded on white pine cribs. It took both time and patience to get acquainted with the dangerous parts of the river and, until improvements were made, many cases of drowning occurred.

He built his first sawmill and grist mill in 1808. These were burned and were rebuilt with his characteristic pluck in sixty days. Square timber was hastened to market as rapidly as possible, the mills being

rebuilt with the proceeds. The business grew and flourished and Mr. Wright eventually derived a large income from it. He built the first timber "slide," on the Hull side of the river, in 1829. Mr. Wright was elected the first member of the Canadian Parliament to represent Ottawa in 1830. He died in 1839, and his name has been perpetuated in Wright County, Quebec. His son, Alonzo Wright, was for many years a striking figure in the Canadian Parliament, in and out of which he was known, from the tributary of the Ottawa which his family and himself had done so much to develop, as "The King of the Gatineau."

The City of Ottawa, the present center of the lumber business, remained in a state of nature for some time after Philemon Wright had formed the nucleus of a settlement on the opposite shore of the river. In 1826 it was covered with bush and had only one house on the present site of the Upper Town. The first impetus to settlement was given by the construction of the Rideau Canal, projected mainly as a military work, under the superintendence of Colonel By. This work was completed in 1831, and in the succeeding year the village of Bytown, as it was then named in honor of Colonel By, had about one hundred and fifty houses. Thereafter it grew rapidly and Hull became practically a suburb.

Meanwhile lumbering operations had been extensively pushed in the district and manufacturing developed to a greater extent than elsewhere in the Province. About 1815 a Mr. Story built a sawmill on the Ottawa; and it is stated that when the man in charge "gigged" back the carriage for a fresh cut he would sit down on the log and eat his dinner, which would be about finished when the cut was done. It is no wonder that heart failure and nervous prostration were then unknown. Robert Gourley, prominent as an author and a political agitator, in his "Statistical Account of Upper Canada," published in 1818, mentions that sawmills of the best construction were in operation on an island in the Ottawa River opposite the higher part of Hawkesbury Township, on a scale superior to that of any other in the Province. "The business seemed to be carried on with great spirit, about fourscore people being employed in the works on the island." They were first owned by Mr. Mears, of Hawkesbury, but, at the time he wrote, they were the property of Mr. Hamilton, from Ireland.

Statistics compiled from the assessment rolls of the Province of Upper Canada give nine sawmills as the number existing in the Ottawa district in 1823, the total number in the eleven districts into which the

Province was then divided being 363. The great majority of these, however, were run merely to supply local requirements.

The town of Pembroke, about one hundred and twenty miles up the river from Ottawa, was founded in 1828 by Colonel Peter White, a native of Edinburgh, Scotland, who was for many years one of the principal timber merchants of the Ottawa Valley. His sons have been actively engaged in the lumber business, and by their enterprise have done much to build up their native town.

The town of Deseronto, on the Bay of Quinté, near the eastern end of Lake Ontario, was founded by Hugo B. Rathbun, of Auburn, New York. In 1854 Mr. Rathbun engaged in the manufacture of lumber at Mill Point, now Deseronto, Ontario. Later his son, Edward Wilkes Rathbun, was taken into partnership and was given the complete charge of the Deseronto business. About 1868 the Rathbun lumber yards were established at Oswego, New York, and sawmills were built later at Gravenhurst, Lindsay, Campbellford, Fenelon Falls, Tweed, Manitoulin Island and Bancroft. The Rathbuns owned two railroads, one from Deseronto to Tweed, a distance of thirty miles, and another connecting Gananoque with the Grand Trunk railroad. They also owned a line of steamers operating on the Bay of Quinté. They manufactured one million railroad ties a year and also owned the cement works near Napanee, gas works, sash and blind factories, match splint factory, chemical works, ship yards, locomotive works and car shops. The firm also operated four lumber yards in Canada and the United States. Edward Wilkes Rathbun died in November, 1903, and was succeeded by his son, E. W. Rathbun.

Henry Franklin Bronson of Bolton, New York, came to Ottawa (then Bytown) in 1853 and built on Victoria Island, in the Ottawa River, the first sawmill which shipped lumber from the Ottawa River to the American market. The venture prospered and grew, and many fortunes were made in the trade.

THE FIRST PAPER MILL IN ONTARIO.

V. H. Hickox, of Niagara Falls, tells of the first paper mill in Ontario. He says:

It was in the summer of 1841 that my father and another paper maker, whose name was Samuel Prine, engaged to go to Toronto and start the first paper mill in Upper Canada. They left Niagara Falls in June of that year. This mill was located about three miles from the city, up the River Don, a beautiful clear stream of water, well supplied with trout and other kinds of fish in abundance. The country round about was a vast wilderness of heavy timber, mostly pine, with here and there a little clearing with log cabin homes of the early pioneers.

Eastwood and Skinner, brothers-in-law, two enterprising Englishmen, built the first mill and received a cash premium from the Canadian government. In connection with the paper mill there was a grist mill, a brewery and distillery, owned by the Helliwell Brothers. The place was named Don Mills.

My father made a sojourn of seven years, during which time he started a second paper mill on the Don River, two miles above the first mill. We moved to Hamburg, west of Buffalo, about 1848. In the year 1851, Albert H. Porter sold the paper mill on Bath Island and my father, by this change, secured his old position as superintendent of the upper Don paper mills. Then he moved back to Toronto in 1851, where he remained for many years, respected as the man who made the first sheet of paper in the Upper Province of Canada.

CROWN TIMBER REGULATIONS.

During the earlier years of the lumber industry there were practically no restrictions on the cutting of timber upon the public domain and no thought on the part of the Government of deriving a revenue from the forest resources. When the British took possession of the country in 1763 elaborate instructions were furnished to Governor James Murray as to his administration. The British government was solicitous for the preservation of large areas of forest land as a source of supply of timber for naval construction, and the Governor was ordered to set aside in every township "proper quantities of land" for fortifications, barracks and other military or naval services, and more particularly for the growth and production of naval timber, "if there are any woodlands fit for that purpose."

The policy which the British government laid down for the formation of Crown timber reserves in Quebec for the preservation of timber for the royal navy was reaffirmed when Upper Canada was set apart as a separate province. The Duke of Richmond, governor-in-chief of the Province of Upper Canada, in 1818 received elaborate instructions that no land should be allotted to settlers until the district had been surveyed and those parts containing masting or other timber fit for the use of the royal navy reserved. Difficulties intervened and these regulations, wise in many respects, were never carried out.

These instructions, though subsequently repeated, were never observed, possibly because the governors had many more urgent matters to engage their attention and no doubt regarded the reservation of forests as altogether superfluous in a country where the timber, until a much later period, seemed inexhaustible.

It was not until 1826 that the earliest steps were taken to secure revenue from the forests on the Crown lands. Previous to this the only persons authorized to cut timber on the public lands were the con-

tractors for the royal navy or those holding licenses for them. In the early years of the Nineteenth Century licenses to cut timber in the Canadian forests were granted by the Imperial government to contractors for the royal dock yards, who, in addition to filling their contracts, took advantage of the privilege granted them for that purpose to do a general business in supplying the British markets. Their mode of operation was to issue licenses to merchants and lumbermen in Canada who were then legally authorized to cut timber as their agents. While these favored firms had a legal monopoly of cutting timber on the public lands, for which they paid nothing to the revenue, a number of unlicensed lumbermen pursued the business actively without asking the leave of anyone. It was found impossible to suppress this practice so long as those who desired to engage in the industry were debarred from doing so in a legitimate manner. The unfairness of the system led to its abolition.

ESTABLISHMENT OF TIMBER DUES SYSTEM.

In 1826 the contractors' monopoly was abrogated and for the first time was inaugurated a system under which the cutting of timber on the ungranted lands of the Ottawa region was extended to anyone desiring to embark in the business, on payment of a fixed scale of rates. This was announced May 3, 1826, by a proclamation of Sir Peregrine Maitland, lieutenant governor of Upper Canada. The dues fixed in this proclamation were: Upon oak timber £6 5s a thousand, or 1½d a foot; red pine £4 3s 4d a thousand, or 1d a foot; yellow (white) pine, £2 1s 8d a thousand, or ½d a foot; sawed, 2d a log; staves, £4 1s 8d a thousand "to be paid in lawful money of our Province of Upper Canada." For the purpose of preventing too small timbers being cut, double the amount of duty was charged upon all which did not square more than eight inches. The money was Canadian currency, one pound sterling of which was equal to $4.

In the case of some of the mills in operation at this early date in the Ottawa Valley, much of the supply apparently came from lands which had been granted by the Crown, for the exploitation of which no license was necessary. Philemon Wright, for instance, is stated to have obtained land grants amounting to 13,000 acres.

The first collector of timber dues on the Ottawa River was Robert Shireff, a pioneer lumberman whose son, Charles Shireff, acted conjointly with him without receiving any formal appointment. The system was modified somewhat in 1827 when Peter Robinson was

appointed surveyor general of woods and forests for Upper Canada. It was provided that licenses to cut specified quantities of the various kinds of merchantable timber off a given territory were to be sold by auction, with upset prices fixed at considerably less than the previously adopted scale. The expenses of the surveyor general's office were very modest. He was allowed £25 per annum for office rent, a like sum for a messenger, and £10 for fuel. Pay of clerks and assistants "as may be necessary and as the governor may deem reasonable" was allowed, but with a special proviso that the whole of such expenses was not to exceed one-sixth of the revenue derived from licenses.

Robinson was instructed to survey the forests in the Province and state what parts it was advisable to keep for the use of the King and what might be sold. The generous instructions showed how little idea the British government had of the size of a province over 260,000 square miles in area, or only about 5,000 square miles less than the great State of Texas, and which, after three-quarters of a century of development, still has large areas unexplored and which will probably not be surveyed until a century from the time Peter Robinson started out. Such timber as was not required for the navy and which was deemed expedient to cut was to be put up for sale after due notice in the *York* (Toronto) *Gazette*. Each license was not to exceed 2,000 cubic feet and the upset prices were, per thousand feet: Oak, £3 3s 4d; ash, elm or beech, £2 10s; red pine, £3; white pine, £1 10s; staves, and handspikes, £1. The timber was to be cut within nine months and paid for within fifteen months from date of license. Measurers were appointed in each district to certify to the amount of lumber cut.

The attempt to regulate the price of licenses by competition was not at that time successful as, owing to the laxity of administration which then prevailed and the recklessness with which the public lands were granted in large areas to men of influence and to political favorites, lumbermen found it considerably more profitable to obtain the fee simple of timbered land, either directly from the Government or by purchase from the first holders of the title, than to pay timber dues. Hence the receipts for some years were small. In 1827 the first returns from timber licenses in Upper Canada were received, the amount being $360. The following year the revenue from this source was $3,134, and in 1829, $2,287.

It may be noted incidentally that about this time Canadians began to reckon in dollars and cents, instead of in pounds, shillings and pence,

though for some time thereafter both systems were used. In fact, there are old farmers in the back townships who to this day calculate in "York shillings."

CONDITIONS PRECEDENT TO THE REBELLION OF 1837.

The loose and careless business methods characteristic of the system of collecting timber dues, as well as other branches of administration in the years preceding Mackenzie's Rebellion, resulted in a loss of many thousands of pounds to the revenue owing to business complications in which the Shireffs became involved. When, under Lord Durham's administration in 1838, after the suppression of the rebellion, an exhaustive investigation was made into the abuses which provoked it, it was officially stated that the gross amount received by the Province of Upper Canada for timber dues, from the establishment of the system up to January 30, 1838, a period of about ten and a half years, was £58,085 4s 11d.

Under the system in vogue at this period the licenses designated the quantity to be cut and the applicant was required to deposit in advance 25 percent of the amount of dues called for by the regulations on that quantity. A frequent practice, however, was to exceed greatly the cut stipulated for, as in this way the cash deposit required was proportionately reduced. A bond was given to cover the balance of the estimated dues.

A license granted to James Wadsworth, of Hull, in 1836 gave him the right to cut 40,000 feet of red pine timber on the south side of the Bonnechere River on the following terms: "Sum payable for this license £41 13s 4d currency, being 25 percent on £166 13s 4d, the value of 40,000 feet at 1d. For the balance of £125, a bond has been granted payable 1st November, 1837."

The descriptions of the limits in these old licenses were often rather vague and indefinite. That in the above mentioned document reads as follows: "The limits granted in the foregoing license are Butted and Bounded as follows, viz.: Commencing one Mile below Enoes' or the Indian Doctor's Landing and to extend up on the south side of the river ten miles more or less to its source or so far as it is capable of floating down timber and to run back five miles, more or less, half way to the waters of the Madawaska River on the course south 21 degrees west."

Another license granted to John Supple, of Hull, in 1838 permits him to cut 25,000 cubic feet of red pine on the north side of the Inlet

of Lake Dore, the rate and terms of payment being the same as in the previous case. His limits were described as "Commencing at the head of Lake Dore to extend three miles up the inlet of the said Lake to be measured on the course S. 82 degrees W. and to run back four miles more or less to the limits granted on Indian River on the course North 8 degrees W."

It is not surprising that, owing to the want of precision in the definition of limits, disputes often arose between limit holders. These difficulties often resulted in resort to physical force, in which the operator who happened to have the largest number of men on the ground generally came off triumphant. In fact, the frequency with which this rough-and-ready means for the settlement of controversies between rival lumbermen was resorted to became one of the causes of overproduction, as the limit holders, finding it advisable to have a large force of men on the spot should it become necessary, in diplomatic phrase, to "rectify their frontiers" and prevent their neighbors from construing the "more or less" qualifications in their licenses too liberally, increased the output considerably beyond the requirements of the market.

It may be noted that until the union of the Provinces of Upper and Lower Canada in 1840, the disposal of timber, as well as of lands and other natural resources, was entirely in the hands of the Crown, that is to say, the administration of the day, without any responsibility to the legislature as to the expenditure of the revenue derived from them. The manner in which this privilege was abused for the benefit of the official classes and their friends was one of the grievances which caused the outbreak in 1837. The plan which was actually adopted and the system which grew up was for lumbermen to apply in the autumn for a license stating the quantity that they wanted to cut and paying 25 percent of the dues in advance. As they were not required to confine themselves strictly to the quantity specified they advanced as little money as possible. The timber was cut the next winter and rafted to Quebec City, to which point the collector proceeded and received the dues. In fact, the practice grew up of taking the notes of Quebec lumber shippers instead of the bonds originally given by the lumbermen, so that the timber was across the ocean and sold in London before the dues were actually paid. For many years this worked no harm; but later, when bad seasons came and several firms failed, the revenue suffered a loss of several thousand pounds.

This free and easy handling of revenues and treatment of instruc-

tions from Westminster was not the worst thing about the administration of this period. Great Britain had lost half the continent and was not inclined to lose the other half in the same way; but London was a long way from Quebec and Toronto, and the officials who came out to administer the affairs of the country were disposed to make hay while the sun shone and trust to the distance preventing the news filtering back to London. The people in the colony of Massachusetts rebelled because taxes were imposed without their consent; but the English settlers in Ontario and the French-Canadians in Quebec took up arms in 1837 because their great natural resources were alienated and given to friends and favorites with a lavish hand. The governor and the majority of his counsel were appointed; and, by methods familiar to all politicians in all ages, they practically secured all the jobs for their relatives and retainers. The administration was known, both in Lower and Upper Canada, as the "Family Compact," which had become a synonym for jobbery and corruption.

MACKENZIE REBELLION AND ITS RESULTS.

In Canada, or any other colony, the difficulty would be speedily gotten rid of today by the legislature refusing to vote supplies, and the administration unable to carry on the government or pay its officials, would resign; but in 1837 the revenue which the administration received was sufficient to pay the running expenses of the government. There was a rebellion in both Upper and Lower Canada, in which all the nationalities represented in Canada joined. In Lower Canada it was led by a French-Canadian, Papineau, with English and Irish lieutenants; while in Upper Canada it was led by an irrepressible Scotchman, William Lyon Mackenzie. The United Empire Loyalists, who had left their fat farms and prosperous businesses in the United States rather than exchange King George for George Washington, were among those who most keenly opposed the Family Compact, and many took up arms, not against the King, but against corrupt ministers who thwarted his will.

The rebels had a good cause, but the fates were against them. They rose on December 4, 1837, and trusted to gain possession of York (Toronto), and also of the Quebec centers of population, before the loyalists could be supported by reënforcements from the garrisons in Lower Canada. But, owing to one of the most remarkably open winters on record, ships were able to navigate Lake Ontario and the St. Lawrence in midwinter and the rebels were crushed, beaten, the leaders forced to flee to the United States, and some who were caught were hanged by the victorious Family Compact.

It is said that success is the only justification for rebellion; but this rebellion was justified, though abortive, and the leaders returned from the United States and from their hiding places in the back woods to be elected to the highest positions within the gift of their countrymen. The reason for this was that the attention of the British government was called to the fact that the state of things in the colony was so desperate and so unjust that men were willing to risk their lives to wipe it out. Lord Durham was sent out to inquire into the whole matter, and as a result of that inquiry he released the prisoners still lying in the jails when he arrived, removed the governors, recalled the fugitives and forever put an end to the Family Compact by giving the people full, responsible local government.

The report of Lord Durham shows that the main abuse from which the country suffered was the granting of wild lands in large tracts to persons who had no intention of improving them, but of simply holding them for a rise in value.

The effect of this practice upon the lumber trade was important. Much of this land, granted so far in excess of actual needs of settlement, was covered with valuable timber, and lumbermen speedily saw that it was cheaper to get hold of the land with all that was on it than to pay the prices charged for the timber licenses. This encouraged improved methods of lumbering. The repeated instructions of the Imperial government to set aside permanent timber reserves and to confine settlement to lands adopted to agriculture were unregarded, and much of the area granted was capable of producing nothing but timber to advantage. Lands could be bought for from 1 to 4 shillings an acre, while the timber dues on an average tract were 6s 8d an acre. Prominent men in the government of Canada urged that, as there was now but little pine left in the United States except in Maine and Carolina, prices should be higher for timber berths in Canada; and they gave as a reason why they were not the presence of the large areas of wild lands open to purchase.

The deputy postmaster general of British North America, T. A. Stayner, in giving evidence before a commission said that in 1835 and 1836 speculators came over from Maine and New York and purchased about a million acres of land said to be wooded with pine or spruce. The Americans estimated these lands as worth from $2 to $6 an acre. Charles Shireff, who has been previously spoken of as the collector of dues at Ottawa, mentions a party of Americans who purchased thou-

sands of acres in the township of Onslow for ten shillings an acre, which price could not bear any proportion to the value of the timber. Many similar cases had occurred, he told the investigating committee, and the temptation to do it was very great because the purchasers were not required to pay the full amount of the purchase price, but only a first installment of varying size, say a fifth or a fourth, and the only penalty for the nonpayment of the remaining installment was the resumption of the land, about which, since the lumberman had stripped off the timber, he was naturally very indifferent.

Mr. Shireff urged that the Government should not sell lands unfit for settlement but merely the timber on them. Though this warning was stated and reiterated by every one interested in the permanent development of the lumber industry, it was many years before it was acted upon. It was acted upon at length, however, and now in Ontario the question is not as to the principle but as to how large a block of arable land in a forest belt should be to make it worth while for the Government to throw it open for settlement.

According to an official statement made at the investigation just referred to, the timber dues collected for a period of ten and a half years, from 1827 to 1838, amounted to £58,085 4s 11d; this was exclusive of losses through loose methods of collecting dues and defalcation of upward of £9,000.

UNION OF 1841 AND NEW TIMBER REGULATIONS.

The result of the rebellion and all these commissions and reports was the union in 1841 of Upper and Lower Canada with a government responsible to the people through their elected representatives.

One of the first things which the new legislature took up was the administration of the timber lands. The collector at Bytown (Ottawa) was instructed to issue licenses in the usual form, but for a limited period, to relicense limits not properly worked and, where there were two or more applicants for the same berth, to put it up at auction for a bonus over the dues. The quantity of timber which the licensees were bound to take out was 5,000 feet a mile of river front and no limit was to exceed ten miles of frontage. This was the first time that the auction principle, now generally adopted, was recognized in Canada.

The receipts from timber in Upper Canada for the year 1839 were £8,244; and for the next thirteen months £18,881, a difference possibly due to the "house cleaning" before turning affairs over to the new government. Under the new regime the timber receipts for Upper and Lower Canada were in 1842, £37,572; in 1843, £46,301; in 1844, £28,828.

The representatives of the people did not seem to recognize the necessity of preserving timber. Most of them appeared to think the tree their enemy, and the impression that the forest area was unlimited rendered them careless. The idea of reforestry and harvesting a periodic crop was not then born in America. A motion to discuss a resolution to prevent the cutting of timber (apparently absolutely) off public lands received short shrift in 1846, but its exact nature and object can not be learned from the journals.

In 1842 new regulations as to the granting of licenses were adopted and the principle of competition between lumbermen in cases where there was more than one applicant for the same limit was put into effect. Willful trespass by limit holders upon public property not included in their limits, which had been frequent under the former conditions, was declared punishable by the cancellation of the license and the seizure of timber so taken, and limit holders were obliged to cut 5,000 feet per square mile off their holdings in each year.

In the earlier days of the export trade with Britain the shippers had to encounter a strong prejudice on the part of the consumer against Canadian pine, which was erroneously supposed to be particularly subject to dry rot and altogether of a quality inferior to that of the Baltic pine. The cause of this prejudice and the change of opinion that finally came about are fully treated in the first chapter on Quebec and, therefore, need not be repeated here.

Another noticeable change in the demand of the British market which occurred somewhat later was the increased appreciation of white pine as compared with red. Red pine, by reason of its similarity to the product of the forests of northern Europe, ever since the introduction of Canadian timber had been more highly esteemed. At an early day the dues on red pine had been fixed at one penny a foot, while white pine paid only one-half penny. So marked was the falling off in the British demand for the former that in 1852 the corporations of Bytown and the municipal council of Carleton County petitioned the Government for the reduction of the red pine duties to the same amount as those payable on white pine. Such valid reasons were advanced in favor of the change that the Government decided to make the reduction.

The year 1845 was an exceedingly prosperous one for the lumber trade, owing largely to the heavy demand in the English market at very remunerative prices. The temporarily favorable conditions resulted in considerable overproduction, which, coupled with a falling off in re-

quirements abroad during 1846 and succeeding years, created a serious depression in the industry. The regulations of the Crown lands department had contributed not a little to stimulate production to an undue degree by requiring the taking out of a large quantity of timber on every limit, regardless of the requirements of the market or the convenience of the operator, under penalty of forfeiture of the limit.

More stringent regulations were adopted in 1846, when the limit was reduced to five miles in length along the river by five in depth, or half way to the next river. The then holders of licenses were allowed to hold them for two years longer, but after that time the limits must be subdivided to these sizes. New and renewed berths were to be put up at auction. The parties were to bind themselves to take out 1,000 feet a square mile a year and were to pay one-fourth of the dues upon this forthwith and bonds were to be given for the remaining three-fourths.

In 1849 the Legislative Assembly appointed a select committee to inquire into and report on the state of the lumber trade, the evidence taken before which indicated some important features of the license system in which reform was necessary. The committee reported that the regulation requiring the cutting of a certain amount of timber on each limit, together with the uncertain tenure of limits, tended to cause overproduction. They recommended the abolition of the deposit system and the substitution of ground rents.

FIRST CANADIAN TIMBER LICENSE LEGISLATION.

The immediate outcome was the adoption during the same year of the first Canadian legislative enactment on the subject of timber licenses, which, with the regulations issued in accordance with its provisions, practically forms the point of departure from which the present system has been evolved. The characteristic and valuable feature of this legislation was that, by practically giving the license holder a preferential claim to renewal of his license so long as he complied with its conditions, and securing him against encroachment by rivals, it imparted greater stability and permanence to the industry and lessened the temptation to reckless overproduction and wasteful methods.

The modern lumbering system as contrasted with the old fashioned method of conducting the industry may be said to have commenced during the '50's and its development was aided by the changes in the law and regulations above noted and by further advances in the same direction introduced in 1851. In that year ground rent on limits was

imposed, the principle being generally favored by practical lumbermen as the most effective means of preventing the monopolization of unworked limits. The ground rent was fixed at fifty cents a square mile in addition to the dues and it was provided that this should be doubled for every year during which the limits remained unworked. While the general principle of granting limits to the first applicant, giving the preference to the previous occupant in case he had complied with the regulations, was left undisturbed, a modification was introduced by the provision that upon rivers where the cost of surveys rendered it advisable, limits might be disposed of at an upset price fixed by the Government, and awarded to the highest bidder in case of competition, an important move in the direction of the auction system as it now exists. All sawlogs cut for exportation were made liable to double rates of duty. This latter clause was the result of an agitation which had sprung up even at that early day against the shipment abroad of logs in an unmanufactured state.

During the continuance of the union, Ontario participated in the same laws and regulations as Quebec. These gradually grew more stringent during the first ten years and in 1851 had reached the beginning of the system at present in use in both Provinces.

AN INQUIRY AS TO TIMBER REGULATIONS.

In 1854 a committee was appointed to review the whole question of timber regulations. One of the snags which it endeavored to uproot was the cutting of timber by bogus settlers. The settler was required to pay down only one-tenth of the purchase price, and these bogus settlers, after having cut and sold the merchantable timber refused to pay the other nine installments. One solution offered was that the land should be sold only for cash; while another was that timber dues should be applied to the purchase of the land. This plan was open to serious objections in that the price of the land was not equal to the dues, and the squatter or settler it was desirable to get at, was never, at the critical time, where the Government could put its finger on him.

The adoption of reciprocity between the United States and Canada in 1854, which secured free exchange in natural products, including lumber, gave an impetus to the sawn lumber trade, and the trade in square timber declined. This condition was discussed by the committee of 1854, and led leading men to urge the Government to speed the parting guest by reducing the dues on sawn lumber as compared with hewn. They did this on the ground that square timber caused a great

waste, only the best sticks being used and only a portion of them. Large parts of the tree that could be worked up in taking out sawlogs were left to decay in the bush and to increase the danger of forest fires. It was estimated that three-fourths more of the tree was used for sawlogs than for square timber, and returns to the Government (owing to the greater number of feet produced) would be three times as much in the former case as in the latter. No difference appears to have been made and the square timber trade declined through natural causes.

The difference between the Canadian and the United States methods of holding land was dealt with by the committee. The exposition of American methods before the committee went to convince it that, whatever the fault in Canadian methods of handling timber lands, they were to be preferred to those in vogue in the United States. The gentleman who explained to the committee the American system was Jonathan R. White, of Michigan. He said the United States wild forest lands were thrown open by proclamation and sold to the highest bidder at an upset price of $1.25 an acre. Lands not sold were open for sale at the upset price, and there was no limit to the amount any man could hold. Mr. White thought the system a very good one, getting the land rapidly under taxation and saving the timber, which under stumpage system was always more or less wasted. The fact that the land was of little value agriculturally was all the more reason for getting rid of it. The Canadian witnesses took issue with Mr. White, claiming the result of the introduction of that system into Canada would be to place the best timber lands in the hands of capitalists or companies who would exact toll on those who went in actually to work the land or cut the timber. The dues on two trees of very ordinary size, seventy-five feet, at ½d a foot, would amount to $1.50, or more than the price of $1.25 an acre at which the land was sold in the United States. But an acre of well timbered land produced five times that amount of dues. This was considering the pine only, and the other woods and the land would still remain to the Government and these would always be worth something.

The wisdom of the Canadian view has been proved, because it keeps the unarable lands in the hands of the Government to license and relicense at ever increasing prices to the lumbermen, and to be reforested without let or hindrance, now that the country and trade is reaching the stage where this method is practicable. Even at the time of the committee of 1854 the idea of an annual crop of timber from a permanent forest was put forward. Fire prevention was discussed also and the

lumbermen held then as they do today that the best way to prevent fires was to prevent squatting in forests, and to confine settlements wholly to agricultural. It was pointed out that scattered settlement on odd bits of land in the midst of pine forests was of no permanent value to the settlers, and by reason of starting fires was ruinous to the lumbermen. Attention was also called to the fact that in Ontario the arable and pine land lay in belts in such relation to each other that the development of timber provided a good market for the farmers and thus helped the development of the agricultural portions.

The regulations of 1855 chiefly affirmed the right of the Government to make any changes it desired in ground rent and the conditions of license, in other words, the license conveyed no vested rights. The growing nature of the industry is shown in receipts for ground rents, timber dues and slide dues. These were: 1856, $262,872; 1857, $289,839; 1858, $232,624; 1859, $316,656. In the regulations of 1860 further steps were taken to stop the squatters, the most effective being a plan of survey to determine what districts should be thrown open to settlement. To prevent the shipping of lumber cut by trespassers on Crown lands to the United States, all vessels previous to obtaining a clearance were obliged to furnish the collector of customs with evidence that the dues had been paid. It was pointed out that the industry was one of the most important in the country. In seven years, ended December 31, 1863, the exports from Upper and Lower Canada amounted to $73,004,312, while the value of agricultural products exported in those years amounted to only $49,951,961. March 17, 1866, the reciprocity treaty with the United States expired and on June 27 Canada put export duties on sawlogs and shingle bolts of $1 a thousand and $1 a cord.

CHAPTER XIII.

ONTARIO AND THE UNITED STATES.

The great expansion which characterized the Ontario lumber trade beginning about the middle of the Nineteenth Century was due mainly to the increasing demands of the United States for Canadian lumber. Active lumbering operations were still being carried on in the central and eastern states, and the industry was just beginning in the Saginaw Valley and other points in the West. The adoption of the reciprocity treaty in 1854, securing the free exchange of natural products between the United States and Canada, including "timber and lumber of all kinds, round, hewed and sawed, manufactured in whole or in part," stimulated considerably the growing demand for the forest products of Canada.

In proportion as the market for sawn lumber developed, the cutting of square timber, long the leading branch of the industry, declined in importance and became less essential to the prosperity of the lumbering interest. From being the principal factor in the export trade it speedily fell to a subordinate position, as its disadvantages, especially in the matter of its wastefulness and the greater danger of forest fires from the amount of litter its prosecution left in the woods, began to attract attention. The extension of the market and the rapidly changing conditions of the trade were attended by some fluctuations and vicissitudes, and inflations and depressions naturally followed because of the abundance of the supply of raw material available. The price of waney and square white pine would sometimes fall in the Quebec market as low as ten cents a cubic foot and suddenly rise to twenty-five cents, and the variations of the Albany market, then an important center of the trade were extensive, and imparted a speculative character to the business.

The American Civil War, and the lavish expenditures which resulted, created a great demand for Canadian lumber at high prices, though the trade received a setback in 1866 by the abrogation of the reciprocity treaty. This led to the reimposition by Ontario of export duties on unmanufactured logs.

A few figures may be given to show the altered character of the trade during the decade immediately preceding this event, and the

growing importance to Canadian lumbermen of the American, as compared with the British, market.

The total exports of forest products from Old Canada (the present Provinces of Ontario and Quebec) to Great Britain for the three-year period 1854-6, at about the time of the adoption of the reciprocity treaty, amounted in value to $18,288,702, while the aggregate shipments to the United States were valued at $8,894,218. The total shipments of lumber and timber for the fiscal year 1867 amounted to $13,948,648. The proportions consigned to Great Britain and the United States were nearly equal, being valued at $6,889,783 and $6,831,252 respectively. The increase in the American export trade was almost entirely in sawn lumber. While "planks and boards" were exported to the United States in 1854 to the value of $1,866,712, the same item figures in the returns for 1867 to the amount of $5,043,367. The development of this feature of the trade, while to a certain extent fostered by the favorable conditions of the reciprocity treaty, was in the main due to the rapid growth of population in the eastern states, coincident with a gradual diminution of their home sources of supply, rendering it necessary for them to look abroad for their requirements.

It was during this period that many of the firms now prominent in connection with the lumbering and allied industries of the Ottawa Valley first established themselves. John R. Booth, one of the oldest and best known representatives of the trade, began business in 1858. Like those of most of the more extensive employers, his interests embrace a number of subsidiary interests, including a large pulp mill and railroad operations on a large scale. E. B. Eddy, head of the E. B. Eddy Company, began the manufacture of matches in 1854. In addition to this branch of the business and extensive lumbering operations, the company is engaged in the manufacture of woodenware and paper. The firm of Bronsons & Weston dates back to 1853, and was one of the first to establish a sawmill on a large scale at the Chaudiere. Other firms which flourished about this period or somewhat later, some of which are still extant or have been reorganized as incorporated companies, are A. H. Baldwin, established in 1853; Perley & Puttee, who commenced business at the Chaudiere in 1857; Gilmour & Co., who had extensive mills at Chelsea on the south bank of the Gatineau; Wright, Batson & Currier, and Hamilton & Co., proprietors of the large Hawkesbury mills near the Grenville Rapids, sixty miles from Ottawa down the Ottawa River.

In 1867 the confederation of the British North American provinces was accomplished, the old union between Upper and Lower Canada being dissolved. The former became the Province of Ontario and the latter the Province of Quebec. By the terms of the British North America Act, under which the Dominion of Canada was constituted, the control of public lands and forests was relegated to the several provinces. By that time considerable headway had been made in the understanding of how best to handle timber lands, but in the agitation over the question of union and in the multiplicity of large political issues which Canadians had to deal with in building up this confederation and opening transportation systems from ocean to ocean, the question of forestry was largely lost sight of for the time.

MANAGEMENT OF CROWN LANDS.

With confederation accomplished and with the knowledge that Crown lands would be henceforth one of the principal sources of provincial revenue (the customs, excise, etc., having gone to the Federal Parliament as a basis of its revenue), the leaders in Ontario turned their attention to the forests, and Honorable Stephen Richards, first Commissioner of Crown Lands for Ontario, rather patted himself on the back on his first reporting to the legislature that a bonus of $519 a square mile, the largest price ever paid, had just been received at a timber sale for an eighteen-mile berth. Contrasted with the price of $31,500 a mile paid in the sale of December, 1903, this seems insignificant, but it showed that the people were beginning to realize the value of this great asset. His first report, covering the year 1868, showed that the revenue from timber dues, ground rents and bonuses amounted to $190,237. The change resulted in increased stringency in the management of the public domain. New regulations were issued, the dues being raised 50 percent of the previous rates and a uniform rate of ground rent fixed.

For some years the volume of exportation steadily increased, and the timber revenue went up by leaps and bounds. In 1868 the dues and ground rents amounted to $190,237; and in 1869, owing to the 50 percent increase in the dues, increased business and more careful supervision, they went up to $508,561. New regulations were adopted in 1869 which increased the ground rent to $2 a square mile, and the dues to the following: Black walnut and oak, per cubic foot, 3 cents; elm, ash, tamarack, and maple, 2 cents; red pine and white pine, birch, basswood, cedar, buttonwood, cottonwood and all boom timber, 1¼ cents;

all other woods, 1 cent; red pine, white pine, basswood, buttonwood and cottonwood sawlogs, per standard of 200 feet board measure, 15 cents; walnut, oak and maple sawlogs, 25 cents; hemlock, spruce and other woods, 10 cents; pipe staves, per thousand, $7; hemlock tanbark, per cord, 30 cents. The duties were to be collected upon exact measurement; but, where this could not be obtained, each stick was to be estimated as containing the following cubic feet: White pine, 70; red pine, 38; oak, 50; elm, 45, and all other woods, 34.

In 1870 the Dominion Parliament passed an act compelling lumbermen to mark their timber to be floated down stream and provided for a registry of such marks; and in 1873 the throwing of sawdust, slabs, edgings, bark, or refuse into any part of a navigable stream was prohibited.

About 1870 the industry was mainly centered in the Ottawa Valley and on the upper waters of the Trent River and waters tributary to the Georgian Bay. Production in the latter region had before that time been limited to a few mills, the output of which was principally consumed in the locality. But, with the advance of settlement, the shipment of lumber from this now important source of production began to increase as the country was opened up.

The beginning of lumbering operations in the Georgian Bay district on a comprehensive scale practically dates from the year 1872, when an extensive sale of timber limits, covering 5,301 square miles on the north shore of Lake Huron, was held, from which the Government realized $602,665 in bonuses and ground rents. The territory included in this sale was largely unfit for agricultural settlement, and, large areas being uninhabited, the timber was exposed to depredations, as every facility existed for its being towed across the frontier. Among the principal purchasers of limits at this sale were McArthur Bros., Toronto; Rathbun & Son, of Mill Point, now Deseronto; Cook Bros., Toronto; James Eagan, Ottawa; Henry Kirk, Toronto; Geo. Green, Brampton; Isaac Cockburn, Toronto; W. H. Gibbs, Oshawa, and Hugh Macdonald, Toronto, some of which names are well known in the business world today.

This period of prosperity reached its climax in 1873, and was the time of the rise of the great lumbering industry of Michigan, Wisconsin and Minnesota, which production reached a volume far surpassing the Canadian output and forming the most considerable source of supply for the great West. The yield of sawn pine lumber of these great

pine-producing states reached the figure of 3,999,780,000 feet in 1873. Falling off during the protracted period of worldwide depression which followed, it increased again in 1880 and developed by leaps and bounds with the increased demand caused by immigration and settlement in the western states, until the high-water mark was reached in 1892 with the enormous total for that year of 8,594,222,802 feet.[1] From that time the output declined, owing partly to the exhaustion of sources of timber supply and partly to the exploitation of the southern forests and the substitution of other construction materials for pine.

RELATIONS WITH THE UNITED STATES.

The change in the lumbering situation in the neighboring states had an important bearing upon the trade in Canada. With the depletion of the pine forests in Michigan the dependence of the American consumer upon Canada for a portion of the lumber supply increased. It became the interest of the American manufacturer to secure this supply as far as possible in the form of raw material to be worked up in the American sawmills in those localities where the domestic forests no longer remained within access. It was equally the interest of the Canadians to export their forest product in as highly manufactured a form as possible.

A committee was appointed by the Federal house in the session of 1874 to look into the question of the export duty on sawlogs, etc., imposed in 1868. It reported that, reduced to an ad valorem rate, it averaged: On stave bolts, 40 percent; oak logs, 30 percent; pine logs, 20 percent; spruce logs, 25 percent, and shingle bolts, 25 percent. The committee reported that, while this enabled sawmill owners to buy cheaper logs, it hurt the settler and timber owner and at the same time did not result in the establishment of more mills.

The duty on oak logs and stave bolts was abolished in 1875. Things remained in this state until 1886, when the export duty on shingle bolts was fixed at $1.50 a cord; on spruce logs, $1 a thousand feet, and on pine logs, $2. In November of the same year, by order in council, the export duty on sawlogs was increased from $2 to $3 a thousand feet; but July 5, 1889, in view of a probable understanding with the United States in regard to duties on Canadian manufactured lumber, the old rate was restored. The negotiations carried on while the McKinley bill was under consideration were successful, and in October, 1890, Sir

[1] Report of the *Northwestern Lumberman*, of Chicago, Illinois, itemized by mills. It is probable that unreported products, either of isolated mills omitted from the list, or of small lots produced by mills chiefly engaged in the cutting of hardwoods, would have brought the total well up toward 9,000,000,000 feet.

John Macdonald, after negotiating with the United States Secretary of State, James G. Blaine, removed the export duty on spruce and pine logs in consideration of the United States Congress reducing the import duty on sawn lumber from $2 to $1 a thousand.

When the Democrats came into power the duty on sawn lumber was removed under the Wilson bill and free trade on logs and lumber between Canada and the United States followed. While this was satisfactory to Canadian lumbermen, market conditions were such that it did them very little good, and lumber exports were less in 1892 than in 1889. The depression of 1893 was accompanied by low prices of lumber which lasted until 1898 and low prices in the United States were attributed to Canadian competition. As the outcome of this feeling, when the Dingley bill was passed in 1897 the old duty of $2 on lumber was restored.

Large quantities of sawlogs were being exported to feed Michigan mills and the Michigan men, being naturally anxious to keep up the supply, adopted the expedient of a clause in the Dingley bill providing that if any country or dependency imposed an export duty the amount of such duty would be added to the import duty. This, if successful, would have transferred the bulk of the Georgian Bay trade to Michigan, because, if that state could get free logs while sawn lumber was charged a stiff duty, nothing could be sawn on the Georgian Bay for the United States market; and, if an export duty was imposed by Canada, then the duty on sawn lumber entering the United States would be prohibitory. The authors of the measure overlooked the fact that the Ontario government does not sell land and timber in fee simple as is done in the United States, but only sells a license to cut timber over a given area subject to the payment of Crown dues, retaining the ownership of the land.

The Georgian Bay lumbermen applied to the Dominion Parliament for an export duty, but the Government, fearing the imposition of retaliatory duties on sawn lumber by the United States, declined to act. The lumbermen then sought relief from the Ontario Provincial legislature. In the session of 1898 the legislature passed an act requiring that all logs cut on government land be manufactured in the Province. Since this was not a duty but the regulation of a landholder respecting its own property, the United States could not impose a retaliatory duty; but the Michigan holders of Ontario timber limits claimed that it was a breach of contract, in that by payment of the bonus they acquired the

limit and the right to cut pine thereon and to dispose of it as they saw fit.

The Government replied that the licenses were for one year only, and that to obtain a renewal of the license the next year they must submit to such regulations as the Government saw fit to impose. The Dominion Parliament refused to interfere and the courts decided in favor of the Provincial government. The effect of this has been to cause the removal of a large number of American lumbermen to Ontario to do a sawmill business there, and it seems to be taken for granted that the exportation of sawlogs from the Province will never again be permitted.

IMPORTANCE OF GEORGIAN BAY DISTRICT.

Michigan lumbermen are largely interested in lumbering operations and timber properties in the Georgian Bay district of Ontario. About 1890 lumbermen in the Saginaw district began making investments in Canadian pine, and increasingly large quantities of Canadian logs were rafted to eastern Michigan mills—80,000,000 feet in 1891, 300,000,000 in 1894 and 238,843,024 in 1898. In April, 1898, the act of the Ontario Legislature requiring logs cut on Crown lands in Canada to be manufactured in that country became effective and this was the death blow to the log rafting industry. At once Michigan men who had made investments in Canadian timber began preparations to manufacture their product in Canada, and now Holland & Graves, Eddy Bros. & Co., S. O. Fisher, The Moulthrop Lumber Company, The William Peter Estate, McArthur Bros. Company, McEwen & Dolson, Huron Lumber Company, Saginaw Lumber & Salt Company, Cleveland-Sarnia Sawmills Company, Loveland & Stone, George L. Burtis and a number of other concerns—with a few exceptions all hailing from Michigan—are operating in the Georgian Bay district.

The lumber industry in this district is the most important in Ontario, as, with the single exception of the Ottawa River district, which embraces a portion of Quebec Province and should not, therefore, be considered here, this district produces by far the largest amount of lumber of any portion of the Province. The condition of the lumber market of the United States is a great factor in determining prices in the Canadian lumber market. Shipments by water from the Georgian Bay ports have increased materially since the abolition of tolls on the Canadian canals. Birch and ash are manufactured and exported quite extensively to the United States. Hemlock, oak, elm and red pine are all used locally. Pickets, pine, cedar shingles, staves and lath are exported.

CHAPTER XIV.

ONTARIO—REVENUES AND RESOURCES.

In 1871 there was an extensive sale of limits in Muskoka and Parry Sound districts, fronting on Georgian Bay. The dues at this sale were double those of the previous one, white pine and red pine being two and one-half cents a foot, or thirty cents a standard. The area disposed of was 487 miles, and the price was $117,672. A still more extensive sale was the one which took place in 1872, when 5,301 miles on the north shore of Lake Huron was disposed of for $602,665. More than three-fifths of this area had previously been under license, but, with the exception of thirty square miles, all had been allowed to lapse.

Legislation was enacted gradually settling the settlers' rights and then came the great river and stream bill suit. This occurred in 1881, when the Ontario government passed an act permitting lumbermen on the upper reaches of streams to use slides and other improvements lower down upon the payment of reasonable dues. Peter MacLaren, the great Ottawa lumberman, who had made improvements on the Mississippi River in Lanark County, claimed the right to prohibit the lumber of the limit holders above him passing through his improvements. The Dominion government took the side of Mr. MacLaren and disallowed the Ontario act, but the case was finally determined in favor of Ontario, and since then lumbermen have had full right to use improvements upon paying tolls fixed by law.

In 1887 standing timber had so increased in value that the dues on sawlogs were increased to $1 a thousand and upon square timber to two cents a foot. The ground rent was increased from $2 to $3 a mile. Under these regulations extensive sales were made on the Muskoka and Petawawa rivers. A new principle was introduced in 1892 when the lumbermen were restricted to the cutting of red pine and white pine, leaving spruce, cedar, hemlock, basswood and other woods to be disposed of otherwise by the Government. It was under these regulations that extensive sales were made in the districts of Nipissing, Algoma, Thunder Bay and Rainy River. The dues were increased to $1.25 a thousand feet on sawlogs and $25 a thousand cubic feet on square timbers. Notwithstanding this, higher prices were realized than ever

before. The mileage sold was 633, for which $2,315,000 was realized, an average of $3,657.18 a square mile.

The fluctuating state of the trade was shown in a return made to the Ontario Legislature in 1878 of the sawlogs, square and waney timber cut each year from 1868 to 1877:

SAWLOGS, SQUARE AND WANEY TIMBER CUT IN ONTARIO, FEET BOARD MEASURE.

1868	177,390,000	1873	589,178,742
1869	375,620,200	1874	406,185,320
1870	300,900,850	1875	396,681,522
1871	358,096,400	1876	296,729,327
1872	669,569,542	1877	270,260,979

The Commissioner of Crown Lands figured that the waste of material in the shipping of square timber instead of sawlogs in the above meant a loss of revenue of $3,577,500, or $357,750 a year, and he urged changing over from square timber to sawlogs.

While for many years the cry has been heard that Ontario is at the end of her timber resources, this is not the view taken by certain well informed men. The late John Bertram, of Toronto, who was one of the best informed practical lumbermen and foresters in Canada, stated in an article published shortly before his death that, while there was a much increased demand for home consumption both in Ontario and in the prairie country in western Canada, he did not look for an increase in the quantity sawed in Ontario or Quebec because, "while there is a large quantity of pine and spruce still available, the forests are beginning to show signs of exhaustion, and it is a fortunate circumstance that many lumbermen are showing interest in the question of reafforestation. The Ontario government has shown wisdom in its system of fire ranging and in setting apart forest reserves in the territory not fit for cultivation. This will prolong the business indefinitely."

The most noteworthy feature of the lumber industry of recent years has been its rapid development in the northwestern portion of the Province. This has been stimulated by the growing demand for the output in Winnipeg and other parts of Manitoba, which look to the mills of Rat Portage, Rainy River, Fort Frances and other centers in the Rainy River district as their nearest source of supply. The continued migration to the West and the growth of Winnipeg have given a remarkable stimulus to the production of lumber in this portion of Ontario.

The income derived from timber forms a considerable portion of the revenue of the Province which, owing mainly to the large receipts from this source, is in the fortunate position of being entirely free from debt

and able to meet all the expenses of administration, in addition to spending a great deal of money in public services, such as elsewhere are sustained wholly by the municipalities, without resorting to direct taxation. In 1903 the total revenue collected from timber was $2,307,-356, the amount being exceptionally large, however, owing to the holding of an extensive timber sale, at which high prices were realized.

The increase in the value of this source of national wealth of late years was indicated by the result of this sale, at which about eight hundred and twenty-six square miles was disposed of. Notwithstanding that the timber dues were raised to $2 a thousand feet board measure on logs, and to $50 a thousand cubic feet on square timber, and the ground rent increased from $3 to $5 a square mile, the amount realized as bonuses was $3,687,337, or an average of $4,464 a mile. The highest price paid per mile was $31,500. The new record this sale established as to the great and increasing value of the pine-bearing lands of Ontario has contributed much to educate public opinion as to the need of forest preservation and to strengthen the hands of the Government in its policy in that regard.

The total area now covered by timber licenses in Ontario is 17,033 square miles, of which 9,231 are in the western timber district and 6,637 in the Ottawa district. The total production of sawlogs in 1903 was 679,966,835 feet board measure, of which 549,488,617 came from the western district as against 104,576,242 from the Ottawa district. In pine boom and dimension timber the total output was 39,834,442 feet, the West leading in about the same proportion.

As the entire forest area of the Province is estimated at 102,000 square miles,[1] it will be seen that the territory now under license forms but a comparatively small proportion of the timber resources yet available.

It is customary in taking stock of the available assets in the way of pine timber, to ignore the territory already disposed of and under license, but some of this territory has been under license for over forty years, is still being operated and is contributing yearly to the provincial treasury, and, so long as this territory escapes the havoc of forest fires and is free from the settler's plow, so long will it continue a source of public revenue.

As to the available white pine supply in the Province outside the present licensed area, no attempt at a careful estimate has yet been

[1] An estimate later than that given on page 61.

made. E. J. Davis, Commissioner of Crown Lands for Ontario, speaking in the legislature February 18, 1904, gave an estimate prepared by his department. In this he estimated the amount of white pine still standing in Ontario at 10,000,000,000 feet, which would suffice for twenty sales such as that of December 9, 1903, when limits were sold for about $3,500,000 in bonuses. This 10,000,000,000 feet should realize, he said, in bonuses $75,000,000. The dues had been increased previous to the last sale from $1.25 to $2 a thousand feet, and the dues on this pine would produce at least $20,000,000. The surveys of the north country had shown that there were at least 300,000,000 cords of pulpwood standing, which, with dues of twenty-five cents a cord (the present dues are forty cents) would produce $75,000,000 for the provincial treasury. There was in sight at least $200,000,000 of revenue, which at $2,000,000 a year would last the Province for one hundred years. The average revenue in recent years from the forests, he pointed out, was between $1,250,000 and $1,500,000 a year, of which $800,000 was dues. This was assuming that the forest was all used up as time went along; but he then explained what the Province was doing to keep up a perpetual supply. Passing over the small timber preserves where the Government, to allow the timber to grow again, has taken back into possession lands cut over or partly cut over under licenses, he described the reserves made in the virgin forest which had been rendered accessible by the building of the new government railway from North Bay to Lake Temagami and northward. The original Temagami Reserve around the lake of that name consisted of 2,200 square miles. This had been increased to 5,900 square miles and, when he spoke, it had just been decided to set apart 3,000 square miles in Algoma district to be known as the Mississaga Reserve. The old plan of license by which the lumbermen handed back the land to the Government when they had cut off the timber was probably the best that could be devised where the land was arable, for the Government could then grant it or sell it to the settlers; but in these reserves where the land is unsuited to agriculture another plan would have to be devised, which would probably take the form of a government forester marking the trees to be cut, which would then be sold by auction, the lumbermen agreeing to cut and carry away the timber in such a way as to reduce fire risk and give undeveloped trees a chance to grow. From the cutting of continually recurring crops of ripe timber on these reserves he anticipated a revenue of several million dollars a year to the treasury, and further reserves are to be made from time to time.

In a speech delivered March 12, 1901, in the Ontario Legislature, Hon. William A. Charlton (who has since assumed office as commissioner of public works) stated that the average yearly cut, including logs, boom and square timber, from 1867 until that date amounted to 549,141,408 feet. The largest cut of any one year was that of 1896, amounting to 952,000,000 feet. He estimated the total quantity of pine timber on lands then under license at 8,000,000,000 feet, and the quantity not under license at that time at 26,000,000,000, making in all 34,000,000,000 feet of pine timber then standing. He considered that, without reference to regrowth or reforestry, the supply was sufficient to last one hundred and fifty years.

The story of the westward movement of the trade is told in the report of square miles under license, although it is to be remarked that an immense area in the Ottawa district remains under license, showing that much of this district will permanently remain under timber.

Date.	Ottawa district.	Central district.	Western district.	Total.
1868	7,678	1,889	2,015	11,582
1869	7,678	1,889	2,016	11,583
1870	7,633	1,849	2,523	12,005
1871	7,512	1,981	3,041	12,534
1872	7,542	1,809	3,007	12,358
1873	7,396	2,038	5,111	14,545
1874	7,388	1,999	6,872	16,259
1875	7,406	2,022	7,621	17,049
1876	7,342	1,344	6,295	14,981
1877	7,356	1,806	6,970	16,132
1878	7,242	1,362	6,937	16,041
1879	7,202	1,203	7,679	16,084
1880	7,228	1,456	7,256	15,940
1881	7,194	1,875	6,538	15,607
1882	7,204	1,961	8,823	17,988
1883	6,989	1,638	8,259	16,886
1884	6,730	1,748	8,362	16,840
1885	6,503	1,537	9,174	17,214
1886	6,778	1,907	9,801	18,486
1887	6,698	1,324	7,828	15,850
1888	6,305	1,751	8,878	16,934
1889	6,547	1,489	9,190	17,226
1890	4,777	1,500	7,278	13,555
1891	7,316	1,474	7,030	15,820
1892	5,051	1,435	6,401	12,887
1893	6,758	1,696	8,790	17,244
1894	7,811	1,524	8,192	17,527
1895	6,589	1,509	9,753	17,851
1896	4,289	1,422	8,011	13,722
1897	7,272	1,429	7,699	16,400
1898	6,985	972	7,062	15,019
1899	5,358	1,386	8,913	15,657
1900	6,154	975	9,603	16,732
1901	6,292	949	10,950	18,191
1902	5,957	975	10,476	17,408
1903	6,637	1,165	9,231	17,033

The following table shows the quantities of the chief varieties of timber cut from Ontario Crown lands in the years indicated:

Date.	SAWLOGS.		SQUARE TIMBER.		Boom and dimension timber, pieces.	Railway ties, pieces.	Pulp-wood, cords.
	White pine, pieces.	Other, pieces.	White pine, cubic feet.	Other, cubic feet.			
1868	885,076	2,219	5,277,786	788,535	1,478	309,081	.....
1869	1,875,974	2,149	9,973,965	2,386,915	3,767	9,953	.....
1870	1,430,666	4,599	6,718,001	1,460,548	15,064	34,846	.....
1871	1,656,359	9,421	10,172,307	1,335,763	30,362	66,537	.....
1872	2,854,047	15,450	6,328,647	631,735	45,569	96,126	.....
1873	2,481,405	7,403	6,977,470	1,280,191	19,861	23,206	.....
1874	2,068,480	16,495	5,795,723	2,496,309	37,006	77,515	.....
1875	2,019,123	7,611	5,671,491	1,089,833	53,820	467	.....
1876	1,959,942	8,530	8,551,049	1,148,581	36,285	7,916	.....
1877	1,493,866	4,288	8,668,249	857,068	22,686	23,439	.....
1878	1,576,550	3,667	4,303,791	969,601	25,772	10,416	.....
1879	2,265,333	9,017	1,870,653	628,211	33,291	18,205	.....
1880	2,886,096	33,722	3,253,036	957,239	57,985	97,431	.....
1881	3,967,592	30,128	4,847,114	1,481,683	89,179	90,258	.....
1882	4,473,607	20,339	5,696,349	1,089,515	110,061	201,161	.....
1883	3,961,187	17,525	5,960,982	390,728	106,728	140,144	.....
1884	3,019,993	43,084	6,378,505	405,645	101,844	715,429	.....
1885	3,916,857	44,354	3,164,866	23,427	139,240	1,015,393	.....
1886	4,357,577	56,537	4,909,976	190,459	128,545	971,266	.....
1887	4,650,258	30,845	2,013,178	461,203	147,288	776,142	.....
1888	6,364,650	36,684	2,923,332	433,256	228,524	761,346	.....
1889	6,820,308	44,801	4,659,755	400,114	159,932	579,201	.....
1890	5,032,230	43,331	3,226,164	166,465	148,863	672,410	.....
1891	4,718,469	85,309	1,557,075	22,839	206,769	975,841	864
1892	6,424,475	110,415	3,841,853	17,466	250,394	628,898	7,544
1893	7,291,439	142,109	1,867,340	40,983	130,429	1,130,405	3,717
1894	7,573,447	131,691	1,173,576	.....	116,581	569,362	10,793
1895	9,586,546	231,072	873,304	.....	201,902	907,862	31,115
1896	10,865,461	306,327	1,128,666	.....	218,799	708,451	35,037
1897	5,381,511	167,567	1,977,400	28,809	150,505	278,955	46,388
1898	7,416,228	167,313	1,459,631	342,299	154,731	1,152,213	16,448
1899	6,521,922	323,946	1,723,274	135,843	221,230	453,855	29,838
1900	9,308,328	768,946	1,919,230	524,387	291,663	1,143,374	65,051
1901	8,688,312	928,780	1,755,881	719,107	287,136	1,449,427	47,738
1902	9,084,886	905,603	1,468,756	1,022,483	272,140	2,575,255	29,703
1903	10,609,924	1,251,215	806,777	482,523	345,329	2,150,573	61,027

The following is a list of Ontario timber sales from 1868 to the present time, showing the quantity sold and the price a mile. Sales are not held every year but only when it is deemed expedient. The table shows the constantly increasing value of timber.

Date.	Square miles sold.	Total price realized.	Dues.	Ground rent.	Highest price per mile.	Average price per mile.
December 23, 1868	38	$ 14,446.50	$0.50	$2.00	$ 519.00	$ 380.17
July 6, 1869	98	25,564.50	.75	2.00	418.00	260.86
February 15, 1870	12	7,680.00	.75	2.00	640.00	640.00
November 23, 1871	487	117,672.00	.75	2.00	500.00	241.62
October 15, 1872	5,031	592,601.50	.75	2.00	1,000.00	117.79
June 6, 1877	375	75,739.00	.75	2.00	500.00	201.97
December 6, 1881	1,379	733,675.00	.75	2.00	2,300.00	532.03
October 22, 1885*	1,012	318,645.00	.75	2.00	1,250.00	314.86
December 15, 1887	459	1,312,312.50	1.00	3.00	6,300.00	2,859.06
October 1, 1890†	376	346,256.25	1.00	3.00	2,625.00	920.89
October 13, 1892	633	2,315,000.00	1.25	3.00	17,500.00	3,657.18
August 18, 1897	159¼	265,162.50	1.25	3.00	6,600.00	1,665.07
December 20, 1899	360	723,550.00	1.25	3.00	8,500.00	2,009.86
September 17, 1901	399¼	732,787.50	1.25	3.00	4,700.00	1,835.41
December 9, 1903	826	3,687,337.00	....	....	31,500.00	4,464.08

*Scattered, broken and forfeited berths. †Berths in Rainy River District.

The total amount of revenue received from timber by the Government of Ontario from 1868, the year following confederation, to the end of 1902 was $29,583,386.

The prices realized in 1903 were the highest ever received by the Government from the sale of timber lands and emphasized the fact that the state of the lumber market will permit the payment of a much higher price for stumpage and that a corresponding increase in the revenue would result. It may be said, however, that the timber sold at this particular time was of exceptional value and was located on lands tributary to the Ottawa River, which affords an easy method of getting the timber to market. During the last few years the Ontario timber limits have been acquired rapidly and this also has served to stimulate business and prices.

Under the mode of procedure the Provincial government now follows the Commissioner of Crown Lands makes an occasional exploration and estimates the ungranted limits so as to guide him in the fixing of reserve bids, which are not announced, however. The lands to be disposed of are then cut up into small limits and advertised in the public press for sale. Subsequently the limits are sold at public auction to the highest bidder, if the price is above the reserve bid. The bonus bid pays for the license to cut the timber upon a stated limit, subject to such annual rents and stumpage dues as may be fixed by the Government. The purchasers of berths in the Nipissing and Algoma districts are entitled to cut red pine and white pine only, except such timber as may be required to make roads. The Rainy River berths include red pine, white pine, spruce, cedar, tamarack and poplar. The timber cut from all berths must be manufactured in Canada.

According to the Canadian census figures of 1901 the lumber and timber production of Ontario was as follows:

SQUARE, WANEY OR FLAT TIMBER, IN CUBIC FEET.

	Amount.	Value.
Ash	231,494	$ 24,662
Birch	78,986	8,554
Elm	1,259,174	136,787
Maple	194,304	21,554
Oak	76,025	13,022
Pine	1,044,439	219,219
All other woods	906,236	94,868
Total	3,790,658	$518,666

These figures serve to show not only the total magnitude of such production in the Province, but also the relative value of these manufactured products of the forests of Ontario. While the census has ar-

ranged the woods alphabetically, it will be discerned that Ontario pine leads all of the other woods in value and, indeed, nearly approaches their combined valuation. The census of 1901 gives also the following detailed figures relating to Ontario log production:

LOGS FOR LUMBER, IN FEET BOARD MEASURE.

	Amount.	Value.
Elm	79,105,000	$ 629,670
Hickory	1,445,000	17,304
Hemlock	84,175,000	482,447
Oak	8,842,000	126,901
Pine	984,352,000	10,116,667
Spruce	8,709,000	71,221
All other logs	167,994,000	1,320,558
Total	1,334,622,000	$12,764,768
Pulpwood, cords	108,335	304,837
Miscellaneous products	.....	8,068,464
Grand total of values		$21,656,735

The same census shows 847 sawmills in operation in the Province, the total production of which in the census year was valued at $25,672,424.

The following statement is from data collected by *The Canada Lumberman*. It covers both the Ontario and Quebec sides of the Ottawa River:

PRODUCTION OF SAWMILLS IN THE OTTAWA VALLEY, IN FEET BOARD MEASURE.

	1902.	1903.	1904.
J. R. Booth, Ottawa, Ont.	125,000,000	115,000,000	115,000,000
W. C. Edwards & Co., Rockland, Que.. and New Edinburgh, Ont.	85,000,000	95,000,000	95,000,000
McLachlin Brothers, Arnprior, Ont.	70,000,000	70,000,000	60,000,000
Hawkesbury Lumber Co., Hawkesbury, Ont.	50,000,000	50,000,000	50,000,000
St. Anthony Lumber Co., Whitney, Ont.	50,000,000	33,000,000	35,000,000
Gillies Bros., Braeside, Ont.	40,000,000	32,000,000	27,000,000
Gilmour & Hughson, Hull, Que.	40,000,000	28,000,000	30,000,000
Hull Lumber Company, Aylmer, Que.	40,000,000	15,000,000	20,000,000
Gilmour & Co., Trenton, Ont.	13,000,000	8,000,000	7,000,000
Pembroke Lumber Company, Pembroke, Ont.	14,000,000	12,000,000	15,000,000
G. H. Perley Company, Calumet, Que.	21,000,000	18,000,000	15,000,000
James MacLaren Co., Buckingham, Que.	25,000,000	25,000,000	20,000,000
J. R. & J. Gillies, Arnprior, Ont.	3,000,000	3,000,000	3,000,000
A. & P. White, Pembroke, Ont.	5,000,000	4,000,000	5,000,000
McLaren & McLaurin, East Templeton, Que.	27,000,000	27,000,000	20,000,000
Rideau Lumber Company, Ottawa, Ont.	5,000,000	5,000,000	5,300,000
Shepard & Morse, Ottawa, Ont.	.....	12,000,000	15,000,000
Fraser & Co., Deschenes, Que.	.....	5,000,000	25,000,000
Davidson & Thackray, Fort Coulonge, Que.	.....	5,000,000	3,500,000
Total	613,000,000	562,000,000	565,800,000

The following figures show in round numbers the production of the Georgian Bay region in 1903 and 1904. There is a decrease in the latter year notwithstanding the fact that it embraces the cut of two or three mills not included in the 1903 statement. Of the cut indicated about ninety percent was pine and the rest hemlock and other woods:

	1903.	1904.
Midland	64,000,000	60,000,000
Parry Sound	57,000,000	50,000,000
Byng Inlet	42,000,000	52,000,000
Sarnia	36,000,000	45,000,000
Little Current	46,000,000	37,000,000
Victoria Harbor	50,000,000	46,000,000
Waubaushene	30,000,000	32,000,000
Blind River	51,000,000	43,000,000
Spragge	27,000,000	27,000,000
Sandwich	26,000,000	21,000,000
Gravenhurst	25,000,000	25,000,000
Cutler	37,000,000	28,000,000
Penetanguishene	40,000,000	17,000,000
Spanish River	16,000,000	23,000,000
Collingwood	16,000,000	16,000,000
Thessalon	16,000,000	25,000,000
John Island	17,000,000	17,000,000
Cache Bay	19,000,000	19,000,000
Huntsville	15,000,000	12,000,000
Bracebridge	14,000,000	14,000,000
Severn	5,000,000	5,000,000
Callander	10,000,000	8,500,000
Powassan	2,000,000	4,000,000
Bobcaygeon	4,000,000	3,000,000
Warren	15,000,000	1,500,000
Collins Inlet	5,000,000	5,000,000
Other points	36,000,000	40,000,000
Total	721,000,000	676,000,000

The principal firms operating in the Georgian Bay district are the following, the table giving the location of their sawmills and their output for 1904:

Saginaw Lumber & Salt Co., Sandwich	21,000,000
Cleveland-Sarnia Sawmills Co., Sarnia	27,500,000
Sarnia Bay Company, Sarnia	16,000,000
Charlton Sawmill Co., Collingwood	13,784,000
Eddy Bros. & Co., Blind River	28,000,000
Dolsen & McEwan	16,000,000
Moulthrop Lumber Co., John Island	17,000,000
Playfair & Co., Midland	21,000,000
Smith Bros., South River	16,000,000
Chew Bros., Midland	14,000,000
Estate William Peter, Parry Sound	18,000,000
Parry Sound Lumber Company, Parry Sound	17,000,000
Conger Lumber Company, Parry Sound	13,000,000
G. G. Gladman, Parry Sound	6,000,000
Loveland & Stone, Cutler	33,000,000
Ontario Lumber Co., French River	8,000,000
Victoria Harbor Lumber Co., Victoria Harbor	46,000,000
John Bertram, Collins Inlet	5,000,000
Georgian Bay Lumber Co., Waubaushene	28,000,000
C. F. Beck & Co., Penetanguishene	11,000,000
W. & A. McArthur Co., Limited, Little Current	25,000,000
Conlon Bros., Little Current	7,000,000
George L. Burtis, Thessalon	17,541,929
N. & A. Dyment, Little Current	8,000,000
Huron Lumber Co., Spanish River	16,000,000
Nipissing Lumber Co., Spanish River	7,000,000
Holland & Graves, Byng Inlet	40,000,000
Total	495,825,929

In the above list will be found many names of historical interest in a consideration of the lumber industry of Ontario. There also appear the names of numerous American operators, who crossed Lake Huron when the exhaustion of their Michigan pine either threatened or actually occurred.

The total production of pine logs and timber in the Province of Ontario from 1879 to 1903 inclusive is recorded in the following table:

PRODUCTION OF PINE LOGS AND TIMBER IN ONTARIO.

Year.	Pine sawlogs. Ft. b. m.	Pine boom timber. Ft. b. m.	White pine sq. timber. Ft. b. m.	Total. Ft. b. m.
1879	322,807,200	10,084,000	29,986,368	362,877,568
1880	377,786,200	11,711,600	50,523,300	440,021,100
1881	493,735,000	19,388,600	75,945,564	589,069,164
1882	518,757,400	22,967,200	81,430,908	623,355,508
1883	443,366,200	19,563,000	76,221,168	539,150,368
1884	357,924,600	17,901,800	81,409,812	457,236,212
1885	469,601,400	29,922,200	38,259,516	537,783,116
1886	534,903,800	29,457,000	61,205,220	625,566,620
1887	567,803,200	31,216,800	29,692,680	628,712,680
1888	699,581,000	41,177,000	40,279,056	781,037,056
1889	725,727,633	32,000,237	60,718,308	818,446,178
1890	519,215,801	33,337,798	40,711,548	593,265,147
1891	451,207,505	37,844,115	18,958,968	508,010,588
1892	606,190,122	42,297,750	46,310,828	694,799,700
1893	718,215,271	24,276,520	22,899,876	765,391,667
1894	613,081,760	17,701,630	14,682,912	644,866,302
1895	800,565,355	32,170,013	10,479,648	843,215,016
1896	904,379,710	34,373,465	13,543,992	952,297,167
1897	477,716,448	25,640,239	23,728,800	527,529,985
1898	544,457,139	26,084,737	17,515,572	587,612,950
1899	498,607,068	29,361,695	20,679,288	548,648,051
1900	643,510,766	34,724,488	23,030,760	701,266,014
1901	598,433,958	32,755,638	21,070,572	652,260,168
1902	615,831,433	38,539,856	17,070,572	671,776,361
1903	679,966,835	39,834,442	9,681,324	729,482,601
Total	14,183,372,804	714,331,823	926,036,560	15,823,677,287

In 1900 a survey and exploration of northern Ontario was undertaken by ten exploration parties. The southern base of the exploration was the Canadian Pacific railway and the northern base the boundary of the Province. The area of the whole Province is about 167,000,000 acres, of which about 23,000,000 acres is included in the old and settled part, while the area explored embraces about 60,000,000 acres. From the summary of results obtained by the exploration, the following is extracted:

"The area is largely covered with extensive forests of spruce, jack pine and poplar. In the district of Nipissing north of the Canadian Pacific railway line, there is estimated to be at least 20,000,000 cords of pulpwood; in the district of Algoma, 100,000,000 cords; in the district of Thunder Bay, 150,000,000 cords, and in the district of Rainy River, 18,000,000 cords, a grand total of 288,000,000 cords. The pine region does not seem to extend much beyond the Height of Land, but on this side in the country around Lakes Temagami and Lady Evelyn and to the north, an area of red and white pine of fine quality was explored and estimated to contain about 3,000,000,000 feet board measure. There are also numerous smaller areas, both timber and land, which

are not included in these figures, but which will be available when the development of the country takes place."

As has been said, the revenue from forests has ranged about one and a quarter millions of dollars a year in recent years. How it has grown since confederation in 1867 is shown in the following figures. It will be noticed, also, how the western district (Georgian Bay and Lake Superior), which produced only about one-eighth of the revenue in 1868, in 1902 produced about five-sixths of the total.

ONTARIO REVENUE FROM BONUSES, TIMBER LICENSES AND GROUND RENTS IN THE YEARS INDICATED.

Year.	Ottawa district.	Central district.	Western district.	Total.
1868	$117,006	$ 84,078	$ 33,123	$ 234,209
1869	247,303	104,388	83,709	435,397
1870	264,842	87,784	73,273	425,901
1871	219,644	65,288	165,470	453,430
1872	306,612	162,739	96,790	*1,191,436
1873	202,814	63,278	87,717	*643,724
1874	280,128	105,563	102,695	503,004
1875	194,248	54,976	40,069	289,294
1876	262,056	72,811	103,122	437,122
1877	203,282	62,118	161,155	426,556
1878	130,004	62,785	92,025	284,816
1879	150,257	63,291	118,464	332,014
1880	226,224	100,334	174,882	501,442
1881	269,990	88,424	159,946	*839,716
1882	242,176	115,364	125,199	*894,052
1883	250,919	110,393	144,234	505,547
1884	196,709	71,399	196,428	464,529
1885	187,114	80,716	333,507	604,338
1886	242,781	82,699	390,323	715,804
1887	258,738	94,029	638,078	990,855
1888	213,560	111,531	973,047	1,316,139
1889	380,111	158,306	540,180	1,078,598
1890	283,328	92,193	540,633	916,155
1891	256,708	72,178	693,723	1,022,619
1892	246,701	93,352	1,834,537	2,174,591
1893	178,856	65,679	1,512,469	1,757,005
1894	246,222	86,660	647,614	980,497
1895	266,765	19,261	567,152	853,179
1896	165,548	84,990	561,882	812,424
1897	393,003	64,589	869,547	1,327,140
1898	291,068	60,197	629,920	981,186
1899	186,163	111,362	795,322	1,092,848
1900	101,322	68,281	1,075,499	1,276,376
1901	221,721	40,487	1,217,638	1,479,847
1902	178,413	88,811	1,064,126	1,331,352
1903	193,535	33,049	2,080,771	2,307,356

*These totals were increased by sales held after the detailed statement of revenue by districts was made up.

CHAPTER XV.

ONTARIO—FOREST RESERVES.

At the outset the business of lumbering was regarded as an essentially transitory feature of the process of clearing and settling the country. In the older portions of Canada the greater part of the land denuded of its timber was suitable for agricultural settlement, and needed for farms by the incoming population. It was regarded as desirable to have the country cleared as quickly as possible for the plow. As lumbering operations were pushed farther back, a large territory was reached where most of the land was broken and sterile and not suited for farming, but where much of it was covered with valuable pine timber.

If the policy which was followed in clearing the agricultural lands of the southern part of the Province had been pursued in the newer territory, large areas, when stripped by the ax and the bush fires usually attendant on lumbering operations under old time methods, would have been practically worthless, their only value consisting of their timber-producing capacity.

The increase in the value of timber induced more conservative methods of cutting and led to the adoption of the system of fire ranging by which the danger of destruction of standing timber by bush fires has been greatly lessened. The large lumber operators realize that, instead of making a thorough clearance of their limits within the shortest possible time, it is often more profitable to treat the forest as a farm, reaping a periodical crop, with as little injury as possible to its reproductive capacity.

As large tracts of country in New Ontario were opened up for settlement and travel by the building of railroads, the question of what action to pursue regarding the large areas of valuable pine land, which if unprotected would be liable to destruction by bush fires, became one of increasing urgency.

An advance in the direction of establishing forest reserves from which settlers would be excluded was made in 1893 by the setting aside of the Algonquin National Park in the Nipissing District. This territory being under license, however, is not, strictly speaking, a forest reserve, though it serves some of the purposes of such. In June, 1897,

a royal commission was appointed, consisting of E. W. Rathbun, of Deseronto; John Bertram, Toronto; J. B. McWilliams, Peterboro; Alex. Kirkwood, chief clerk of the lands branch of the Crown lands department, and Thomas Southworth, clerk of forestry, to investigate and report on the subject of restoring and preserving the growth of white pine and other timber trees upon lands not adapted to agricultural purposes or to settlement. The two first named gentlemen were practical and experienced lumbermen. After a personal investigation extending over considerable tracts of country they presented a report, the most important feature of which was a recommendation that the Government take the power to withdraw from sale or settlement and set aside to be kept in permanent forest reserves such areas of territory as are generally unsuitable for settlement and yet valuable for growing timber.

In accordance with this recommendation the Ontario Legislature in 1898 conferred the requisite authority upon the administration by the Forest Reserves Act. The first action taken in pursuance of this policy was the creation of the Eastern Forest Reserve, consisting of 80,000 acres in the counties of Frontenac and Addington, in 1899. The following year the Sibley Reserve, comprising about 45,000 acres on the north shore of Lake Superior, was set apart. A more important step was taken in 1901 when the Temagami Forest Reserve was constituted, comprising an area of 2,200 square miles around Lake Temagami in the Nipissing district. This contains one of the most valuable of the pine forests in Ontario, the quantity of standing timber being roughly estimated at from 3,000,000,000 to 5,000,000,000 feet. This reserve was subsequently enlarged by the addition of territory to the north and west, bringing its area up to a total of 5,900 square miles. The Mississaga Reserve in the Algoma district was added to the list in 1904. It comprises about 3,000 square miles of virgin timber. It is altogether probable that as settlement advances in New Ontario, only the fringe of which has so far been touched by civilization, further areas will be set apart as forest reserves, wherever timber covered tracts of importance are found to exist on non-agricultural lands.

Of recent years, the forestry work of the Province of Ontario has been under the management of Thomas Southworth, spoken of above, with the title of Director of Forestry. His extensive studies and practical experience have qualified him to speak with particular authority of all the phases of this general subject of forest preservation and its financial aspects. For this reason we reproduce in this chapter an arti-

cle prepared by him at a recent date.[1] This article to a certain extent is a reproduction of what has been said elsewhere, but it so clearly explains and logically summarizes the whole subject that it is reproduced, as follows:

The Province of Ontario is one of the greatest business corporations in the world. Whether viewed in the light of an inheritor having a vast estate to dispose of, or as all this and a trading company as well, Ontario is an extensive corporation doing business in a very large way.

Its shareholders are the individual people of the Province, and handsome dividends are yearly paid to them in the form of the support of public services, charity and education, that would otherwise be paid for out of their private pockets in the form of taxes.

I presume it may be stated that the working capital of the Province is, through the right to levy taxes, only limited by the ability of the citizens to pay, as is the case with other similar corporations having more and richer shareholders, but it is proposed to refer only to the estate or inheritance common to us all in our land and water areas, and what they contain or produce. This includes land, forests, minerals, game, fish and water powers, all of which supply an income that could be increased if desired.

Unlike many corporations or trading companies, however, the Province realizes that there are ways in which the "greatest good to the greatest number" of the shareholders in this enterprise may be reached other than in the direct payment of cash dividends, and it has been deemed for the general good that the forest should be worked as the chief producer of cash dividends.

Therefore for the purpose of this article we will eliminate any consideration of any of the provincial assets other than that of the Crown forest.

The forest wealth of the Province has until recently been classed under two divisions: That still remaining the property of the Crown partly sold under license to lumbermen and partly without any claim at all; and that part held by settlers to whom lands had been allotted or sold by the Crown.

In the development of the timber trade in Ontario the idea gradually evolved was to dispose of the merchantable timber, principally pine, for cash revenue, before handing over the land on which it grew to individuals to be converted into farms. Having this idea in view, the business was not regarded as one of our permanent industries. The lumberman was considered as but the forerunner of the farmer, and no attempt was made for many years to do any more than harvest the standing crop of pine and other coniferous trees to the best advantage. No idea of taking off another crop than the original one was thought of. For many years this process worked well. As lumbermen established camps, and cut over their limits, the shantyman often become a farmer, squatting upon a tract of good land as he found it in the limit, and he was soon followed by his friends. This process has settled many townships in the Province, and where the land included in the limit was good for farming, no better plan could probably be devised. The hardwoods and enough pine for building purposes were left on the land for the settler,

[1] Published in *The Canada Lumberman* January 19, 1905.

and from the money received from the largest pine, roads were built for the settler and the whole people of the Province shared in the dividends.

As the lumberman pushed farther north in search of pine, however, the character of the country changed. Large areas were placed under license to lumbermen in which the land was unsuited for farming. The settler still followed the lumberman and tried to make farms where nature had provided that forests only could be profitably grown, finding out only after their capital and the best years of their lives had been spent, that they had made a mistake.

While these men have been wasting their efforts dragging out a bare existence, the Province has lost large sums in cash that might have been derived from these same areas had they been left to produce a second crop of pine timber.

In addition to the encroachments of settlers upon the forest area, fire proved a prominent factor in emphasizing the ephemeral character of the lumber industry; large tracts were burned over, until it began to be recognized as the natural thing that fire followed the lumberman. The success of the fire ranging system adopted in 1885 showed that this danger could be largely removed.

This partial immunity from forest fires led our legislators to consider the possibility of giving the forest industries a more permanent character, and in 1895, when I was appointed to the forestry work under the Government, I was directed by the then Commissioner of Crown Lands, the Hon. A. S. Hardy, to submit a report on the best method of reafforestating these burned areas with pine; to ascertain the comparative cost of planting and of sowing tree seeds, with plan of operation.

Estimates of the cost of seedling trees for replanting were secured, and in the process of investigating the burned over areas to ascertain the probable cost of getting them in condition to replant or sow, I concluded and so reported that neither was necessary except in a few places. The cost of replanting or even of seeding successfully would be so great per acre that the directors of the corporation, the Legislature, would never vote the money necessary to accomplish the work over so large an area; and they would be right, for it is very likely that the initial expense compounded even at three percent, for the number of years necessary for the plantation to reach a merchantable age, plus the annual expenditure for protection and care, would exceed the amount realized from the crop even at the enhanced prices likely to be obtained at that time.

It may be said that even so, for the sake of the incidental or indirect benefits in the way of climatic effect and water supply the investment would be worth while, but it was found that planting was not at all necessary, that practically all the investment required was time and freedom from settlement or fire. On burned over territory a new forest was growing, and in nearly every case, where pine was present in the previous crop, pine was growing again, not at first perhaps; the first crop after the fire was usually birch, poplar or other trees that seed yearly and whose seeds carry immense distances, but nearly always pine followed where the fire had left any parent pine trees within a wide radius, and would be found growing up under the shade and protection of the broad leaved trees, under the exact conditions required to make good timber.

This condition of affairs simplified the problem of reafforestation on Ontario Crown lands, and in my report to the Government in 1896 I recommended that areas found unsuited for general farming should be permanently withdrawn from settlement and placed in forest reserves.

In the following year the Government appointed a royal commission to report on the same subject. This commission included among its members two of the ablest lumbermen in Canada, the late E. W. Rathbun and the late John Bertram, and this commission indorsed this recommendation as follows:

"A large portion of the central division of the Province is more profitable from the standpoint of public revenue as forest land than under cultivation for farm crops, and as in addition to this it contains the headwaters of all our principal streams, all that part of this division found upon examination to be not well adapted for farming should be added to the permanent Crown forest reserves."

In 1898 the legislature passed an act entitled "An Act to Establish Forest Reserves," the first specific action by legislation toward the creation of a permanent Crown forest. This act was submitted to the legislature by Hon. J. M. Gibson, then Commissioner of Crown Lands, and was passed without a dissenting voice.

The passage of the forest reserves act, and the creation of reserves thereunder, is the formal announcement of the Government policy of gradually separating the non-agricultural from the agricultural lands, and is the first organized and definite attempt to create a permanent forest estate to be owned in perpetuity by the Crown and operated for timber crops. Under the act there have so far been created four forest reserves, amounting in all to 5,821,000 acres. These include the Eastern Forest Reserve of 80,000 acres; the Sibley Forest Reserve of 45,000 acres; the Temagami Forest Reserve of 3,776,000 acres, and the Mississaga Reserve of 1,920,000 acres.

There should be added to this Algonquin Park, created in 1893 mainly as a game preserve, with an acreage of 1,101,000 acres,[2] making a total of permanent forest reserves of 6,922,000 acres.

These reserves are of different character. The two former, the Eastern Reserve in Frontenac County and the Sibley Reserve, which takes in the township of Sibley including Thunder Cape on the north shore of Lake Superior, have been lumbered, and in most cases burned over, and now contain a very thrifty growth of white pine and other trees. It will be some time before they are ready again for lumbering operations, but the growth is very rapid and the time when they may be again operated for pine and other timbers will be much less than would be imagined in the absence of definite information and measurements of the rate of growth of this young timber.

The Temagami Reserve lies in the district of Nipissing and contains 5,900 square miles or 3,776,000 acres. This reserve besides including some of the most picturesque and beautiful lakes in the world, of which Temagami and Lady Evelyn might be mentioned, contains a very large quantity of pine timber now ready to be cut. About forty years ago the band of Indians living in the territory, alarmed at the incursions of the lumbermen who were operating on Lake Temiscamingue and at the suggestion, it is said, of a Hudson Bay officer equally interested with them in the preservation of this country as a hunting ground, started a fire that swept over a good many hundreds of square miles, including the northern part of Temagami, Lady Evelyn, Anima, Nipissing and other lakes. Over this burned territory there is now a thrifty growth of poplar, birch, as well as pine and other coniferous

[2] The area of Algonquin Park is placed at 1,109,383 acres in other carefully compiled statistics on Ontario, which are at hand.

trees, the pine making growth at the rate of one inch in diameter in about two and a half to three years. Of the timber now sufficiently large to cut or what would be estimated by a lumberman in buying the territory for lumbering, I believe there is about five thousand millions, or five billions of feet board measure, exclusive of spruce, tamarack and hardwoods.

The Mississaga Reserve is included in the territory drained by the Winnebago and Mississaga rivers in the district of Algoma, and lies between the main line of the Canadian Pacific railway and the Sault Ste. Marie branch of the same line. It comprises a territory of 3,000 square miles, or 1,920,000 acres, and is estimated to contain over three thousand millions of feet of merchantable white pine besides other timbers.

In giving these figures of areas of forest reserves, it must be borne in mind that the Government has only recently entered upon this policy, and it requires time to properly investigate the different areas before having them come under the provisions of the forest reserves act. By the act a reserve can be created by order in council, but if on further investigation it was found desirable to open this land for agricultural purposes, a subsequent act of the legislature would be necessary in order to take it out of the reserves. In a general way, however, we are aware that there is a very large territory in the Province of Ontario peculiarly suitable for permanent forests.

So far as the question of future timber supplies and the consequent effect on climate and industrial conditions are concerned the Province of Ontario is in a peculiarly fortunate condition. The southern part of the Province which extends almost into the middle of the United States is a very rich agricultural section, now entirely settled up, and the home of a prosperous agricultural community. North of this agricultural belt, stretching across the Province from east to west, lies the watershed separating the streams flowing south into the Great Lakes and the St. Lawrence from those flowing north into our great Canadian sea. This height of land or watershed is not a mountainous ridge, but a more or less level tableland, rugged and rough in character, for the most part quite unsuited for agriculture, but the natural home of the white and red pine, spruce and other coniferous trees. True, in this belt there are occasional valleys of good land. In the Temiscamingue district for instance, there are nearly a million acres of rich alluvial clay soil. There is also a good agricultural section in the Rainy River Valley and another one at Wabigoon on the main line of the Canadian Pacific railway. But generally speaking, that is the character of this immense watershed stretching hundreds of miles across the Province from east to west.

North of this territory again, on the slope running to Hudson Bay, lies another agricultural district, estimated to contain over sixteen millions of acres of first class farming land, but covered at present with a very valuable growth of spruce and other timber.

In estimating the annual dividends possible or likely to be derived from this forest asset, a good many things have to be taken into account. While the reserves so far created are pine-bearing, not all of the territory suitable for reserves contains pine at present though it may be made to do so. Some of this territory is rocky and has been so severely burned over, notably on the north shore of Lake Superior, as to have no soil left, and we need to figure on long periods of time before those

small areas will become productive. There must also be eliminated the water areas, and fire must be counted on as a contingency.

The present forest reserve area includes distinctly pine-bearing lands, and for purposes of computation over the whole area, I will take this area 6,922,000 acres as a basis. In a country where we have no large artificial plantations that have reached maturity from the seed, it is difficult to form definite conclusions as to the annual growth of timber, but from measurements obtained by the Washington Bureau of Forestry over many parts of the northern or pine-bearing states, they have adopted nearly sixty cubic feet as the normal annual growth under ordinary forest conditions on an acre of forest land. This includes the whole of all sorts of trees, not pine alone. This in board measure would be 720 feet per acre per year. In our pine-bearing land, particularly in the reserves referred to, white pine is not the only tree, but it is the dominant tree, and a large proportion of this annual growth will be of that variety of timber.

Pinchot and Graves, in their exhaustive study of the white pine in Pennsylvania, estimate that a pine tree ten inches in diameter will yield 84 percent of merchantable timber, and in a tree twenty-six inches diameter only seven percent is waste. Under continuous operations, 10 percent would be a fair allowance for waste in all kinds of timber, but there should also be eliminated much solid timber not now merchantable. With allowance also for water areas and spots not well seeded, I do not think 300 feet board measure per acre an unreasonable estimate for the annual growth of pine on an acre of land in the areas. That it is not unreasonable is shown from yields on lands that have been cut over. There are numerous instances where 50,000 feet of pine per acre have been cut, and this where only the merchantable trees were removed, leaving many others on the way to a merchantable size, while our estimate is for the total annual growth.

An ordinary forest well seeded to pine would produce this 50,000 feet in about one hundred years or at the rate of 500 feet per year. One other deduction must be made, however, for fire, for while we have greatly lessened the damage from this source, it must be counted on, and we will reduce this estimate 50 percent or 150 feet board measure an acre a year for the pine timber only. This estimate applied to our present reserves would give an annual production of 1,038,300,000 feet.

As to the value of this timber, much depends on its location and ease of access to market. On the basis of the recent timber sale, $7 per thousand feet would be a fair average as applied to the reserves in question. This would return annually $7,268,100. This sum appears large, but it must be borne in mind that the territory now being operated each year, probably not so large as this, returns $1,000,000 to the treasury, and at $1.25 instead of $7 per thousand feet.

It would, perhaps, be unfair to apply the prices realized at the recent sale to the whole of this area, but to reduce it to $5, a very modest estimate, the annual increment in pine would reach a value of $5,191,500, and besides the other timbers growing on the reserves, spruce, cedar, birch, larch, maple, etc., have a commercial value that is rapidly increasing.

One hundred and fifty thousand feet board measure at $5 per thousand would be worth 75 cents as the annual rental value of this land. It may at first sight appear high, but the Prussian Crown forests under a most expensive semimilitary

system of management, including the cost of maintaining several forestry schools and colleges, yield a net income over all expenses of about $1.45 an acre a year over the whole territory good and bad. I am well aware of the difference in conditions as to markets, etc., but surely if the Germans can obtain a *net* revenue of $1.45, we can, in time at least, under proper management, realize half that sum as our *gross revenue*. I might also add that the Crown forests of Saxony yield about $4.50 an acre a year, net.

A recent concrete instance of the growth of pine under somewhat adverse circumstances is shown by the result of a small plantation of pine trees on the sand plains of Nebraska. This plantation covers .52 of an acre on the ranch of Bruner Bros., in Holt County, Nebraska. It is rectangular in form, measuring 70x192 feet, and is located in sand hills bordering a dry valley. The trees on this plantation were set out in the spring of 1891 as three-year-old seedlings averaging about eight inches in height. Furrows were turned two feet apart, and the trees were planted two feet apart in the furrows. Since planting, the trees have received no cultivation whatever, but they have been protected from fire and stock. The altitude of the location is 2,200 feet.

This sand is what is ordinarily called blow sand and covered some of the small seedlings. Last year the Bureau of Forestry at Washington had these trees counted and measured, when it was found that the total volume of wood in the plantation was 586.02 cubic feet, with a total annual growth of 50.6 cubic feet. This, converted into board measure, would be over 600 feet a year on a fraction over half an acre, or 1,200 feet an acre a year.

It is true these trees were planted at regular intervals, and would therefore have a better chance for growth than trees reproduced by nature with her wasteful methods, but it must also be remembered that the soil was very bad and of such a nature as had been considered hitherto quite incapable of growing trees at all.

Hence it will be seen that my estimate of 150 feet board measure an acre a year in our peculiar pine-bearing country is a very moderate estimate. Applying this estimate to say 40,000,000 acres of permanent reserves, which I hope to live to see, we have a yearly growth of 6,000,000,000 feet, which at $5 per thousand would represent a value of $30,000,000.

This is not a rosy picture, but a very conservative estimate, and if the timber other than pine is considered, it will be found low.

And now, having definitely adopted the policy of separating agricultural from non-agricultural lands, placing large areas of non-agricultural lands in reserves to form a permanent Crown forest to be operated in perpetuity for timber supplies and the payment of cash dividends, the problem is presented of how to work these reserves to the best advantage.

In this various problems present themselves. The first, of course, is the great one of fire protection, but this I am happy to say we are within reasonable distance of having solved. Of course in the forest, as in the city, the prevention of fires entirely is an impossibility, and in the forest there is the added difficulty not often found in well regulated cities, that a fire once under headway cannot be checked by any human agency at present known. At the same time the system of patrol adopted some years ago is proving very effective, and our losses from fires for the past few years have been inconsiderable.

Among the most serious problems confronting the Government in the permanent timber policy, is the reproduction of the right kind of species from a commercial point of view. This Province is the habitat of probably the most valuable timber tree in the world, the Weymouth or white pine, the tree that has been so great a factor in the prosperity of the Province. There are peculiar features connected with its reproduction that have to be carefully considered in any permanent forestry operations.

In the first place, I have noticed that where a forest has been operated for pine for a number of years, and where no fire has taken place, there seem to be no seedling pines coming up. True, there are pine trees still growing to take the place of the mature trees removed, but they are trees that were suppressed and stunted in their growth at the time of the previous lumbering operations, and that took on new growth after the pressure in the forest was relieved, but I cannot find that in a forest of this sort there is any new crop coming on, that is to say, trees that have seeded since the cutting of the original crop.

Why this is so is not quite clear to me, but I imagine the reason will be found in the fact that the ground and the conditions of shade are not suitable for the proper germination and growth of the pine seeds.

On the other hand, where there has been a forest fire, after lumbering operations, we nearly always find a growth of young pine coming up, at any rate if any old or seed trees have been left in the vicinity of the fire.

Assuming this condition of affairs to be general, that young pine will not come up as a second crop except under suitable conditions, it will readily be seen that if in operating an old forest, nothing but the pine trees are taken out, the result must eventually be that the character of the forest will have changed from a pine forest to one of another description, and necessarily of a less valuable character. If it is pine mixed with spruce, if the pine is removed and the spruce only allowed to reproduce, it will naturally become a spruce forest, or a hardwood forest as the case may be.

Hence it is obvious that in operating an old or virgin forest with a view of reproduction of the most valuable sorts of trees, a scientific knowledge of the growth and method of reproduction of these trees will be necessary in order to have the cutting properly executed. This must be done also with a view to the financial part of the operation, because whether in private forestry or government forestry, it must necessarily be largely a commercial proposition, and the cost of operating must be considered in its relation to the ultimate profit.

This is one of the problems confronting us. There are others of a more or less technical nature, and for their solution scientifically trained men will, in my opinion, be necessary. That we have many men engaged in the lumbering business who are highly skilled men indeed in the operation of removing the present standing crop of timber as expeditiously and economically as possible, is true, but their training is not extended to the problem of removing this timber with any regard to a future crop.

While we need scientifically trained men for this purpose, men with a knowledge of botany, plant pathology and general sylviculture, as these men would have to be employed partly by the Government, partly by lumbermen, it would be necessary that in addition to these things they should also be expert lumbermen, and

have a thorough knowledge of logging, driving to market, sawing, culling lumber, etc., so that in addition to the training they could receive in the schools, their education would be utterly incomplete without the other training in the bush and in the sawmill, as well as in the lumber yard.

For the proper management of our permanent forests, well trained men will be needed and it will require the joint training of the college, the bush and the sawmill to produce them.

It is difficult to estimate the far-reaching consequences of this policy in securing a permanent source of future supply against the time when the present demand for lumber and other forest products will have enormously increased and many now productive areas, if worked in the ordinary way, will have become depleted. The intention of the Government of the Province is that these reserves shall be operated in accordance with forestry principles, removing only the mature timber from time to time with as little injury as possible to the young growth and the reproductive character of the forest in order that the supply may be perpetually maintained.

CHAPTER XVI.

ONTARIO—TORONTO INSPECTION.

The following rules and regulations for the inspection of pine and hardwood lumber were adopted by the lumber section of the Board of Trade of the City of Toronto, Ontario, in 1890. Though now obsolete, they are of historical interest.

PINE LUMBER.

INSTRUCTIONS FOR INSPECTION.

Inspectors of lumber must measure and inspect each piece as they find it, of full length and width. Imperfections are not to be measured out.

All lumber must be put into the grade its defects call for, regardless of measurement.

All lumber over 1 inch in thickness must be measured full, with the ¼ or ½ added on each piece (no fraction in width allowed).

In inspection the inspector is instructed to use his best judgment, based upon the rules laid down for his guidance.

The standard knot is to be considered as not exceeding 1¼ inches in diameter.

Splits are a greater or lesser defect in lumber, and must be considered accordingly.

All lumber must be cut plump in thickness and be well manufactured, and all lumber imperfectly manufactured shall be classed as culls.

GRADES.

The following shall be the grades of lumber sanctioned by the Council of the Board of Trade for the Lumber Section of the Board of Trade of the City of Toronto:

Clear Lumber.—Clear lumber shall be perfect in all respects and free from wane, rot, shake or check, not less than 12 feet long, 8 inches wide and 1 inch thick. A piece 12 inches wide will admit of imperfections to the extent of one standard knot or its equivalent in sap. In lumber over 12 inches wide the inspector must use his best judgment in accordance with the instructions above given.

Picks.—Pickings must not be less than 12 feet long, 8 inches wide and 1 inch in thickness, well manufactured and free from wane, rot, shake or check. A piece 8 inches wide will admit of one standard knot, or imperfections in sap to the same extent. A piece 12 inches wide will admit of two standard knots, or imperfections in sap to the same extent. For lumber wider than 12 inches, of this grade, inspectors will carry out the instructions as given regarding wide, clear lumber.

No. 1 Cutting Up.—No. 1 cutting up shall not be less than 12 feet long, 7 inches wide and 1 inch in thickness. Clear pieces 10 feet long and the required width are included in this grade; this must be free from wane, rot, shake or check.

Pieces from 7 to 9 inches wide will admit of imperfections to the extent of two standard knots or their equivalent in sap. Pieces from 10 to 12 inches wide will admit of three standard knots or imperfections equivalent to them in sap, and wider for lumber of this grade inspectors will follow instructions as given in two previous grades. Inspectors are informed that this grade of lumber is expected to cut out two-thirds clear in profitable lengths to the consumer.

No. 2 Cutting Up.—No. 2 cutting up shall not be less than 10 feet long, 6 inches wide and 1 inch in thickness, and shall cut at least one-half clear in accordance with the instructions as given above regarding No. 1 cutting up lumber.

Fine Dressing.—This grade of lumber shall be generally of a sound character, and shall be free from wane, rot, shake or check, not less than 10 feet long, 7 inches wide and 1 inch in thickness. A piece 7 inches wide will admit of one or more knots which can be covered with a ten-cent piece if they are sound. A piece wider than 7 inches will admit of one or more knots of the same size according to the judgment of the inspector in regard to the width.

Common Dressing.—Common dressing shall not be less than 10 feet long, 7 inches wide and 1 inch in thickness, and shall be free from wane, rot or check, and shall be generally of a sound character, and will admit of standard knots that will not unfit it for dressing purposes.

Common.—Common shall be free from rot and unsound knots, and well manufactured, not less than 10 feet long, 7 inches wide and 1 inch in thickness.

Strips.—Clear strips shall be from 4 to 6 inches wide, not less than 12 feet long, and 1 inch in thickness, and shall have one perfectly clear face, free from all imperfections; bright sap will be permitted on the reverse side.

Sap Strips.—Sap strips for fine dressing shall be from 4 to 6 inches wide, not less than 12 feet long and 1 inch in thickness, and will admit of one knot which can be covered by a 10-cent piece in a piece 4 inches wide, and two knots of like size in a piece 6 inches wide. All strips free from other imperfections and having bright sap on two sides would be admitted into this grade.

Common Dressing Strips.—Common dressing strips shall be from 4 to 6 inches wide, not less than 10 feet long, and 1 inch in thickness, and shall be well manufactured and generally of a sound character; will admit of knots which are sound and not coarse, and which will not unfit it for ordinary dressing purposes.

Common Strips.—Common strips shall be from 4 to 6 inches in width, not less than 10 feet long and 1 inch in thickness, free from rot and wane and to be of a coarse, sound character.

No. 1 Culls.—This grade shall consist of lumber above the grade of No. 2 culls and shall admit of coarse knots and stain and be free from rot. It shall also admit of pieces imperfectly manufactured below 1 inch in thickness and perfectly sound, and not rendered worthless through improper manufacture.

No. 2 Culls.—No. 2 culls shall be lumber that will work one-half sound.

No. 1 Lath.—No. 1 lath shall be 4 feet long, and shall be when cut 1⅛, 1⅜ and 1⅝ inches in width, cut out of good, sound, live timber, free from wane, rot or knots, well manufactured and trimmed square at the ends.

No. 2 Lath.—No. 2 lath shall be of the same width and length as No. 1 lath, and shall admit of a small portion of wane, and also will admit of lath sap stained, and will admit of small, sound knots; must otherwise be well manufactured.

No. XXX Shingles.—No. XXX shingles, packed in 4 bunches to the 1,000, of 250 each, free from all rot, shake, sap, knots, pin holes, bastards, or defects of any nature. A shingle 4 inches being the standard, 16-inch shingles should be 5 shingles to 2 inches thickness at butt, with $\frac{1}{16}$ inch points, and 18-inch shingles, 5 to 2¼ inches thickness at butt, and $\frac{1}{16}$ at points, to be well manufactured and well pointed.

No. XX 6-Inch Clear Butts.—No. XX 6-inch clear butts must be perfect for at least 6 inches from butts, and the defects from this hereon to be of water-tight character, and same regulation regarding thickness as XXX shingles.

No. 1.—No. 1 to be of a grade not specially up to, so as to be considered in, either of above grades, and to be sold by special agreement.

All Other Shingles.—All other shingles are culls, and their value is to be a matter of arrangement, if they have any market value.

HARDWOOD LUMBER.

INSTRUCTIONS FOR INSPECTION.

It is impossible to make rules that will govern every piece of lumber, there being no two pieces of lumber exactly alike. It is therefore expected that the inspector shall be a person of experience, and use his best judgment, based upon the general rules given, making no allowance for the purpose of raising or lowering the grades of a piece.

The inspector must not favor either the buyer or seller, but take lumber as he finds it, and pass each piece into the grade to which it belongs. Inspectors should examine all lumber on the poorest side, except flooring. All lumber must be measured in even lengths, excepting stock that is cut to order for special purposes, when it shall be measured for the full contents. Bark or waney pieces shall be measured inside the bark or wane. All tapering pieces will be measured one-third the length of the piece from the small end.

All badly cut lumber shall be classed as cull, or placed one grade below what it would be if properly manufactured. All lumber shall be sawed thick enough to meet the required thickness when seasoned. Lumber sawed for newels, columns, balusters, axles, or other specific purposes, must be inspected with a view of the intended use of the piece, and the adaptability for that purpose, as in most cases it cannot be utilized for other purposes. Heart pieces are excluded from all grades above cull. Worm holes are considered one of the most serious defects. Gum spots in cherry is a defect, and, if excessive, will lower the piece one or two grades. Warped, twisted, stained and stick-rotten lumber shall either be classed as cull, or mill cull and refuse.

The standard lengths of whitewood to be 12, 14 and 16 feet, admitting 10 per cent of 10 feet lengths; walnut and cherry, 10, 12, 14 and 16 feet lengths, admitting 10 percent of 8 feet; 8 feet to be admitted as No. 1 must be 12 inches wide and upwards; to grade as No. 2, 8 inches wide and upwards.

A standard knot must not exceed 1¼ inches in diameter, and must be sound. Log run shall be the unpicked run of the log, mill cull out. Lumber sold on grade, and without special contract will be measured according to these rules. The inspector will be required to keep a correct copy of all measurements, and give duplicate of same to both buyer and seller if required.

In all grades mentioned as combined in No. 1 and No. 2, all pieces less than 8 inches shall be considered as seconds.

BLACK WALNUT.

Combined grade of firsts and seconds, rejects and shipping culls.

No. 1.—No. 1, from 8 to 10 inches, shall be clear of all defects; 10 to 16 inches wide may have 1½ inches bright sap, or one standard knot; 16 inches wide and upwards may have 2 inches bright sap, or two standard knots showing on one side only.

Seconds.—Seconds, 6 inches wide and upwards, must be clear of all defects at 7 inches; at 10 inches will admit of 1½ inches sap or two standard knots; 10 to 16 inches wide will admit of 2 inches sap, or two standard knots; 16 inches wide and upwards may have 3 inches sap, or three standard knots; 12 inches wide and upwards will admit of a split, if straight, ⅙ the length of the piece, provided the piece be equal to No. 1 in other respects. Not over 10 percent of seconds will be taken with splits of the above character.

Rejects.—Rejects, 5 inches wide and upwards; at 7 inches may have 1 inch sap, or one standard knot; 7 to 12 inches wide may have 2 inches sap, or two sound knots; 12 to 18 inches wide may have 4 inches sap, or four sound knots; above 18 inches may have 5 inches bright, sound sap.

Shipping Cull.—Shipping cull will include all lumber not equal to the above that will average and work two-thirds its width and length.

CHERRY AND BUTTERNUT

Will be graded and inspected according to the rules given for black walnut, with the exception of gum specks in cherry. (See instructions.)

WHITEWOOD, COTTONWOOD OR BALM OF GILEAD

Will include the combined grade of first and seconds—No. 1 common, No. 2 common, or shipping cull. The combined grade of firsts and seconds shall not be less than 65 percent of No. 1.

No. 1.—No. 1 shall be 10 inches wide and upwards, and clear of all defects at 12 inches; 12 to 15 inches may have 1½ inches bright sap, or one standard knot showing on one side only; 15 to 18 inches may have 2 inches sap; 18 inches and upwards may have 3 inches sap, or two standard knots showing on one side only.

Seconds.—Seconds, 8 inches wide and upwards, clear of all defects at 9 inches; at 10 inches wide, may have one standard knot or a split not over 12 inches long; 15 to 18 inches wide may have two standard knots, or 3 inches bright sap; 18 to 22 inches may have three standard knots or 4 inches bright, sound sap.

No. 1 Common.—No. 1 common shall be 6 inches wide and upwards, bright, sound and clear sap, not a defect in this grade; 8 to 12 inches wide, may have three standard knots; 12 to 16 inches wide, four standard knots; 16 to 24 inches, five standard knots, or may have straight heart cracks not showing over one-quarter the length of the piece, if it has no other defect excepting bright sap.

No. 2 Common or Shipping Cull.—No. 2 common or shipping cull will include lumber with more defects than the No. 1 common. Pieces will be received where two-thirds of the piece will be available for use for rough manufacturing purposes; stained sap or other defects will be received in this grade; dozed and rotten sap, and other lumber, than as above named, will be classed as mill cull or refuse, and have no standard value.

BASSWOOD

Shall be inspected the same way as whitewood, cottonwood or balm of Gilead, with the exception that seconds will take lumber 6 inches wide and up.

ASH AND OAK

Shall be graded as firsts and seconds, and shall be 6 inches and over in width.

Boards or Plank.—Boards or plank 8 inches wide will admit of one standard knot or one defect; 10 inches and over wide will admit of two or more defects, according to the width of the piece; bright sap is not considered a defect.

Culls.—Culls include all width, lengths and sizes, except such stock as will not work one-half without waste. Other than the above are classed as mill culls and have no value in this market.

CHESTNUT

Shall be 6 inches and over in width, and clear up to 8 inches. Pieces 9 inches wide may have three standard knots; over 12 inches wide, four standard knots. This grade must be absolutely free from worm or pin holes. Culls shall constitute all lumber below the above grade that will cut one-half without waste.

SYCAMORE

Shall be inspected the same way as oak and ash.

HICKORY

Shall be inspected the same as oak and ash.

ROCK AND SOFT ELM

Shall be 6 inches and up wide, and up to 10 inches shall be perfect. Beyond that width shall take the inspection given to oak and ash.

HARD AND SOFT MAPLE

Shall be inspected for firsts and seconds in the same manner as oak and ash.

Clear Maple Flooring.—Clear maple flooring shall have at least one clear face, and two edges also clear.

Common Maple Flooring.—Common maple flooring shall be of the same general character as clear; may have one or two small sound knots of not more than ¼ of an inch in diameter, or a small wane on one edge, which will not injure it for working its full size without waste.

BIRCH

Shall have the same inspection as hard and soft maple, with the exception that sap is considered a defect more than in maple.

CHAPTER XVII.

ONTARIO—PERSONNEL.

In the preceding chapters which treat of the lumber history of the Province of Ontario, are many references to individuals; but the sequential character of most of the narrative, which relates to timber and lumber rather than to individuals, did not permit of specific reference to many persons who were prominent in the lumber industry and the operations of many of whom should have a place in any history of the lumber industry in Canada. This chapter, therefore, is devoted to a brief definition of the place of certain individuals, firms and companies in the lumber development of Ontario during the last hundred years. By no means all who should be included are mentioned and to those an apology is perhaps due, but the list includes those regarding whom data were immediately available.

As in the chapter devoted to the personnel of the Quebec industry, there is a certain co-mingling of interests. The Ottawa Valley includes sections of both Ontario and Quebec, the river forming, as it does, the boundary line between the two provinces. Some Ottawa lumbermen have had their chief holdings in Quebec waters, while some residing and having mills on the Quebec side of the river have had timber holdings in Ontario. From some standpoints the history of the Ottawa Valley, without regard to provincial lines, would have been more desirable; but the plan of the work made most desirable the present arrangement, which in this particular connection seems somewhat arbitrary. For one who would secure a comprehensive view of the Ottawa Valley as a whole it will be necessary to read the history of both provinces and the account of the personnel of each.

THE WHITE FAMILY.

The town of Pembroke, about one hundred and twenty miles up the river from Ottawa, was founded in 1828 by Col. Peter White, a native of Edinburgh, Scotland, who was for many years one of the principal timber merchants of the Ottawa Valley. His sons have been actively engaged in the lumber business and by their enterprise have done much to build up their native town. Hon. Peter White, born at Pembroke August 30, 1838, after receiving a business training from an Ottawa

mercantile firm, entered into partnership with his brother, Andrew T. White, now deceased, as A. & P. White, and for many years carried on an extensive lumber business which is still continued under the firm name. Mr. White is known best, perhaps, as an active politician. He was elected to Parliament in the Conservative interest for North Renfrew in 1874 and, with the exception of a brief interval, represented the constituency steadily until 1896. He was chosen Speaker of the House in 1891 and held that position during a parliamentary term, until 1896, in which year he was defeated in the general election. He carried the constituency again in 1904. Mr. White is a member of the Privy Council of Canada, to which he was called in 1897. He is a director of the Pembroke Lumber Company and is prominently identified with many local commercial enterprises. His brother and business partner, Andrew T. White, was also in public life and for some time represented North Renfrew in the Ontario Legislature.

WILLIAM MOHR.

William Mohr, a prominent figure in the early lumber trade of the Ottawa Valley, died at his home in the township of Fitzroy, near Renfrew, Ontario, in May, 1903, in the ninetieth year of his age. His operations were confined to the square timber trade. He took many rafts to Quebec, his transactions sometimes reaching 750,000 cubic feet in a season. He operated on the Quyon, Bonnechere, Petawawa, Du Moine and Madawaska rivers, where year after year he regularly made his trips to the shanties.

BOYD CALDWELL & CO.

The late Boyd Caldwell, of Lanark, Ontario, came to Canada from his native place in Renfrewshire, Scotland, in 1821 with his parents, when only three years of age. For about fifty years he was engaged in the export timber business, but in 1867 became more extensively concerned in the manufacture of woolen goods. Boyd Caldwell died in 1888. The firm of Boyd Caldwell & Co., of which he was the founder, is still extant, having recently been incorporated, with his son, Thomas Boyd Caldwell, as president. In addition to its extensive woolen mills the company operates a large planing and sawmill.

GILMOUR & CO.

Allan Gilmour, a member of a family that in the early days was extensively engaged in the square timber trade and is today prominently represented in lumber manufacturing, was born in Lanarkshire, Scotland, August 23, 1816. In his early youth he went to Montreal, where

he entered the employ of William Ritchie & Co., wholesale merchants. In 1840 he and his cousins, James, John and David Gilmour, assumed the business. Shortly afterward they engaged in the production of square timber for the Quebec market, and in 1853 Allan Gilmour took up his residence in Ottawa, which became the headquarters of Gilmour & Co. The firm acquired large sawmills on the Gatineau, Blanche and North Nation rivers, tributaries of the Ottawa, as well as steam mills at Trenton, on the Bay of Quinté. Allan Gilmour retired from business in 1873 and died in 1895.

THE COOKS.

George J. Cook, of the Cook & Bro. Lumber Company, was a brother of Herman H. Cook and was born August 22, 1824, in Williamsburg Township, Dundas County, Ontario. He was all his life actively engaged in the lumber business. His first operations, early in the '40's, were on the Nation River, from which they were transferred to Belleville and subsequently farther west. He was one of the first lumbermen to take out board pine in the country lying between Toronto and Barrie. The later operations of the company under his management have been in the Algoma district, where it owns extensive limits. Mr. Cook died August 21, 1902, and was succeeded as president of the company by his nephew, George W. Cook.

H. H. Cook is a son of George Cook. He built a mill at Midland, Ontario, in 1872, and during the next ten years built six others in various localities. Mr. Cook is at the head of the Ontario Lumber Company, of Toronto, and owns extensive limits on the French and Vermillion rivers.

THOMAS COLE.

The death of Thomas Cole, of Westboro, Ontario, in 1904, removed one of the pioneer lumbermen of the Ottawa Valley. Mr. Cole was born in Devonshire, England, in 1820. He went to Canada when still young, and was attracted to the lumber business, first locating at Papineauville, Quebec, taking out square timber. Some years later he became a partner of the late James MacLaren, of Buckingham, Quebec, J. C. Edwards and Daniel Cameron in a firm which acquired the Gilmour timber and sawmill interests on the Nation River. The firm did business at the North Nation mills until 1878, when, through the death of Mr. Cameron, the firm wound up its affairs. Mr. Cole left a wife, four sons and five daughters.

THE M'LACHLIN FAMILY.

The founder of the large lumbering business now carried on by McLachlin Bros. at Arnprior, Renfrew County, Ontario, was Daniel McLachlin, one of the pioneer lumbermen of the Ottawa Valley, who established it over sixty years ago. He was an important factor in the public and commercial life of his day and represented his constituency in the Canadian Parliament.

In 1853 Daniel McLachlin purchased the water powers at the mouth of the Madawaska River and the land on which the town of Arnprior now stands, and in 1857 moved up from Ottawa to Arnprior with his family. In 1866 he erected the first sawmill in that place to saw lumber for the American market. In 1869 he retired from business, leaving the work to be carried on by his three sons, Hugh, Frederick and Claude, under the style of McLachlin Bros. He died in 1872.

During the last quarter of a century McLachlin Bros. have cut an average of 60,000,000 feet per annum. The firm has operated for years on the Madawaska, Bonnechere, Petawawa, Kippewa and Black rivers and other tributaries of the Ottawa River, at present furnishing employment to about a thousand men.

Claude McLachlin died in New York April 19, 1903. He was the youngest son of Daniel McLachlin and was born at Ottawa in 1854.

THE CHARLTON BROTHERS.

Among the Canadian lumbermen who during the last generation or so have risen to prominence in public life, John Charlton, of Lynedoch, Norfolk County, Ontario, is easily foremost. Mr. Charlton, though an American by birth, is of British parentage. He was born in New York State, February 3, 1829, and went with his family to Canada in 1849. He established himself at Lynedoch and engaged extensively in lumbering operations.

Always keenly interested in social and political questions and a strong Liberal of the old school by conviction, he took an active part in politics and in 1872 was elected to the House of Commons for North Norfolk, a seat which he retained throughout all political vicissitudes until the last general election in 1904, when his failing health compelled his retirement from politics. Though a keen partisan, he held decided views of his own on many questions. He is the author of a measure usually known as the "Charlton Act for the Protection of Girls," and devoted much attention to the advocacy of commercial reciprocity between Canada and the United States. He was appointed by the British

government a member of the Joint High Commission which met at Quebec in 1898 to arrange disputes and remove obstacles to trade between the two countries. A volume of Mr. Charlton's speeches and addresses on various topics has been published.

Hon. William Charlton, brother of John Charlton, is a native of Cattaraugus County, New York. His earlier years were spent in Iowa, but in 1861 he made his home at Lynedoch, Ontario, and engaged in lumbering and mercantile business. He attained a leading position in the locality and took a prominent part in politics on the Liberal side. He was elected to the Provincial Legislature of Ontario, for South Norfolk, in 1891 and reëlected in several following contests. His thorough knowledge of the lumbering industry and the conditions prevailing in the backwoods contributed greatly to his usefulness as a legislator. In 1902 he was chosen Speaker of the House, occupying the position until the defeat of his party in the general elections of 1904. Mr. Charlton is a member of the firm of Pitts & Charlton, of Toronto.

WILLIAM MACKEY.

William Mackey was a prominent figure for over a half century in the lumbering trade of the Ottawa Valley. He came to Ottawa, then Bytown, from his native country of Ireland in 1842 and secured employment in the construction of the first government slide built at the Chaudiere, and was subsequently engaged in improvement work and lumbering on the Upper Ottawa under Hon. James Skead. In 1850 he went into business on his own account and about this time formed a partnership with Neil Robertson which lasted for twenty years and was terminated by Mr. Robertson's death. Their early operations were conducted in the Madawaska country at a time when the square timber trade was at its height. They made money rapidly until the depression set in. In addition to the square timber operations they had a sawmill on a limit at Amable du Ford. When they experienced some reverses Mr. Robertson wished to withdraw from milling operations and to give up his share in the limit as an unprofitable venture. Mr. Mackey's faith in the future of the industry, however, was unshaken, and he relieved his partner of any obligation as to this feature of their business and secured the entire control of the Amable du Ford limit. After the market recovered he took from the limit annually large quantities of timber and eventually disposed of it for $65,000. Mr. Mackey retired from active business in 1902 and sold out his limits and other lumbering property to J. R. Booth for $655,000. He died a few months afterward.

H. L. LOVERING.

H. L. Lovering, of Coldwater, Ontario, of English birth, began lumbering in October, 1850, on the present site of Port Severn, at the mouth of the Severn River. In 1852 he located at the head of Lake Superior and cut the first board manufactured on the site of the present cities of Duluth and Superior. In 1857, having returned to Ontario, he associated himself with A. R. Christie, of Port Severn. Since 1870 he has been with the Georgian Bay Lumber Company.

JOHN R. BOOTH.

John R. Booth, of Ottawa, Ontario, went there in 1852 and leased a small mill. He now owns about 4,250 square miles of timber limits—sufficient timber land to make a strip a mile wide reaching across Canada from the Atlantic to the Pacific. In one of his mills 600,000 feet of lumber is produced daily and between 1,500 and 1,600 men are given employment directly or indirectly.

Mr. Booth built the Canada Atlantic and the Ottawa, Arnprior & Parry Sound railways, with 400 miles of main line and 100 miles of siding. He also founded a line of steamers, built car shops and created other extensive interests. In 1904 he erected a pulp mill at the Chaudiere. Mr. Booth has also a distributing yard and planing mill at Burlington, Vermont.

ALEXANDER FRASER.

Alexander Fraser, of Ottawa, one of the leaders of the square timber trade, was the son of Hugh Fraser, a Highlander who served in the War of 1812 and afterward settled at a point near Ottawa, where Alexander was born in 1830. He embarked in the lumbering industry and in 1853 took out his first raft of square timber on Black River. His career was successful from the start, and his operations rapidly increased until during the '70's he had frequently a dozen or so rafts simultaneously on the way to market. He was known from the headwaters of the Ottawa to Quebec. He was a man of great energy and determination of character, was possessed of a keen foresight and sound business judgment and often by tacit consent was accorded a leading part in the management of large enterprises in which he was interested. He was one of the founders of the Bank of Ottawa, the Lachine Rapids Hydraulic Company and the Ottawa Trust & Deposit Company and was also heavily interested in the Upper Ottawa Improvement Company and the Keewatin Lumber Company.

Mr. Fraser sustained great reverses from time to time, but his

strong financial standing enabled him to bear them easily. In 1895, upon his retirement from active business, his sons, J. B. and W. H. A. Fraser, organized the Fraser Lumber Company. Mr. Fraser died June 1, 1903, aged seventy-three years.

HON. ERSKINE H. BRONSON.

Hon. Erskine Henry Bronson, of Ottawa, was born at Bolton, New York, in 1844. His father, Henry Franklin Bronson, moved to Ottawa, then Bytown, in 1853, and built on Victoria Island, in the Ottawa River, the first sawmill which shipped lumber from Ottawa to the American market. The venture prospered and grew and many fortunes were made in the trade. At the age of twenty-one the younger Bronson entered his father's business, familiarizing himself with all of its details. In 1867 he was given an interest in the business, which was afterward incorporated as the Bronson-Weston Lumber Company. The cut for twenty years averaged 50,000,000 feet of lumber annually and one season it amounted to 85,000,000. The mill went out of operation in 1898, but the company still owns large areas of timber lands. Mr. Bronson is president of several industrial companies. He represented Ottawa in the Provincial Legislature of Ontario between 1886 and 1898, and for some years was a member of the Liberal administration.

ROBERT STEWART.

Robert Stewart, of Guelph, Ontario, located there in 1855, and is now the owner of one of the largest plants in Ontario manufacturing sash, doors and trim.

THE M'ARTHUR BROS. CO., LIMITED.

This concern was composed originally of John, Alexander and Peter McArthur, of whom only the latter survives. For nearly a half century they conducted a manufacturing business in board pine, in western Canada and Michigan. Their head office was in Toronto, with branches in Montreal and Quebec. They held valuable timber limits in various parts of Canada, and still have important interests in this respect, as well as others in gold, silver, lead and copper, both in Canada and in the United States. The firm still manufactures timber for the Quebec market, its product being handled by The McArthur Export Company, in Quebec City. Its specialty, board pine, has been always recognized as superior and is well known in all consuming countries.

The eldest brother of the family, Archibald McArthur, with his sons, is engaged, in a limited way, in the manufacture of mixed varieties of

square timber for the Quebec market, at Lancaster, Glengarry County, Ontario, where the Canadian branch of the family originated.

Under the name of The McArthur Bros. Co., Limited, Peter McArthur conducts a large enterprise in lumber in Detroit, Michigan.

THE RATHBUN COMPANY.

Edward Wilkes Rathbun, late president of the Rathbun Company, of Deseronto, Ontario, was born in 1842 at Auburn, New York. During his youth his father, Hugo B. Rathbun, left the United States to engage in the lumbering industry in eastern Ontario. He started a small sawmill at Mill Point, now the town of Deseronto, on the Bay of Quinté.

E. W. Rathbun, after having received a first-class business training in New York, joined his father. The industry soon attained large proportions and expanded in many directions. In 1884 it was incorporated as the Rathbun Company, with E. W. Rathbun as president. The company established sawmill plants at Gravenhurst, Lindsay, Campbellford, Tweed, Bancroft, Fenelon Falls and Manitoulin Island. Other branches of industry were added and operated from time to time as auxiliaries, either by the Rathbun Company or other corporations closely affiliated with it and controlled by Mr. Rathbun. These included a sash and door factory doing a very large export trade, charcoal kilns to utilize the by-products of lumbering, cement works, etc. The Rathbun Company is also in the lumber and coal carrying trade, owns a dry dock and ship yard and has extensive car shops. The stockholders are proprietors of the Bay of Quinté railway, eighty-four miles in length. These and other diversified industries aid each other and have built up a flourishing industrial community. The company owns about 350,000 acres of government timber limits in addition to 60,000 acres of timbered land in fee simple.

Mr. Rathbun was a firm believer in the necessity of conserving the forest as a permanent source of supply, and the extensive limits under his control were worked on economical principles with a view to avoiding waste and preserving the younger growth of trees with an eye to future requirements. He had made a close study of the question, and was appointed a member of the Ontario Forestry Commission in 1897, in which capacity he brought his practical experience as a lumberman to bear upon the problems submitted. The report of this body had an important influence upon the policy since pursued by the Government.

Mr. Rathbun, who died November 24, 1903, was a many-sided man

of tireless energy and liberal culture, and took a keen, practical interest in all public questions.

THE HURDMAN FAMILY.

Robert Hurdman, of Ottawa, was the youngest and surviving member of the original Hurdman family, consisting of five brothers, William, Charles, John, George and Robert, who were prominently identified for a half century with the lumber trade of the Ottawa Valley. Their father was Charles Hurdman, who emigrated from Ireland in 1818, and settled in Hull Township.

Robert Hurdman was born in 1830, and in connection with his brothers operated extensively in the square timber trade on the Petawawa River, Ontario, their first operations being in 1866. In 1872 limits were purchased in the Kippewa district, and in 1879 they began to get out logs on contract for the mill owners, in the same year forming the partnership of Sherman, Lord & Hurdman. The firm operated the old Crannell mill in the Chaudiere district, the logs being cut by the Hurdmans on their limits. A limit was also purchased that year in the Coulonge district. Several changes and reorganizations in the personnel and style of the partnership subsequently took place. In 1886 the name was R. Hurdman & Co., Mr. Hurdman acting as manager of the mills. The concern afterward embraced other interests and in 1891 became the Buell, Orr, Hurdman Company. Mr. Hurdman, however, had large lumbering interests outside of the company's operations and dealt extensively in timber limits, accumulating considerable wealth. He entered into partnership with the Shepard & Morse Lumber Company, of Boston, to operate his limit in the Kippewa district. After the dissolution of this partnership he purchased limits from the Bronson Company, at Deep River, which he sold to Fraser & Co. A few years ago Mr. Hurdman bought from R. H. Flock & Co. the limits at Ross Lake in the Kippewa district which he operated with the help of his son until the time of his death. He died May 4, 1904, aged seventy-four years.

HON. WILLIAM C. EDWARDS.

Hon. William C. Edwards, of Ottawa, is the son of William Edwards, who came from England to Canada in 1820 and settled in Clarence Township, Russell County, Ontario, where Senator Edwards was born May 7, 1844. He established in 1868 the firm of W. C. Edwards & Co., the transactions of which have been large and successful. In addition to his lumber interests Mr. Edwards devotes a good deal of

attention to stock raising and agriculture. Entering the political field as a Liberal, he was elected to the House of Commons in 1887, and in 1903 was appointed a member of the Senate.

ROBERT LAIDLAW.

Robert Laidlaw, of Toronto, has always been identified with the lumber industry, and in 1871, in partnership with Thomas Shortreed, purchased some timber in Barrie Township, Simcoe County, Ontario, where he operated until the timber was exhausted. In 1886 Mr. Laidlaw established wholesale and retail yards at Sarnia, Ontario, and Buffalo, New York. He is also a member of the R. T. Jones Lumber Company of North Tonawanda, New York.

GILLIES BROTHERS.

The business of Gillies Bros. Company, Limited, was founded in 1873, by James, William, John and David Gillies, sons of the late John Gillies, who at one time carried on extensive lumbering operations at Carleton Place, Ontario, in partnership with Peter MacLaren. The Gillies brothers bought a sawmill plant at Braeside, Ontario, which has been enlarged and improved until at the present time they manufacture about 40,000,000 feet of lumber yearly, in addition to their output of shingles, lath, etc., giving employment to about a thousand men in the mills and the bush. They hold about one thousand miles of timber limits, partly in Ontario and partly in Quebec, on the Coulonge, Petawawa and Montreal rivers and Lake Temiscamingue. For the last thirty-five years the greater portion of their output has found a market in the United States. James Gillies is president of the company and is also head of the John Gillies Estate Company, manufacturer of gasoline launches and sawmill machinery at Carleton Place.

GEORGE M'CORMACK.

George McCormack, of Orillia, Ontario, was born October 12, 1850, at Lochaber, Ottawa County, Quebec, of Irish and Scotch descent. Having in his youth acquired a thorough knowledge of the lumber trade in the Ottawa Valley, he transferred his operations to the then little known region of Parry Sound, which offered a promising field. He displayed much foresight and energy, and his trade rapidly extended. For many years he was in partnership with the late Angus McLeod under the name of McCormack & McLeod until the death of the latter in 1903. In addition to his operations in northwestern Ontario, Mr. McCormack has large interests in the lumber trade of British Columbia. He is a Conservative in politics and takes an active part in

public life. He entered the House of Commons in 1896 as representative of the Muskoka and Parry Sound district and was a member during two terms.

GEORGE H. PERLEY.

George H. Perley, of Ottawa, is the son of William G. Perley, one of the pioneer lumbermen of the Ottawa Valley. His native place is Lebanon, New Hampshire, and the date of his birth September 12, 1857. His business career began with his admission to the firm of Perley & Pattee, of which his father was the senior partner. At present he is head of the firm of G. H. Perley & Co., vice president of the Hull Lumber Company, and is also actively concerned in other industrial undertakings.

Mr. Perley is a public-spirited citizen and has taken an active part in charitable enterprises. He was chairman of the relief fund which distributed nearly a million dollars to the sufferers of the Ottawa fire in 1900. In politics he is a Conservative and on three occasions was nominated as candidate of that party for the House of Commons, being returned in 1904 as member for Argenteuil, Quebec.

JOHN B. MILLER.

John B. Miller, of Toronto, president of the Parry Sound Lumber Company, is a native of Athens, Leeds County, Ontario, and was born July 26, 1862. His father was John Clausin Miller, at one time Superintendent of Woods and Forests for Ontario, and subsequently a lumber operator. At an early age Mr. Miller was associated in the business with his father, upon the death of whom in 1884 he succeeded to the presidency of the Parry Sound Lumber Company, which does a very extensive business. He is also largely interested in manufacturing, being joint owner of the Polson Iron Works, of Toronto, and is a prominent figure in the commercial life of the city. In February, 1905, he was elected president of the Lumbermen's Association of Ontario.

JOHN BERTRAM.

On November 28, 1904, Canada lost one of its foremost citizens in the person of John Bertram, who died from an operation for appendicitis at his home in Toronto. He was a man of splendid business ability and sterling integrity. Though prominent in many other spheres of activity he was, perhaps, more closely identified with the lumber industry than with any other. He was a Scotchman by birth, and arrived in Canada in 1860 when twenty-three years of age, settling at Peterboro, Ontario, where he engaged in the hardware trade. He moved to

Toronto in 1878, embarking in the wholesale branch of the business. About this time he began extensive lumbering operations in connection with the Collins Inlet Lumber Company, of which he was president, having large limits on the Georgian Bay with sawmills at Collins Inlet.

He was eminently successful as an operator, and was a noted advocate of forest preservation. His own operations were conducted on economical principles with an eye to the future productiveness of his limits, and utilized to the best possible advantage not only the pine but the hardwood growth. Owing to his practical knowledge of forest conditions, of which he had made a life study, in 1897 he was appointed a member of the Ontario Forestry Commission to report on the subject of restoring and preserving the growth of white pine and other timber trees upon lands in the Province which are not adapted to agricultural purposes or to settlement. The valuable report of this commission practically inaugurated a new era in forest administration. Its recommendations were adopted by the Government, and a large area of land was added to the forest reserves. He was an active and valued member of the Canadian Forestry Association and the author of several masterly papers on forestry subjects.

Mr. Bertram was largely interested in the Bertram Engine Works Company, of Toronto, of which he became president in 1900. His last field of public usefulness was as chairman of the Dominion Transportation Commission. He was appointed to that office October 27, 1903. Under his leadership the commission had collected much valuable information, when ill health terminated his tenure of office. A widow and a family of seven survive him.

NATHANIEL DYMENT.

A lumber operator since the time of his youth is Nathaniel Dyment, of Barrie, Ontario. His first operations were in Ancaster and Beverly townships, Wentworth County, and subsequently he built a number of mills on the Great Western railway. In 1886 the firm of Mickle, Dyment & Son was organized, with mills at Gravenhurst, Severn Bridge and Thessalon, Ontario, with an annual output of 35,000,000 feet.

ELIHU STEWART.

Elihu Stewart, Superintendent of Forestry for Canada, was born in Sombra, Lambton County, Ontario, November 17, 1844. He was admitted as a Dominion land surveyor in 1872, and was extensively engaged in Crown surveys both in Ontario and the Northwest Territories. He resided for some time in the town of Collingwood and took

an active part in municipal and political affairs. He was elected mayor of the town in 1896, and during the same year unsuccessfully contested North Simcoe in the interest of the Liberal party.

In 1899 he was appointed Superintendent of Forestry, owing to his wide knowledge of the requirements of the Northwest, where extensive operations in tree planting have since been carried on under his direction with the best results. Since the work has been undertaken its scope has been greatly increased. During the years 1901–1904 upward of 3,200,000 trees, distributed by the Government, have been planted by the farmers in the prairie country. Over half of these trees were set out in 1904.

AUBREY WHITE.

Aubrey White, Assistant Minister of Lands and Mines for Ontario, was born at Lisonally House, Tyrone County, Ireland, March 19, 1845, and received his education in that country. He came to Canada in 1862, and for some years was engaged in the lumber business in the Muskoka district. In 1876 he entered the service of the Government as a forest ranger and some years later was appointed clerk of the Woods and Forests Branch. Recommendations made by him to the Provincial government resulted in the adoption of the fire-ranging system, which was established in 1885, and, having subsequently been greatly extended, has done much to check the ravages of forest fires.

In 1887 Mr. White was advanced to the post which he now holds in what was then known as the Department of Crown Lands. During successive administrations he has taken a prominent part in the shaping and carrying out of their timber policies and the effecting of such changes in the regulations as were rendered necessary by the development of the Province. Mr. White is a leading Free Mason and a prominent member of the Canadian Forestry Association.

THOMAS SOUTHWORTH.

Thomas Southworth, director of Forestry and Colonization for Ontario, was born in Leeds County, Ontario, in 1855, of American parentage, and is a direct descendant of one of the Pilgrims who came over in the *Mayflower*. He was for many years engaged in journalism as editor and manager of the Brockville *Recorder*. In 1895 he was appointed Clerk of Forestry. Previous to his appointment the duties of the position had been merely of an educational and advisory character, but, owing to the growing urgency of the question, the scope of the office was greatly enlarged and it was put upon a practical basis in con-

nection with administrative work. To the investigations undertaken by Mr. Southworth, and the data and suggestions presented by the Bureau to the Government, the establishment of the system of extensive forest reserves in the wooded regions of New Ontario is mainly due. Mr. Southworth was a member of the Royal Commission which in 1897 reported on the subject in favor of the setting apart of forest reserves. Latterly he has been entrusted with the direction of colonization movements in the newer parts of the Province.

CHAPTER XVIII.

NEW BRUNSWICK—TIMBER HISTORY.

Although the landing of DeMonts, the French pioneer, in the present harbor of St. John, New Brunswick, June 24, 1604, is annually celebrated in the Canadian Province, the progressive history of New Brunswick dates from the time of the influx of loyalists from the United States in 1783. They were known as the United Empire Loyalists; and, so great was their love for their King and royal traditions, they left the United States after the successful issue of the Revolution again to find a home under British rule on the American continent.

On their arrival at St. John they found a country covered with pine, spruce, fir and hardwoods, and almost unscarred by the ax. They found the River St. John and other streams penetrating, with their tributaries, this magnificent timber. The River St. John, it is true, rises in Maine, but the greater part of its channel lies within the present Province of New Brunswick. Another portion of the stream forms the boundary between the New America to which the loyalists had come and the old new America which they had left. They recognized the importance and value of the St. John as a waterway, and even to this day it brings to the City of St. John large numbers of logs from both Maine and New Brunswick.

The Province of New Brunswick embraces 27,985 square miles. The principal timber territory is traversed by the Tobique and smaller streams which empty into the St. John, the Miramichi, the Nepisiguit and the Restigouche. These are the principal log-floating streams in New Brunswick. The Province contains 17,910,400 acres, of which about 7,500,000 acres remain in the hands of the Crown and may be considered timber lands. Of these about six million acres are under license to lumber operators and many have been denuded of the more valuable and larger timber, though still capable of being profitably operated. The remainder of the Crown lands, about 1,500,000 acres not under license, is in the interior of the Province and is almost in its pristine condition. In addition to the timber on the public lands, there is much valuable timber on lands held by private owners. In particular the 1,647,772 acres granted to the New Brunswick railway as a bonus

includes some of the finest timber land in the Province, stretching from the southwest Miramichi waters across the Tobique Valley to the head waters of the Restigouche. It is leased by the company to lumber operators and yields a large annual cut. Alexander Gibson, one of the largest operators, owns 200,000 acres of forest land and other individuals hold the fee simple of extensive tracts, so that the total area of forest land is at least ten million acres. Some authorities put the figure considerably higher; Lieutenant Governor Jabez B. Snowball, an expert in the lumber trade, estimates the total forest area at about twelve million acres, but as this apparently includes large tracts which have been stripped of timber by fire and by the ax, the former estimate probably includes all the land at present available for lumbering operations.

Spruce is the predominant tree and, although wherever operations have been carried on the heavier spruce is pretty well cleared off, there is still an abundance of ordinary sized trees. The merchantable pine is nearly exhausted, but in many localities a flourishing young growth is springing up which, if protected against fire, will form a valuable future source of supply. Along the north shore there is a belt of hardwood comprising oak, beech and maple. Of the total forest area 60 percent is estimated to be spruce land, 10 percent pine, 5 percent hemlock, 5 percent cedar and 20 percent hardwoods, which latter consist principally of birch, beech, ash and maple.

The original timber growth of the Province was white pine and red pine principally, but the proportion of these woods has been much reduced by cutting. Spruce is now the principal article of local manufacture and foreign export and owing to its availability and rapid growth it enjoys a favor equal to, if not greater, than that of pine. White spruce and black spruce predominate and smaller quantities of red spruce, hemlock, balsam, fir and white cedar are also present. Among the hardwoods are the red, yellow and white birches, the hard and soft maples, ash, white, red or black, beech and American elm, generally distributed, and butternut and basswood in the southern part of the Province. Red birch and yellow birch form the greatest hardwood wealth and much white birch is cut for spool stock.

New Brunswick has from the earliest days been a great lumbering section, the industry being favored by the geographical position of the Province and its physical conformation, which presents special facilities for the shipping and marketing of its forest product. It is surrounded

on the southeast and partly on the north by water, giving a seaboard of 545 miles. There are two great river systems, the St. John and the Miramichi, with another important one, the Restigouche, and numerous smaller rivers which, with lakes, intersect the Province in every direction, affording abundant facilities for floating timber from the interior to the coast. In addition to these natural highways New Brunswick claims to have a larger railway mileage in proportion to population than any other country.

As early as 1778 the magnificent timber on the St. John River attracted British enterprise and capital. In 1781 Jonathan Leavitt launched at St. John the pioneer vessel of the fleet of New Brunswick built ships which subsequently sailed from that port.

The territory was at that time a portion of the Province of Nova Scotia. It was set apart as a separate province in 1785. Up to that time it was but sparsely settled, the population being composed mainly of a few Acadians and some straggling settlers from New England attracted by the profits promised by the timber or the fish trade. But the population was being increased by an influx of United Empire Loyalists who had taken the side of Britain during the Revolutionary War and felt compelled in consequence to seek homes outside of the United States. European immigrants also came in large numbers, the principal attraction being the opportunities afforded by the growing timber industry, which was greatly increased by the demands of the British navy. The ships which left New Brunswick with cargoes of timber returned laden with immigrants, many of whom passed on to the United States. Those who remained in the Province and took up land, however, were greatly aided financially by the market afforded for their produce by the lumberman and the timber merchant.

W. O. Raymond, LL. D., writing in the *St. John Telegraph* on "Early History of New Brunswick Families," says concerning the first sawmill in New Brunswick:

"The reference to a mill, built by the brothers Louis and Mathieu d'Amours in the neighborhood of Fort Nashwaak, may serve to explain the statement of Villebon in 1696, that he had caused planks for madriers, or gun platforms, to be made near the fort. This mill at any rate antedates by the best part of a century the mill built by Simonds & White at St. John in 1767 and that built by Colonel Beamsley Glasier's millwrights at the Nashwaak in 1768. Doubtless it was a very primitive affair, but it sawed lumber, and was in its modest way the pioneer of

the greatest manufacturing industry of New Brunswick at the present day."

In 1790 there were two sawmills of a primitive design in St. John. In 1822 a steam engine and boiler were imported from Birmingham and the first steam sawmill was started, the first output being shipped the same year to Cork, Ireland. Thereafter the number of sawmills increased rapidly and the item of sawn lumber began to assume a prominent position in the table of exports.

The noted Miramichi forest fire occurred in 1825. It had been a summer almost without rain and, when autumn came, the woods were as dry as tinder. Fires from numerous causes originated in many places in the forest and columns of smoke enshrouded the earth in the darkness of twilight. The danger did not become great, however, so long as the air was still. On the night of October 7, 1825, a strong wind arose and fanned the flames into fury. A local historian has thus described it:

> At eight o'clock the wind increased to a swift hurricane from the west and soon afterwards a loud and appalling roar was heard, with explosions and a crackling like that of discharges of musketry. The air was filled with pieces of burning wood and cinders, which were driven along by the gale, igniting everything upon which they fell. The roaring grew louder and sheets of flame seemed to pierce the sky. The people ran hither and thither, some gave up in despair, some took refuge in the river, domestic and wild animals mingled in the general rush for safety. In the space of a single hour the fire swept over the district north of the river, destroying everything in its path. The sweep of the fire in northern New Brunswick extended for one hundred miles and covered an area of 6,000 square miles.

The crowning catastrophe came when the conflagration swept away within an hour Newcastle, Douglastown and other villages on the northern side of the Miramichi River. Of five hundred buildings only twenty-five remained, and the ships in the harbor were burned.

The fire was not confined to this district. It devastated the whole country from the Bartibogue to the Nashwaak, a distance of more than one hundred miles, and crossed the upper Tobique Mountains one hundred miles distant in another direction. The total area laid waste was about six thousand square miles and the loss of timber at the low estimate then placed upon it was reckoned at £500,000. The effects of this disastrous fire were seriously felt by the trade for many years afterward.

EARLY LUMBERING METHODS.

The following description of the methods of lumber manufacture employed at an early period, taken from the "Account of the Province

of New Brunswick by Thomas Baillie, Esq.," in 1832, will be of interest. Mr. Baillie was surveyor general. The work was written mainly for the benefit of future immigrants.

Mills for sawing lumber are our principal and largest branches of industry. The proper dimensions of the building are sixty feet long, forty feet broad and about twenty feet in height to the roof. The usual expense of the whole undertaking, including the dam, is seldom less than £1,000, provided the river be large. In this country, wood and water being so abundant, steam and iron are not likely to prove profitable when the former materials can be used.

Labor is so exceedingly high that mills are constructed in a very simple manner, substituting great power for complicated machinery, and no fault could possibly be found with such an economical arrangement, provided the power remained at its usual maximum. But during the summer months and in the depth of winter the water, which is generally so abundant, becomes so much reduced in quantity and the machinery is then in want of sufficient power to continue in operation. The simplicity of the machinery and its being made of wood admit, in the scarcity of millwrights, of the repairs being at any time effected by the millers themselves, at which they are exceedingly expert. The difficulty attending iron machinery in the event of accidents would be irreparable, for, considering the remote situations of mills, an engineer could not possibly be obtained in sufficient time to prevent delay.

Sawmills are worked with undershot water wheels, carrying a crank to which is applied a connecting rod giving motion to the saw. One saw in a frame is universally considered more advantageous than gangs, owing to the acceleration of the motion. The part of the machinery which causes the log to advance to the saw and to carry it back is equally simple and prodigal of water. . . .

The sawmills manufacture boards one inch thick from the white pine, the spruce and the hemlock for the consumption of the Province, and the former article also for the West Indies. Heretofore they have been principally employed in the sawing of deals from the white and red pine and a few from spruce for the British market, but the latter trade has sustained so severe a shock from the low state of the home market that the mills would have gone to decay had not the West Indies at one period held out some inducement to manufacture boards. The raw material is obtained from the Crown lands under a license for which a duty of two shillings and six pence for every thousand superficial feet of one inch in thickness is paid to the Crown.

The writer proceeds to show how the sawmills have always been the pioneers of settlement and gives the rate of wages prevailing at that period as follows: For first-class millmen, £6 per month; second class, £4 10s; laborers, £3 to £4 10s. Men in the woods received £4 per month with board. "With charges so heavy as these," concludes Thomas Baillie, Esq., "it is perfectly impossible for our mill owners to compete with the Americans." Nevertheless, as the figures previously quoted show, the trade continued to flourish as the depression in the British market passed away and the demand from that quarter again became active.

Shipbuilding formed at this time an important industry. In the earlier days many of the vessels built in the Province were defective, being built by contract for from £4 to £7 per ton. In 1840 an effort was made with some success to improve the standard by a rigid system of inspection. For many years the abundance and good quality of timber gave New Brunswick a notable advantage in shipbuilding.

In the early days of the Nineteenth Century many people were disposed to regard the lumbering industry somewhat unfavorably, as an obstacle to the agricultural development of the country and as a frequent cause of demoralization to the men engaged in it. Complaints of this sort are frequently met with in the descriptive works of the writers of the period. Joseph Bouchette, surveyor general of Lower Canada, in a work dealing with the British American colonies, published in 1832, in speaking of the northern region of the Province, says:

"The quantities of timber that have been felled, squared and taken from this part of the country are enormous and yet no one industry presents so few symptoms of improvement. The pursuit of lumbering (perhaps a necessary evil in colonizing a wilderness) seems indeed of a demoralizing tendency, sometimes depriving its followers of the inclination and even capability for consistent and steady industry."

Another writer, J. McGregor, in his "Historical and Descriptive Sketches of the Maritime Colonies of British America," published in 1828, gives a very vivid description of the hardships and discomforts of a lumberer's life and the primitive camp arrangements then in vogue:

They commence by clearing away a few of the surrounding trees and building a camp of round logs, the walls of which are seldom more than four or five feet high, the roof covered with birch bark or boards. A pit is dug under the camp to preserve anything liable to injury from the frost. The fire is either at the middle or at one end, the smoke goes out through the roof, hay, straw or fir branches are spread across the whole breadth of the habitation, on which they all lie down together at night to sleep with their feet next the fire. When the fire gets low he who first awakes or feels himself cold, springs up and throws on five or six billets and in this way they manage to have a large fire all night. One person is hired as cook, whose duty it is to have breakfast ready before daylight, at which all the party arise, when each man takes his "morning," or the indispensable dram of raw rum, before breakfast. The meal consists of bread, or occasionally potatoes, with boiled beef, pork or fish and tea sweetened with molasses. Dinner is usually the same, with pea soup instead of tea, and the supper resembles the breakfast. These men are enormous eaters and they also drink great quantities of rum, which they scarcely ever dilute.

After describing the rafting of timber down stream in the spring, and its attendant hardships, the writer goes on to say:

No course of life can undermine the constitution more than that of a lumberer or raftsman. The winter snow and frost, although severe, are nothing to endure in comparison with the extreme cold of the snow water of the freshets in which the lumberer is day after day wet up to the middle and often immersed from head to foot. To stimulate the organs in order to sustain the cold these men swallow immoderate quantities of ardent spirits and habits of drunkenness are the usual consequence. Their moral character with few exceptions, is dishonest and worthless. Premature old age and shortness of days form the inevitable fate of a lumberer. After settling and delivering up their rafts, they pass some weeks in indulgence, drinking, smoking and dashing off in a long coat, flashy waistcoat and trousers, Wellington or Hessian boots, a handkerchief of many colors round the neck, a watch with a long chain and numberless brass seals and an umbrella.

The picture is a strong one, and that there were exceptions to the rule of profligacy and that the sad fate of the lumberer was not inevitable, the author a little further on admits in giving instances of young men who, by saving their earnings in lumbering on the Miramichi, were enabled to purchase farms, or became principals in the lumber business.

CHAPTER XIX.

NEW BRUNSWICK—FOREST LEGISLATION.

As in the other provinces of Canada, so it was in New Brunswick—the home Government early sought to regulate the timber wealth. England always thought much of her naval greatness and sought to assure in her North American colonies a sufficient supply of white pine for masting for her ships. Thomas Baillie was appointed surveyor general in 1824, receiving the following explicit instructions:

Whereas we have been graciously pleased to give instructions unto our right trusty and right entirely well-beloved cousin and counsellor, George, Earl of Dalhousie, Captain General and Governor-in-Chief in and for our Province of New Brunswick in America, for the regulation of his conduct in granting lands to our loyal refugees, who have taken refuge in that Province, and others who may become settlers therein, and amongst other things to signify our will and pleasure that no grant whatever be made of lands within our said Province until our Surveyor-General of the Woods, or his Deputy lawfully appointed shall have viewed and marked out such districts within our said Province as reservations to Us, our Heirs and Successors, as shall be found to contain any considerable growth of masting, or other timber fitting for the use of our Royal Navy; and that our Surveyor-General of Lands in our said Province shall not certify any plots of lands ordered and surveyed for any person or persons whatsoever, in order that grants may be made out for the same until it shall appear unto him by a certificate under the hand of our Surveyor-General of the Woods, or his Deputy, that the land so to be granted is not part of or included within any district marked out as a reservation for Us, our Heirs and Successors, as aforesaid for the purpose before mentioned.

It is therefore our will and pleasure that and you are hereby authorised and empowered to give license in writing to any of our subjects in our Province of New Brunswick, to cut down such white pine and other trees growing upon the waste land which you shall judge to be not proper for the use of our Royal Navy.

INVESTIGATION OF 1833.

In 1827 the sale of limits by auction instead of by fixed fees was instituted, any purchase to be limited to a maximum of 1,200 acres to one person. Subsequent regulations in 1829 ordered a survey before sale and sought to prevent unnecessary waste in the cutting of timber. The receipts from timber limits in 1831 were £10,820. Joseph Cunard had been granted in 1831 a reservation for ten years on the Nepisiguit River above the falls on condition that he would improve the waterfall and secure a license to cut one thousand tons of timber per annum.

This arrangement created criticism and, together with other complaints, brought about an investigation of timber administration, and a committee of the legislative assembly was appointed in 1833 to make an investigation. At this investigation it appeared that it was the custom to receive from April of one year to May 1 of the following year applications for timber berths from all persons indiscriminately, so long as they were accompanied by a fee of forty-five shillings. On the latter date the applicants were notified whether their applications had been accepted or rejected. If there were two or more applicants for one piece of land all were rejected but one and the lucky man was given three months in which to pay the dues, amounting to 1s per ton for white pine and 1s 3d for red pine. In addition there was a tax of 3d per ton for expenses of survey. Mill reserves might be obtained by the same method, but in 1833 a new regulation made it necessary to secure these mill sites by public auction.

In 1837 the home Government assigned to the Provincial government the regulation of Crown lands and the enjoyment of revenues therefrom. New regulations were adopted providing for five-year licenses and dues of 2s on white pine and 2s 6d on red pine.

The average cut of New Brunswick for the years 1835, 1836 and 1837 was 116,600 tons of timber (16,820,000 feet of lumber) and the dues were £16,416. The average annual export of pine and birch timber during the same period was 249,926 tons, of masts and spars 619 and of deals 73,250,423 feet.

The following table showing the growth of the industry is given in Dr. Abraham Gesner's work on New Brunswick, published in London in 1847:

Year.	Sawmills.	Values.	Persons employed.
1831	229	£320,000	3,798
1836	320	420,000	4,200
1840	574	740,000	7,400
1845	640	900,000	8,400

The shipments from St. John in 1822 were: Pine timber, 79,122 tons; birch timber, 7,520 tons; masts and spars, 2,147; poles, 383; lathwood, 10,047 cords; boards, planks and deals, 8,277,000 feet; staves, 2,392,000 pieces; shingles, 2,842,000 pieces; shooks, 268 bunches. In 1832 the exports from St. John of deals, boards and scantling had increased to 22,000,000 feet; in 1842, to 43,000,000 feet, and in 1852, to 186,314,000 feet. Then came reverses followed by a period of depression which lasted several years, but in 1872 the shipments under this head stood at 236,639,000 feet.

During the early '40's the trade in sawn lumber, which had been rapidly increasing while that in square timber had been falling off, began to take the lead in volume and importance. In 1835 the square timber trade was far in advance, the values of the exports of forest products for that year being: Square timber, £291,817; boards, £13,437; deals, £104,150; staves, £12,969. For 1839 the returns of exports from the port of St. John giving quantities as well as values (in returns from other ports quantities are not specified) were as follows: Square timber, 255,647 tons, value £277,998; boards, 6,622,000 feet, £16,641; deals, 75,969,000 feet, £189,252; staves, 1,858,000, £8,318. Six years later the sawn lumber exports considerably exceeded the shipments of square timber, the following being the returns for 1845 from St. John: Square timber, 244,846 tons, £275,451; boards, 10,537,000 feet, £26,342; deals, 127,860,000 feet, £319,650; staves, 1,008,000, £4,536; total, £625,979. The values above given, it may be noted, are in sterling money, the pound sterling being a trifle under $5. The "pound" of the old Canadian or Halifax currency is equivalent to $4 and in these old records it is not always clear which is meant.

The contributions of the lumber industry to the public revenue were comparatively insignificant until the middle of the century. The receipts of the Provincial government on account of timber in 1849 were £1,821, omitting fractional currency; in 1850, £2,304; in 1851, £1,851 and in 1852, £5,256 (probably Halifax currency). In 1853 an attempt was made to put the industry on a more conservative basis and to give limit holders a guarantee of permanency of occupation. Previous to that time it appears to have been the practice to submit all the holdings to public competition every year, with the obvious result of encouraging production, each licensee being anxious only to realize as much as possible from a limit that might pass into other hands in a few months. Accordingly the upset price of mileage was advanced from 10 shillings ($2) to 20 shillings ($4) per square mile with a proviso for renewal for three years in case as much as $10 per mile were paid. The report for that year of Surveyor General R. D. Wilmot refers as follows to the change:

> Great complaints having been made by those engaged in the lumber trade that the practice of annually putting up all the timber berths to public competition bore injuriously as well on the trade as on the revenue, the expense incurred in building camps, erecting dams, cutting roads and other matters incident to the business being so great that they would prefer paying an increased rate of mileage if they could thereby secure the right of renewal for a longer period than one year. The

Government, in order to meet in some degree the views of the lumbering interest, determined to offer the timber berths at auction at the upset price of 20 shillings per square mile, giving the purchaser who bid it off at 50 shillings or more per mile the right of renewal for three years at the rate it was bid off. Ninety-seven persons, holding 962½ square miles, are accordingly entitled to the privilege of renewal under this regulation.

The receipts from timber that year increased to £8,668.

In 1844 an export duty was laid on logs. In 1867, when New Brunswick entered the Canadian confederation, the export duty was abolished, a special allowance of $150,000 annually being made by the Dominion government to the Province to compensate it for the loss of revenue. In 1867 the receipts from timber were $80,882.68, the sum of $56,415.58 being contributed by export duty. Another important change was made in 1874 when the duties were based on the cut of lumber and licenses were made renewable for two years.

TERM OF LEASES INCREASED.

In 1883 the Government concluded that it was time to call a halt in the policy of alienating large tracts of public lands unfitted for cultivation, sales in fee simple and extensive railway grants having considerably lessened the area capable of producing a revenue from its timber product. It adopted the principle of retaining possession of all the purely timber land remaining, and since then only small and isolated lots of such land, which, by reason of local conditions, could not be advantageously administered by the department, have been sold outright. In the same year it was decided to increase the length of the term for which timber limits could be leased to ten years, with the result that the public revenue again showed a large increase.

The leases issued for ten years expiring in 1893, the Government in 1892 appointed a royal commission to make a full inquiry into the condition of the lumber trade and into the best policy to be adopted in administering the timber lands. The commission was so strongly impressed with the desirability of giving the lumberman a permanent tenure of his holding that it recommended the leasing of the lands in perpetuity. This, however, was going farther than public opinion was prepared to sanction, but the Government proposed by way of compromise—a way most governments have—to grant leases for twenty-five years reserving the right to increase the mileage rate and fix rates of stumpage. The result was that a decision was reached to grant licenses renewable from year to year for twenty-five years, making it possible for a license issued in 1893 to be renewed until August 1, 1918. Under

the present plan the licenses are sold at public auction at $20 per square mile, with an additional charge of $8 for renewal. The dues on pine and spruce were fixed at $1 a thousand feet and in 1904 increased to $1.25. Ten thousand feet of lumber must be cut each year on each limit.

In 1883 the amount realized from sales was $38,462 for 3,117 square miles. Ten years later under the new long-lease system the lands were sold at public auction for twenty-five years, the amount received for premiums and leases in 1893 being $89,830. There were then issued 1,387 leases at an average price of $17.25 a mile, and since then the number has steadily increased until practically all the available Crown lands of the Province have been brought under lease. In 1899 1,170 square miles were leased at an average of $21 a square mile. The policy of long leases has resulted in material benefit to the lumbermen and contributed not a little to the prosperity of the trade. The receipts of the Provincial government for 1903 from sales and renewals of timber licenses were $46,898 and from stumpage dues $122,630, making a total of $169,528.

The first act for the preservation of forests from fire was passed in 1885. By its provisions fires must not be started between May 1 and December 1 except for clearing land, for cooking and for other necessary purposes. The penalty for failing to take the necessary precautions in the selection of the places for these fires and in their extinguishment after they have served their purposes includes a fine varying for $20 to $200. Railway locomotives must be equipped with spark arrestors and section men must be given instructions to watch for and extinguish fires caused by railway trains. In 1897 further legislation to protect the forests from fires was secured when statutory authority was obtained for the appointment of forest rangers. The year 1903 was a notable one for unusually severe forest fires. It was estimated that during that year two hundred million feet of timber was destroyed by fire. The conflagration wiped out an entire village besides destroying many other buildings.

Some important changes in the mileage and stumpage rates and conditions under which licenses are issued took effect in 1904, all being in the direction of greater stringency. Under the regulations now in force the upset mileage on limits is $20 a square mile, and the mileage payable yearly on renewals is $8 a square mile. Licenses are to be for not more than ten nor less than two square miles and the licensee may

be required to cut ten thousand superficial feet a square mile. The holder of timber limits is not permitted to manufacture a log measuring less than eighteen feet in length and ten inches in diameter at the small end. The stumpage dues are as follows:

Spruce, pine, fir or hackmatack saw top, per 1,000 feet	$1.25
Hardwood timber up to average of 14 inches square, per ton	1.10
Above 14 inches additional per inch, per ton	.10
Hardwood logs, per 1,000 superficial feet	.80
Pine timber up to 14 inches square, per ton	1.25
Additional per inch, per ton	.25
Hackmatack and spruce timber, per ton	.65
Cedar logs, per 1,000 superficial feet	1.25
Hemlock, per 1,000 superficial feet	.60
White birch logs, for spool wood, per 1,000 feet	.80

The following statement, taken from the surveyor general's reports, shows the quantities and kinds of timber cut from Crown lands during the fiscal years ended October 31, 1902 and 1903 respectively:

	1902.	1903.
Spruce and pine sawlogs, superficial feet	86,531,693	90,857,515
Hemlock logs, superficial feet	2,388,567	2,627,694
Cedar logs, superficial feet	15,357,249	16,041,955
Hardwood logs, superficial feet	2,936,007	3,869,712
Hardwood timber, tons	54½	215
Fir logs, superficial feet	2,764,411	4,219,593

This statement, it should be borne in mind, covers only the cut upon public lands under license and takes no account of the very large quantity taken from forest lands belonging to private owners.

PRODUCTION OF TIMBER IN NEW BRUNSWICK.
(Compiled from the reports of the Crown lands department.)

Year.	Spruce and pine logs (superficial feet).	Hemlock logs (superficial feet).	Cedar logs (superficial feet).
1879	88,856,803	92,750	38,323
1880	117,534,482	106,271	79,824
1881	135,159,742	425,080	.....
1882	149,348,548	598,315	172,255
1883	144,943,725	14,579,860	804,525
1884	87,294,775	21,237,385	1,143,882
1885	60,417,896	372,532	1,144,695
1886	76,887,027	4,881,750	1,520,781
1887	64,300,098	3,567,445	1,525,076
1888	68,382,300	13,054,434	2,964,564
1889	79,287,013	17,594,206	4,063,549
1890	95,539,612	12,139,048	4,716,201
1891	66,355,301	12,777,830	5,029,723
1892	79,495,134	1,526,554	12,034,758
1893	86,809,334	7,015,471	13,950,428
1894	56,804,581	60,106	5,635,475
1895	81,289,061	15,815,314	9,677,642
1896	76,985,459	12,785,743	14,279,880
1897	102,841,781	2,246,104	11,239,208
1898	80,856,347	3,726,756	7,669,293
1899	80,739,731	851,100	11,318,188
1900	91,979,461	5,826,785	14,417,895
1901	83,449,123	1,907,816	11,187,791
1902	86,531,693	2,388,576	15,357,249
1903	96,857,515	2,627,694	16,041,955
Total	2,238,946,542	159,204,925	166,013,160

CHAPTER XX.

NEW BRUNSWICK—RECENT OPERATIONS.

Notwithstanding the extent to which lumbering has been carried on, the supply of spruce will last for an indefinite period under the conservative methods of cutting, as the spruce is a tree of rapid growth and will attain merchantable proportions in thirty years. On the public lands no tree is permitted to be cut that will not make a log of ten inches diameter at the top, eighteen feet up, although many private owners allow the cutting of small spruce for pulpwood.

Many of the large limit holders follow a system of rotation. The land is laid off in strips of one and one-quarter or one and one-half miles wide and from five to ten miles in length. One strip is cut over each year and all the merchantable trees taken. The next year the adjoining strip is worked, and so on until the larger of the young growth of the first strip is available. The tracts nearest the great rivers have been most thoroughly worked and each year the operations are more distant from the point of shipment.

The portable or small rotary mill is much used on small tracts of private land, and the annual product is considerable in the aggregate, but does not figure in the provincial returns. While the large mills are most numerous near the river mouth, still there are many scattered through the interior with facilities for shipping their product by rail or floating it down the rivers to the coast.

While spruce is the great article of export there is a large cut of cedar for shingles for the United States and local markets. A good deal of hemlock is also sent to the United States as boards and there is a growing trade with Britain in birch for spool wood. The pulp industry is undergoing a great development and new sources of supply, tapped by railways in districts from which the large timber has been taken, provide raw material for the pulp mills.

THE ST. JOHN DISTRICT.

St. John is the center of the lumber manufacturing and shipping trade. As the River St. John is over four hundred and fifty miles in length and has numerous tributaries, it drains an immense territory not only in New Brunswick but in the adjoining State of Maine and in the

Province of Quebec, so that a large portion of the logs manufactured in the St. John mills come from outside the Province. The manufacturers as a rule do not operate in the woods, but contract at so much a thousand feet for the cutting, rafting and driving of the logs to their mills. There are three log driving companies—the Madawaska, St. John River and Fredricton boom companies and also a company on the Tobique, the chief tributary of the St. John in New Brunswick. Driving is always an uncertain feature, as the Grand Falls, 225 miles from the mouth of the St. John, have a descent of seventy-four feet, below which is a narrow and deep gorge through which logs must pass. Logs are often hung up for the season or damaged by a jam in the gorge.

The leading shippers from St. John are W. M. Mackay, who exports about one hundred million feet annually, George McKean and the A. Gibson Railway & Manufacturing Company. W. Alexander Gibson, of the latter company, has been engaged in the lumber trade for about a half century. He commenced life as a poor boy and advanced step by step until he became manager of the finest mill in the Province. About 1864 he acquired the lumbering establishment of Rankine, Ferguson & Co. on the Nashwaak River about two miles from Fredricton and undertook a series of improvements, establishing a number of other industries such as cotton mills, tanneries, etc. The village erected by these activities is called Marysville. He subsequently extended his lumbering operations to the Miramichi district and built the Northwestern railway, opening up large tracts of timber lands in that region.

In 1871 the firm of Randolph & Baker erected a large mill two miles from the mouth of the St. John, which mill is one of the best sawing dimension lumber for the British market. The firm's plant has an annual capacity of twenty million feet of long lumber, and it also ships quantities of lath to the United States.

Frederick Moore, of Woodstock, New Brunswick, was born in Canterbury, York County, New Brunswick, in 1839. Between the years 1862 and 1884 he was one of the heaviest operators in Aroostook County, Maine, cutting from 5,000,000 to 15,000,000 feet of spruce annually for the St. John, New Brunswick, market. In 1884 he built a sawmill, with a planing mill, on the Maduxnakeag River, a branch of the St. John River, for cutting logs from the Aroostook region. He occupies a prominent position in the New Brunswick trade.

In 1904 a total of 183 vessels cleared from St. John with lumber, a slight increase over the 171 lumber clearances in 1903. In 1904 cargoes embraced 463,585 tons, or 172,995,507 superficial feet, while the cargoes of 1903 included 411,546 tons, or 174,360,562 superficial feet. The shipments were to Liverpool, London, Glasgow, Belfast, Dublin and ports in Spain, Australia and other countries. In 1904 the shipments of birch were 3,567 tons, compared with 4,498 tons in 1903. Pine timber shipments were fifteen tons, a marked decrease from the forty-eight tons shipped in 1903. Shipments from the thirteen other ports in New Brunswick in 1904 brought the total amount of deals and other lumber shipped from the Province up to 641,711 tons, or 358,851,893 superficial feet.

St. John's export trade in forest products is larger than that of any other port in Canada, except Montreal, amounting in value during the fiscal year 1903 to $4,298,308, including the following items: Pine deals, $10,801; spruce and other deals, $2,496,467; planks and boards, $624,943; shingles, $339,699.

THE MIRAMICHI DISTRICT.

The Miramichi district has witnessed changes similar to those which have characterized the development of the industry in the region tributary to the St. John. It had formerly its pine timber and lumber period and extensive shipbuilding operations. The trade of the present day is mainly in spruce deals, with some business in spool wood and a growing demand for pulpwood. There are two branches of the Miramichi, which unite about twenty miles from the bay into which it flows and have a tributary area of many thousand square miles. The streams extend far westward toward Maine. The great bulk of the cut is spruce, only about five percent being pine, with some hardwood, cedar and hemlock. Practically all timber lands tributary to the Miramichi and Crown lands are owned by the New Brunswick Railway Company. Under the regulations in force for cutting there is a chance for the spruce to reproduce itself and, while the average size of logs shows a decrease, there is no absolute clearing of the forest. The more desirable tracts are becoming less accessible yearly. The railway company looks carefully after its timber interests and has a staff of scalers and foresters, charging a rate of $1.50 per 1,000 feet to operators.

The log cut on the Miramichi for the season of 1902-3 was 125,000,000 feet, as compared with 123,000,000 feet for the previous season. Miramichi ranks next to St. John among the lumber shipping ports of

the Province, the trans-Atlantic shipments for 1903 being 102,944,276 feet and for 1902, 123,000,000 feet.

The spool wood industry has attained its greatest development on the Miramichi, where 3,000,000 or 4,000,000 feet of birch are taken out annually for this purpose. Clark, Skillings & Co., of Glasgow, have three mills cutting about 2,500,000 feet each year.

THE RESTIGOUCHE DISTRICT.

In the Restigouche district there is still much virgin forest, spruce and cedar predominating. Some pine and a good deal of birch, maple and beech are also found. Nowhere else in the Province is cedar so plentiful and the export trade in shingles is large. The Restigouche River, two hundred miles in length, forms a part of the boundary between New Brunswick and Quebec, receiving tributaries from both Provinces, so that much of the cut of the Restigouche comes from Quebec lands. The shipping ports for this district are Dalhousie and Campbellton, the trans-Atlantic exports of lumber for 1903 from these points being respectively 20,910,384 and 18,075,362 feet. These figures, however, are considerably swollen by the amount of lumber manufactured in the Province of Quebec and forwarded by rail for shipment abroad.

The total trans-Atlantic shipments of lumber from New Brunswick ports amounted to 452,000,000 feet in 1902 and 391,000,000 in 1903.

Hon. Jabez B. Snowball, lieutenant governor of New Brunswick, has been prominently identified with the Miramichi lumber industry for over thirty-five years. He was born in England, reared in Newfoundland and made his success in New Brunswick. He did the latter Province valuable service in promoting and building a railway. His first mills were on the Miramichi River, and at Chatham he built a mill with a daily capacity of 170,000 feet, the largest on the river. In 1900 the interests of Mr. Snowball were converted into a joint stock company, which is known as the J. B. Snowball Company, Limited, and is composed of members of his family. The company cuts between 30,000,000 and 40,000,000 feet of lumber each year and owns nearly six hundred miles of timber limits on Crown lands, held on the twenty-five year system. It owns six tug boats on the Miramichi River, employs nine hundred men in the busy season and has extensive commercial interests. Mr. Snowball was the chief factor in the organization of the first electric street and domestic lighting service and also the first public telephone service in New Brunswick. His interest in forestry matters has been marked, and he has been of much service in furthering a better organization of the lumber industry.

Hon. John Percival Burchill, of South Nelson, New Brunswick, is a member of a family which for the last sixty years has been engaged in the lumber business in New Brunswick. He was born in 1855 on the Miramichi River, and in the year 1875 took charge of the outside operations of his father's business. In 1881 he entered into partnership with his father and brothers under the firm name of George Burchill & Sons. They own over 150 square miles of timber limits in the Province. Mr. Burchill has taken a conspicuous part in public life. He was elected as a Liberal to the New Brunswick Legislature in 1882, and has served two terms as Speaker of that body.

James Murchie, of Milltown, New Brunswick, was born at St. Stephen, that Province, August 13, 1813, of Scotch parentage. He began life as a farmer and cut timber in a small way to sell to mill owners as an additional source of income. Gradually his transactions increased until in 1859 he engaged in the manufacture of lumber, taking his sons into partnership. James Murchie & Sons, in addition to their establishments at Benton, Deer Lake, Fredricton and Edmundston, New Brunswick, operated extensively in the adjoining State of Maine. They acquired large areas of timber lands and a strong financial position, although they suffered severe losses from fire. Mr. Murchie filled many leading positions, including the presidency of the New Brunswick & Canadian Railroad Company and the Frontier Steamboat Company. He died, at the age of eighty-six, May 29, 1900.

The late William Richards, who was one of the most extensive lumber operators on the Miramichi River, New Brunswick, was born in Cardigan, York County, that Province. He died at his home in Boiestown, New Brunswick, June 1, 1903, after more than a year's illness, aged sixty-eight years.

CHANGES OF A QUARTER CENTURY.

Great changes have taken place in the conditions pertaining to the New Brunswick industry and trade within twenty-five years. One of the more notable of these changes is the effect of repeated timber cuttings on the size of the logs. The sawyer of the late '70's would have been astonished had he been asked to saw out a specification from such logs as are now being used. Half a dozen log surveys (spruce) chosen from a file at random and dated April and May, 1881, show nine pieces to the thousand feet; a like number, dated April, 1904, shows that seventeen pieces were required to make up the same quantity.

Each winter, as it came, found the logging crews penetrating farther

and farther into the forests that bordered the main streams and estuaries of the St. John River, the Miramichi and the Restigouche. Most of the ground has been cut over several times, and in nearly all cases long before the new growth has attained a size at all comparable with the original growth.

What the ultimate result of this decline in quality will be is hard to decide. On the St. John River, where the industry is the oldest, the results are beginning to be apparent in a slow but sure curtailment of the annual output. In other sections of the Province the limits have not been worked for a long period and the timber is therefore better. One vital effect that is certain to follow the scarcity of large timber will be the lack of new blood and new capital in the industry. The virgin forests of newly settled countries are sure to attract those who have the desire and means to devote themselves to the manufacture of lumber. The demands of the pulp manufacturers for material in the shape of undersized logs have had, during the last few years, and will have in time to come, a tendency to still further reduce the average size of available timber throughout the lower counties of New Brunswick, and all other sections in the vicinity of pulp mills. Heretofore, trees that were not large enough to be manufactured into lumber were allowed to stand until they had attained the necessary dimensions; nowadays, in numerous instances, they are cut for pulpwood, the anxiety to realize upon them quickly being, of course, the chief inducement.

Another marked change in New Brunswick lumber conditions has resulted from the diminution of the annual output of pine. Until about 1888 pine was the staple forest product, American mills manufacturing little else. Year by year the quantity of pine logs cut has decreased, until in 1904 1,000,000 feet would easily cover the total manufacture on the St. John River. The logs secured in late years are small and of an inferior grade, compared with those of the last century. In the early '80's, when provincial logs were worth from $9 to $12 a thousand feet on the St. John, considerable variation was the rule, owing to the corresponding variation in the size and quality of the logs. They would probably be a great deal higher today were they obtainable. It is scarcely worth while to make any comparison with the present prices, as they are seldom on the market in lots of importance.

As pine gradually became scarcer, spruce came more into demand and also more valuable year by year, in spite of the gradual degeneration in size. This increase in value is due chiefly to three facts: The

logs are harder to get; wages and supplies are more costly, and stumpage rates of the material have increased. From 1880 to 1885 spruce logs that could not be duplicated in the provinces today at any price brought from $7 to $8.50 a thousand feet at the mill; from these figures the price crept slowly upward until it reached $12.50, which price was touched in 1904. During the twenty-five years immediately preceding 1905, the market price of spruce lumber in the United Kingdom had been creeping up slowly but surely. In the year 1879 prices were extremely low, several large lots having been disposed of at figures that left from $5.75 to $6 a thousand for merchantable lumber. Of course, it would not be reasonable to use these figures as a criterion, for the year mentioned was one of light demand, forced shipments and the consequent lower prices mentioned above. For several years following, the trade showed a marked improvement both in prices and demand. A fair average price for the early '80's would have been $8.50 a thousand for merchantable spruce deals. From that time until the year 1900 prices rose gradually, interrupted, of course, by many periods of temporary depression, due to the presence of unfavorable conditions; but always, when the reaction set in, gaining more than had been lost. The end of the century found the figures in the vicinity of $11.50 for merchantable. Then followed three prosperous years. The demand during that period was extremely brisk and the shipments from the provinces were larger than they had ever been before, conditions being so favorable that in many cases the American logs (which are worth $2 more a thousand, because their product, when they are manufactured by an American citizen, is allowed to go into the United States free of duty) were sawed into English size and shipped to the United Kingdom.

The high water mark in prices was touched in 1903 when merchantable deals were sold in large quantities at figures that ranged from $13.25 a thousand to $13.75 f. o. b. steamer at New Brunswick ports. Early in 1904 the English market took a decided slump. Prices fell suddenly and emphatically until on September 1 purchases could have been made as low as $11.50 a thousand, with lumber plentiful.

The general decrease in the size of logs being sawed has had a marked effect upon the quantity of wide deals turned out, and the result is that the difference in the percentage of the wide lumber in the specifications is apparent and quite important in figuring the value of lumber.

In recent years it has been the general impression that the average quality of lumber produced is much lower than that manufactured twenty-five years previous. This is owing to the fact that the larger growth was certain to be cleaner and to have fewer knots and twists. Of course, in making a comparison of prices prevalent in recent years with those of former times, this depreciation in size and quality is an important element.

Twenty-five years prior to 1905 consignments to the markets of the United States from New Brunswick consisted chiefly of pine, the greater part of which was made up of one-inch boards. In later years, for reasons mentioned in an earlier paragraph, shipments of pine are few and light. With spruce it is exactly the reverse. In the late '70's and early '80's the shipments of spruce from the Maritime Provinces to the United States were not of great importance; recently spruce is the staple.

The spruce trade with the United States has also changed in this, that the smaller sizes have been much less in demand during the last few years, whereas formerly the demand was principally for plank and scantling. Recently it has run chiefly to three-inch stock.

On the whole the variation in price has not been so great as in the case of the English markets, although sudden fluctuations are more frequent. It is estimated that the output of spruce lumber in New Brunswick in 1904 was 80,000,000 superficial feet. The estimated output for 1905 was 95,000,000 feet. The output in cedar shingles in 1904 was about 260,000,000 pieces, as compared with 255,000,000 in 1903. The market prices of spruce lumber at Campbellton in 1904 were: $18 a thousand for 10-inch and 12-inch dimension, $14 for 9-inch and under, $16 for 10-inch and 12-inch random lengths 10 feet and upward in length, and $12 a thousand for 2x3, 2x4, 2x5, 2x6, 2x7, 3x4, 10 feet and upward in length; $11 for all other randoms 9 inches and under in size 10 feet and up in length; $11 for 5-inch and upward widths merchantable boards; $18 to $26 for matched boards; $9 for spruce boards; $11 for bundled furring; $8 for pickets, and $2 for lath. Spruce clapboards, extra, $42; clear spruce clapboards, $40; second clear, $38; extra No. 1, $32; No. 1, $21; No. 2, $12.

The market prices of cedar shingles at Campbellton were: Extras, $2.60; clear, $2.10; second clear, $1.60, and extra No. 1, $1.10.

LUMBER STATISTICS.

According to the Canadian census of 1901, the number of sawmills

in the Province of New Brunswick was 236 and the value of the product $7,041,848. As the census, however, includes only industries employing five or more hands, some of the smaller mills are not enumerated. The value of forest products in the rough is given as follows: Square, waney or flat timber, $34,484; logs for lumber, $1,667,694; pulpwood, $37,577; miscellaneous, $1,295,860; total, $3,035,615. The following are the quantities and values of the items under the two former heads:

SQUARE, WANEY OR FLAT TIMBER.

	Cubic feet.	Value.
Ash	1,998	$209
Birch	153,214	17,010
Elm	1,160	116
Maple	4,722	476
Oak	200	28
Pine	60,009	6,722
All other timber	99,472	9,923

LOGS FOR LUMBER.

	Feet b. m.	Value.
Elm	491,000	$1,560
Hickory	35,000	184
Hemlock	26,696,000	107,571
Oak	25,000	232
Pine	19,166,000	125,213
Spruce	182,759,000	1,099,302
All other logs	61,721,000	333,632
Wood for pulp (cords)	14,486	37,577

The forests of New Brunswick always have been her greatest source of wealth, and lumbering has been her greatest industry. Her first important exports were lumber products and to this day the forests furnish employment for a large proportion of her people and a splendid revenue to her internal government. The volume of the product shows a wonderful persistence, and it seems likely that, with the practice of conservative forestry methods and the large area illy adapted to agriculture, the forests will forever remain the chief resource of the Province.

Complete figures of logical arrangement are difficult to procure, but the following tables give the most important facts as to the trade history of the Province, and many enlightening details.

LUMBER AND TIMBER SHIPMENTS OF NEW BRUNSWICK.

Shipments from Miramichi for thirteen years, from 1892 to 1904 inclusive, in feet, were:

1892	95,000,000	1899	129,000,000
1893	83,000,000	1900	122,000,000
1894	96,000,000	1901	129,000,000
1895	82,000,000	1902	123,000,000
1896	106,000,000	1903	102,944,276
1897	102,000,000	1904	94,500,000
1898	113,000,000		

The shipments during 1902 from various New Brunswick ports were as follows:

Port.	Shippers.	Cargoes.	Tons.	Board measure.
*Miramichi	11	99	114,200	122,017,741
Dalhousie	8	37	28,224	26,344,112
Campbellton	3	30	22,824	24,142,117
Bathurst	2	16	18,703	20,874,278
Sackville	4	21	36,687	16,526,150
Hopewell	2	5	9,193	13,754,451
Harvey	4	7	9,736	9,816,040
Shediac	4	13	6,846	6,855,637
Richibucto	2	14	6,239	6,571,351
Buctouche	1	2	932	897,172
Hillsborough	2	3	1,561	1,898,038
St. John	..	...	.....	200,662,534

*In addition to the above, Miramichi exported 29 tons of birch and 1,159,065 feet of box shooks in 1902.

SHIPMENTS FROM NEW BRUNSWICK BY PORTS, 1903 AND 1904.

Port.	1903. Superficial feet.	1904. Superficial feet.
St. John	174,360,562	172,995,507
Dalhousie	20,910,384	22,097,965
Campbellton	18,075,362	23,077,883
Bathurst	20,770,642	16,273,355
Chatham	71,670,117	57,294,488
Newcastle	34,123,256	37,255,841
Richibucto	4,735,614	2,784,477
Buctouche	897,418	754,580
Sackville	8,545,560	6,205,370
Shediac	2,391,141	2,801,271
Hopewell Cape	26,834,162	5,138,666
Hillsborough	1,912,237	4,515,571
Harvey	3,135,250	6,331,152
Dorchester	.....	1,355,767
Total	388,361,705	358,881,893

Decrease in 1904, 29,479,812 feet.

DISTRIBUTION OF ST. JOHN, NEW BRUNSWICK, SHIPMENTS FOR THE YEARS 1903 AND 1904.

Port.	1903. Superficial feet.	1904. Superficial feet.
Liverpool	37,515,600	32,629,698
Bristol Channel	30,337,578	32,869,095
Barrow	5,234,805	4,770,241
London	8,208,164	12,541,993
Manchester	24,820,185	30,523,660
River Mersey	1,748,944	.....
Glasgow	19,295,791	17,443,413
Greenock	863,056	1,105,481
Limerick	4,578,164	594,058
Belfast	14,181,266	6,008,899
Sligo	394,177	484,991
Dublin	3,930,494	.....
Bantry	805,644	751,983
Londonderry	2,785,292	1,537,018
Drogheda	.....	736,798
Australia	1,638,263	10,678,148
Spain	1,657,775	596,672
Other ports	16,365,364	19,725,399
Total	174,360,562	172,997,547

Decrease in 1904, 1,363,015 feet.

SHIPPERS FROM PORT OF ST. JOHN.

Shippers.	1903.	1904.
W. M. Mackay	98,972,137	61,638,915
A. Gibson Ry. & Mfg. Co	25,619,521	33,858,471
Geo. McKean	29,665,471	42,335,455
Other shippers	20,103,433	35,162,807
Total	174,360,562	172,995,648

SHIPPERS FROM PORTS OF MIRAMICHI IN 1904.

Shippers.	Superficial feet.
F. E. Neale	39,000,000
Snowball Co	20,000,000
W. M. Mackay	11,000,000
D. J. Richie Co	11,000,000
E. Hutchison	8,000,000
G. Burchill & Sons	4,000,000
Damery & McDonald	1,500,000
Total	94,500,000

SHIPMENTS FROM ST. JOHN, NEW BRUNSWICK, TO TRANS-ATLANTIC PORTS FROM NOVEMBER 30, 1901, TO NOVEMBER 30, 1902.

To	Lumber, board measure.	Tons timber.		To	Lumber, board measure.	Tons timber.	
		Pine.	Birch.			Pine.	Birch.
Liverpool	46,642,866	54	2,076	*Brought forward,*	169.083,902	54	2,201
Birkenhead	2,005,242			Limerick	3,518,190		
Manchester	34,754,366			Londonderry	1,866,856		
Barrow	5,118,365			Belfast	3,626,546		
Preston	3,426,060			Dublin	11,595,324		
Cardiff	20,139,606			Cork	1,872,574		
Sharpness	14,324,589			Youghall	506,043		
Bristol	3,471,095			Drogheda	454,060		
Barry	1,850,879			Bantry	801,035		
Avonmouth	2,637,118			Malaga	856,501		
Newport	3,633,104			Lisbon	598,378		
Swansea	3,466,251			Bilboa	554,684		
Glasgow	15,896,385			Valencia	842,368		
Ayr	669,332			Cora Blanca	96,572		
London	10,293,428		125	Santa Cruz	1,197,306		
Sutton Bridge Dock	755,216			Melbourne (Australia)	3,192,195		
Carried forward.	169,083,902	54	2,201	Total	200,662,534	54	2,201

LUMBER SHIPMENTS FROM ST. JOHN TO TRANS-ATLANTIC PORTS FOR THIRTEEN YEARS.

Year.	Total feet board measure.	Timber (tons).	
		Birch.	Pine.
1892	146,529,309	10,200	....
1893	156,653,334	5,294	....
1894	153,473,076	5,015	....
1895	126,449,706	8,374	324
1896	167,249,707	9,892	128
1897	244,399,066	9,454	92
1898	184,954,343	6,636	95
1899	184,192,435	5,859	131
1900	236,459,838	5,851	71
1901	176,295,257	6,206	50
1902	200,662,534	2,201	54
1903	174,360,562	4,498	48
1904	172,995,507	3,567	15

TOTAL TRANS-ATLANTIC SHIPMENTS OF NEW BRUNSWICK, 1901 COMPARED WITH 1902.

From	1901.		1902.	
	Lumber, board measure.	Tons timber.	Lumber, board measure.	Tons timber.
St. John	176,295,257	6,256	200,662,534	2,255
Miramichi	128,827,450	61	123,176,806	29
Moncton { Hillsborough,			1,898,038	
Moncton { Hopewell,	25,478,403		13,754,451	
Moncton { Harvey,			9,816,040	
Shediac	4,774,000		6,855,637	
Dalhousie	18,966,980		26,344,112	
Campbellton	19,661,270		24,142,117	
Richibucto and Buctouche	3,943,143		7,468,528	
Sackville	4,566,278		16,526,150	
Bathurst	16,361,944		20,874,278	
Total	398,874,725	6,317	451,518,691	2,284

The trans-Atlantic shipments from the Province of New Brunswick for thirteen years were:

	Feet board measure.		Feet board measure.
1892	325,000,000	1899	426,000,000
1893	312,000,000	1900	489,000,000
1894	326,000,000	1901	399,000,000
1895	291,000,000	1902	452,000,000
1896	386,000,000	1903	388,361,705
1897	494,000,000	1904	358,881,893
1898	412,000,000		

The United States Consulate at St. John has compiled the following statement of values of shipments to the United States for 1903 and 1904:

CANADIAN PRODUCT.

	1903.	1904.
Lumber	$197,821	$104,803
Lath	187,295	211,296
Shingles	53,021	31,552
Total	$438,137	$347,651

AMERICAN PRODUCT.

	1903.	1904.
Lumber	$435,664	$448,071
Lath	57,668	52,400
Shingles	100,382	36,602
Total	$593,714	$537,073

In addition, there were shipped to countries other than the United States approximately 358,000,000 feet of lumber from the Province of New Brunswick in 1904, an approximate decrease of 30,000,000 feet from shipments of 1903. There was a decrease of 5,000,000 feet in Liverpool consignments, but an increase of 6,000,000 feet in lumber consigned to Manchester.

CHAPTER XXI.

NOVA SCOTIA—LUMBER HISTORY.

Nova Scotia was the first settled of any of the Canadian provinces, a colony being established at Annapolis, then Port Royal, as early as 1605. At that time and for long afterward it was noted for the density of its forests; and, in fact, it was over two hundred years before roads were cut through it for any distance into the interior, the settlements being confined to the coast and the land accessible by the rivers. One hundred years ago the country was heavily timbered with spruce, pine, hemlock, fir, poplar, hackmatack and various hardwoods—white birch, yellow birch, red birch, maple, beech and oak.

The lumbering industry was actively pursued in Nova Scotia at a time when the sister Province of New Brunswick, then included within her limits, was an unpeopled wilderness. A return of the several townships of Nova Scotia January 1, 1761, reported among the industries then extant thirty-one sawmills with an aggregate output of 1,271,000 feet of lumber. The first exports were to the United States on a very limited scale, and at a later date a large trade in lumber was built up with the West Indies, under the stimulus of which the industry rapidly developed. The demand for shipbuilding purposes was another factor in encouraging the production of timber.

Joseph Bouchette in his descriptive work, "The British Dominions in North America," published in 1832, writes as follows regarding conditions in the trade during the early part of the century:

"There are sawmills in every district of the Province, and even as far back as 1785 there were ninety of them in the country. The number has been vastly increased since that period. The quantity of lumber prepared and exported is momentous, and it is considered as good here as in any other part of America. Shipbuilding is carried on to a great extent in every part of the Province. In the ship yards of the peninsula alone there were built in the year 1826 131 vessels containing 15,535 tons, and in 1828, ninety-four vessels containing 6,560 tons. The average quantity of shipbuilding is not less than 10,000 tons per annum, principally sloops, schooners and vessels for the fishery."

Dr. Abraham Gesner, writing of the "Industrial Resources of Nova

Scotia," in 1849, deplores the tendency of the timber trade to divert the attention of the settlers from agriculture, asserting that, owing to the inducements it held out, thousands of farms had been abandoned or neglected. "In drawing away great numbers of the active part of the population to the backwoods," he writes, "agriculture has languished and the general prosperity of the country has been retarded."

During those palmy days of the trade every river and log driving stream was followed to its source and the timber cut away after the reckless and improvident fashion of that time. Until, indeed, a comparatively recent period the operators in the Province have in the main followed the policy of making a thorough clearance of all merchantable timber in sight. In this respect they did not differ much from operators elsewhere and, under the conditions then prevailing, had every inducement to realize the resources of their holdings as rapidly as possible, owing to the frequency and extent of forest fires, which usually follow lumbering operations and the progress of settlement, destroying what the ax spares. Later there was a law covering forest protection, but until recently there had been no enforcement of the act.

The destruction of the forests was accelerated by the system of land grants and the readiness of the Provincial government to part, for a very trifling consideration, with the fee simple of large areas of the public domain, the policy in the early history of the country being to get it settled at any cost. Grants were made of large areas to private individuals, and a large number was issued to soldiers to take up wild land. These extensive holdings, secured by the early settlers, usually ran back from the river front near which the farms were located, including a large area of timbered land on the higher ground to the rear, the lots frequently having a depth of several miles. As the timber remaining increased in value it was utilized by small portable sawmills moving from one place to another wherever a cut of a few thousand feet could be secured.

Outside of these individual holdings was a large tract of timber in the interior divided by a watershed running east and west. Here, as in other localities, extensive grants have been made from time to time to large operators, railway companies, etc., until nearly the whole of the timber land has passed out of the hands of the Government.

Nova Scotia offers an excellent field for forestry operations, as the producing farm lands lie in the valleys, while the foothills and the interior are nonagricultural in character and will always be more

valuable for the production of timber than for any other purpose. Forests naturally reproduce themselves more rapidly in Nova Scotia than in almost any other section of the country, due to natural conditions favorable to tree growth.

Owing to the length of time the country has been settled and to the destructive and improvident methods of lumbering pursued, the timber resources, once so great, have been largely exhausted. Cape Breton Island, which forms a portion of the Province, has practically no spruce timber that would make deal stock, though it has considerable hardwood. In the remainder of the Province the area of good timber land is estimated at about 2,700,000 acres. In an official statement of some years ago, the average stumpage of the timber lands was estimated at about 2,000 superficial feet an acre of merchantable spruce, 1,500 feet of hemlock and 500 feet of hardwood. This would make about 5,400,000,000 feet of spruce, 4,050,000,000 feet of hemlock and 1,350,000,000 feet of hardwood; but as cutting has been going on steadily in the meantime, it is safe to make a considerable deduction from these figures. This computation was made as an average over the whole territory, as some lands yield only spruce, some hemlock and others hardwood, while in some sections all are to some extent intermingled.

When cutting first began it was almost entirely confined to the white pine, which has now practically disappeared with the exception of some tracts in western Nova Scotia and a scattered young growth which, if preserved, may become valuable some day. Spruce is the mainstay of the Province. The old growth of spruce is confined to the holdings of large operators and scattered tracts in the remoter sections. The average timber is straight and of good size and height, usually producing three or more logs to each tree. The new growth of the Province is largely spruce and will grow to cutting size in thirty to forty years. The pulp mills are taking much of the small spruce, and in addition there is a large export to South America of spruce one inch by two inches up, and two inches by three inches up, for which the small trees are cut. Conservative operators cut down trees twelve to thirteen inches at the butt, or larger, leaving the others standing. With proper care in sawing the very young trees and bushes, they are able to go over these lands every seven to ten years for a new crop, making the yield practically perpetual. Although there is a supply of extra good spruce for pulpwood, this industry had not been developed until recently; now, however, pulp operators are seeking timber areas in the

Province, owing to reasonable prices for lands, large bodies of timber to be secured and favorable water conditions for power to operate and develop mills.

Until a recent period, hemlock had not been largely manufactured and little use had been made of the bark. There are now large tracts of hemlock that command attention and, with the advancing prices of bark, they will be a valuable asset to the lumberman. Fir has been largely killed by insects, but is used to some extent for cooperage. There is practically no cedar. The hardwood as a rule grows mixed and, except in a few localities, pays only to cut as it runs. Birch of the white and yellow varieties, maple and beech are abundant. Oak is scattered, the principal growth being in Queens, Lunenburg and Shelburne counties. There is a scattered growth of poplar of small size, which is cut for pulp and staves. There is practically no elm, and but little ash. Until the present time hardwoods have not been cut for export, except for the English market in moderate quantity. But there has been and still is a large annual cut used for firewood, both locally and for export to the United States, and hardwood is also extensively used for shipbuilding. In the eastern end of the Province there are extensive tracts of birch in Guysborough County, and in the western country hardwood is distributed all through the green wood, much of it being old growth of good proportion. The extension of the railways will make these hardwoods more accessible and will probably lead to a large cutting within a short time.

As the policy of Nova Scotia until recently has been to sell the public lands in fee simple, making no distinction between timber producing and agricultural lands, there are no government dues payable on the cut of timber and no returns made to the Provincial government regarding the annual output. An important change was made in the law in 1899 by which it was provided that, instead of granting the lands as theretofore, the Government may issue leases, for the purpose of cutting and removing timber only for the period of twenty years at not less than forty cents an acre for the term, subject to renewal. It was furthermore provided that in case of more than one application for the same tract the lease may be put up to competition and go to the highest bidder. The lessee is entitled to take all timber of not less than ten inches diameter. Leases may be made at fifty cents an acre for the same term permitting the cutting of timber not less than five inches in diameter, and the Government is empowered to lease on other

terms where the land is of inferior quality and the lessee is prepared to expend money in the erection of pulp mills, etc. The Government is also authorized to repurchase at not more than twenty-five cents an acre land previously granted for lumbering purposes.

This legislation unfortunately comes too late to have much effect in preserving the government timber resources of the Province, as the area of valuable timber lands remaining under the control of the Government is inconsiderable. In 1903 only 1,464,726 acres of land of any description remained ungranted, of which only five percent was timbered, most of it being a poor description of wild land.

The receipts from Crown lands in Nova Scotia in 1904, left an actual surplus of $13,235.65 after expenses of $10,645.51 had been paid. This $10,000 item includes, as usual, all the cost of surveys, although under a recent act this cost has to be borne by the applicant. The sum received from these new sources has been placed in the treasury of the department. During 1904 no very large leases were issued, there being none of over 10,000 acres, and nearly all of them were issued to persons actually engaged in the lumber business.

The timber of Nova Scotia is now owned by private individuals and corporations. It is estimated that about one-half the wooded lands is in the possession of large holders. The other half is owned by settlers and consists of small holdings of under a thousand acres. The larger holdings are being added to, and their position has been much strengthened during the last two or three years. The owners also control valuable water privileges and shipping facilities. The lands are situated on rivers where there is an opportunity to drive logs to the mills, and, in many cases, to tide water, where they are manufactured and shipped. There is excellent water power all over the Province, sufficient for lumbering and pulp and paper mills. A logging railway is now under construction near Bridgewater to be operated by the Davison Lumber Company, Limited. Many of the rivers furnish water power for electric light, so that manufacturing is no longer confined to the hours of daylight.

As has been mentioned already, there was a law in Nova Scotia regarding the protection of forests from fire, but it was not enforced. The lumbermen's association of western Nova Scotia, with the help of the boards of trade, has succeeded in having this law amended so that it can be enforced, and, consequently, there has been decided improvement in this regard. It is now believed that it is possible to prevent

large forest fires in the future. If this is done there is no doubt but that the growth of wood in Nova Scotia is going to increase the available timber within a short time. The amended law provides for a chief fire ranger in each county who has the privilege of appointing under him other rangers to assist him in his duties. These rangers are periodically to go over their timber district and put out all fires that may occur, and the chief ranger makes a report of each year's work to the Government. This special work is paid by government salary to the head official, and the municipality pays for the work done. The holders of timber lands in each county owning 1,000 acres and over each are taxed one-fourth cent an acre. This is a special tax levied for the purpose of controlling forest fires, and is paid into the municipality. It is probable that in ordinary seasons this special tax will cover the cost of protection. Any balance left over goes to the credit of the funds; but, in case this tax is not sufficient, the municipality is to pay any deficit that may occur. The act regarding forest fires has been enforced in the municipalities of Annapolis, Digby, Clare, Yarmouth, Shelburne, Queens, Lunenburg, Colchester and Pictou, where chief rangers have been appointed.

SOME NOTEWORTHY LUMBERMEN.

Among lumbermen of Nova Scotia worthy of especial mention is E. D. Davison. He was the founder of the firm of E. D. Davison & Sons, Bridgewater, Nova Scotia, and died in the summer of 1902, in his fifty-seventh year. He was one of the most extensive operators in the Province of Nova Scotia, and is said to have built in 1845 the first steam sawmill erected in the Province. The firm held 200,000 acres of timber lands on branches of the Lahave, Medway and Nictau rivers, where its operations were principally carried on. Mr. Davison spent his lifetime in the trade and was regarded as one of the best authorities in Nova Scotia on all matters connected with lumber and forestry. He took a keen interest in public affairs and was mayor of Bridgewater and representative of Lunenburg County in the Nova Scotia Legislature. In 1903, the business, then known as E. D. Davison & Sons, Limited, was purchased by J. M. Hastings and associates, of Pittsburg, Pennsylvania.

Lewis Miller, a large owner of lumber mills in Scotland and Sweden, finding that his forests in the latter country were becoming exhausted, turned his attention toward British America in 1900. He purchased extensive forests near the center of Newfoundland and at Glenwood and

Red Indian Lake in that colony he built large mills. Upon the receipt of a tempting offer from an American syndicate in 1903, he sold out his Newfoundland interests. In October of the same year he transferred his operations to Nova Scotia, where he purchased the properties of the Dominion Lumber Company, comprising a mill at Ingram Docks, twenty-five miles from Halifax, and 80,000 acres of timber lands. He began operations in June, 1904, and manufactures extensively for the British market. Mr. Miller was born in 1848 at Crieff, Perthshire, Scotland.

The St. Croix Lumber Company, of Hartville, Nova Scotia, was incorporated in December, 1903. The concern began operations by purchasing the mills and limits of T. G. McMullen, of Hartville. The limits comprise 30,000 acres of first class timber lands, heavily covered with pine, spruce, hemlock and birch. David McPherson, the president of the company, was born in Shelburne County, Nova Scotia, in 1834, of Scotch parents. On attaining the age of manhood he went to Halifax and began work as a shipbuilder, soon building up a large trade in the construction of wooden ships, which he owns and runs to this day. At the age of thirty-five he became interested in public affairs, and was shortly afterward elected to the city council of Halifax. Since then he has twice been elected mayor—1892-8. In 1898 he entered the Provincial House and soon distinguished himself, being appointed a member of the Cabinet of Nova Scotia in 1900.

CHAPTER XXII.

NOVA SCOTIA—EXPORTS, STATISTICS.

Nova Scotia has excellent shipping facilities. No part of the country is over sixty miles from tide water, and numerous navigable rivers flow into the Atlantic, Gulf of St. Lawrence and the Bay of Fundy. Three railway systems, namely, the Intercolonial, the Dominion Atlantic and the Halifax & Southwestern, are in operation and the rails extend the whole length of the Province. The shipping points of the railways are Sydney, Pictou, Pugwash, Windsor, Kingsport, Annapolis, Weymouth, Yarmouth, Tusket, Bridgewater, Lunenburg and Halifax, from which lumber is exported; and, besides these places, there are many ports and harbors on the coast available for good sized vessels and from which lumber is shipped. The bays and harbors indenting the shore are very numerous, making the coast line about one thousand miles in extent. The harbors on the Atlantic Coast have a good depth of water and very little tide. The shipping ports on the Bay of Fundy have strong tides, the rise and fall being from twenty-five to forty feet. In many of these places vessels load lying aground, or in the stream, where they can lie afloat, from barges and lighters.

At Ship Harbour, Halifax County, there is thirty feet of water at the mills; at Liscomb, twenty-two feet; at Sheet Harbour, twenty-eight feet; at St. Mary's River, seventeen feet, and at Bridgewater and Lunenburg, seventeen feet. There is no better harbor in Canada than Halifax, from which the annual export of lumber is over 60,000,000 feet —more than that from all the other ports of the Province combined.

Particular stress is laid upon the shipping conditions of Nova Scotia for the reason that the Province depends entirely upon the export trade. The home consumption is so light that it need not be taken into consideration. Thus the small population or previously slow growth of the Province, slow compared with that of other countries, has not had the effect of conserving the timber. On the contrary, the continued activity of the export trade of the last fifty years has reached the stage where the annual cut of the Province has caught up with the yearly growth.

Nova Scotia has the following markets for its products: The United

States, England, Ireland, Scotland, France, West Indies, Cuba, Argentine Republic, Brazil, British Guiana and Trinidad. Water transportation from points in western Nova Scotia ranges from 300 to 500 miles to New York, Boston and Philadelphia.

There are two grand divisions to be made in considering the lumber exports of Nova Scotia, brought about by trade conditions: The eastern end of the Province ships almost entirely to the English deal market, and the western end to South America, the West Indies and the United States. The cut for the English market is three-inch deals, and that for the West, boards, plank, rails and scantling. The deals are carried largely by liners or tramp steamers, while the western part of the Province engages a large fleet of sailing vessels from 150 to 1,000 tons register, a favorable size for the West Indies being a vessel of from 300,000 to 400,000 capacity, and for South America, a vessel of from 500,000 to 1,000,000 capacity.

Summing up, Nova Scotia may be said to possess the following specialties that are peculiarly conducive to the carrying on of the lumber industry: It has the nearest spruce timber for shipment to the European market; it has a monopoly of the West Indian trade for cheap lumber; it has a natural reproduction of woods that can not be excelled for rapidity of growth and quality, owing to favorable rainfalls and climatic conditions; its lumber fleet is largely owned in the Province; the shipping facilities are excellent and inexpensive, and the principal ports of shipment are open all the year around.

Among the leading exporters of Nova Scotia are: Dickie & McGrath, Tusket; Parker, Eakins Company, Limited, Yarmouth; Rhodes, Curry & Co., Limited, Amherst; Alfred Dickie, Lower Stewiacke; Davison Lumber Company, Limited, Bridgewater; the Nova Scotia Lumber Company, Walton; Charles T. White, Apple River, and Clarke Bros., Bear River. The average annual output of the latter firm is about 8,000,000 feet. Alfred Dickie is an extensive operator having mills at Ship Harbour, Lower Stewiacke and other points and owning 40,000 acres of timber land, the standing timber on which is estimated at 40,000,000 feet.

The following figures will give an idea of the extent of the lumber operations in Nova Scotia and of the export: Total area of the Province, 21,428 square miles, or 13,713,920 acres; estimated timber and wood land, 7,500,000 acres; estimated export from western Nova Scotia, 110,000,000 superficial feet; estimated export from eastern Nova Scotia,

including Halifax shipments, 135,000,000 superficial feet; total export, 245,000,000 feet per annum.

The total value of the shipments of forest products from Halifax for the fiscal year 1903 was $1,048,160, which included spruce and other deals, $746,591; planks and boards, $115,282, and scantling, $34,797.

The Canadian census of 1901 gives the number of sawmills in Nova Scotia employing five hands or more as 228, the value of the product being $2,940,107. The quantities and values of forest products were as follows:

SQUARE, WANEY OR FLAT TIMBER.

	Quantity, cubic feet.	Value.
Ash	3,502	$ 373
Birch	382,126	47,783
Elm	410	38
Maple	46,439	4,124
Oak	22,261	4,164
Pine	98,577	12,923
All other timber	356,371	39,697
Total	909,686	$109,102

LOGS FOR LUMBER.

	Feet board measure.	Value.
Elm	25,000	$ 233
Hickory	16,000	166
Hemlock	48,877,000	237,814
Oak	881,000	15,207
Pine	18,955,000	144,907
Spruce	198,892,000	1,272,653
All other logs	26,784,000	168,956
Total	294,430,000	$1,839,936
Pulpwood (cords)	18,348	48,320
Miscellaneous products	.....	1,460,490
Grand total of values		$3,457,848

TRANS-ATLANTIC SHIPMENTS FROM NOVA SCOTIA, SEASON 1902.

Ports.	Superficial feet deals, scantling, ends, boards, etc.	Tons timber.
Halifax, including Ship Harbour, Musquodobit and Tusket	97,101,000	1,807
Pugwash	18,714,051	
Parrsborough	15,870,255	
Liscomb	11,260,816	
Yarmouth	6,621,000	
Pictou	4,133,346	
Total	153,700,468	1,807

SHIPMENTS OF DEALS, ETC., FROM NOVA SCOTIA TO TRANS-ATLANTIC PORTS.

Year.	Feet.	Year.	Feet.
1892	87,861,398	1898	148,239,804
1893	109,252,930	1899	128,009,504
1894	106,327,250	1900	146,294,110
1895	109,324,393	1901	182,000,336
1896	123,116,389	1902	153,700,468
1897	185,362,562		

NOVA SCOTIA EXPORTS IN 1904.

Districts.	Manufacturers and Exporters.	Available supply, acreage.	Annual export, superficial feet.
Annapolis Royal....	Pickels & Mills, Annapolis Royal,		
Bear River }	Clarke Bros., Bear River,	400,000	20,000,000
Digby }			
Weymouth	G. D. Campbell & Co., Weymouth.....	200,000	12,000,000
St. Mary's Bay }			
Yarmouth	Parker, Eakins Company, Ltd., Yarmouth,		
Tusket	Dickie & McGrath, Tusket,	750,000	25,000,000
	Blackadar & Co., Meteghan,		
Port Medway	Davison Lumber Company, Ltd.,		
*Bridgewater }	Bridgewater.	1,000,000	23,000,000
Lunenburg			
Shelburne.....	United Lumber Company, Ltd., Jordan River,		
Liverpool.	McKay Bros., Clyde River,	350,000	10,000,000
	John Millard, Liverpool,		
St. Margaret's Bay.	Louis Miller, St. Margaret's Bay	200,000	10,000,000
Wolfville			
Hantsport }	S. P. Benjamin & Co., Wolfville,	250,000	7,000,000
Windsor	G. W. Henderson, Halifax,		
Kingsport			
Halifax.....	(See Special Report).....	2,335,000	63,000,000
Musquodobit.....	Musquodobit Lumber Co.....	150,000	
Ship Harbour.....	Alf Dickie, Stewiacke.....	140,000	
Sheet Harbour }	Dominion Lumber Co., Sheet Harbour.....	300,000	
Mosers River }			
Liscombe.....	Alf Dickie, Stewiacke	125,000	
St. Mary's River....	Alf Dickie, Stewiacke.....	150,000	
Stewiacke River....	Alf Dickie, Stewiacke.....	300,000	35,000,000
Pictou and Pugwash }	Primrose Bros., Pictou,	500,000	20,000,000
	T. G. McMullen, Truro,		
Parrsborough and E. Minas Basin }	Neuville Lumber Co., Parrsborough, Rhodes, Curry & Co., Ltd., Amherst, Chas. T. White, Apple River, Nova Scotia Lumber Co., Walton, St. Croix Lumber Co., St. Croix,	350,000	15,000,000
Total.....	.....	7,500,000	240,000,000

*NOTE.—Bridgewater exports will be increased to 50,000,000 feet in 1905.

It is evident that, with the limited acreage and the fact that the original forest has practically all disappeared, no material increase of the product is to be expected; but, conversely, with a climate especially favorable to tree growth, and a considerable area not adapted to agriculture, that lumbering will be always a chief industry.

EXPORTS OF LUMBER FROM HALIFAX, JANUARY 1 TO DECEMBER 1, 1904.

	Superficial feet.		
W. Malcolm McKay.....	22,300,000		
Alfred Dickie.....	12,200,000	United States	1,500,000
		Lath	3,000,000
I. H. Mathers.....	10,000,000	United States	200,000
G. W. Henderson.....	1,300,000	United States	8,500,000
		Lath	9,000,000
Smith Tyrer & Co.....	4,000,000		
T. G. McMullen.....	2,000,000		
Estimate for December.....	1,000,000		
	52,800,000		
United States.....	10,200,000		
Exports for 1904	63,000,000	Lath	12,000,000
		Lumber	10,200,000
Exports for 1903	65,000,000		

The following table shows the amount of the different kinds of lumber shipped by five of the leading firms of Halifax, from January 1 to December 1, 1904:

Kind of lumber.	Superficial feet.		
	To Europe.	To United States.	Total.
Spruce	35,757,564	5,548,346	41,305,910
Hemlock	7,202,030	3,962,153	11,164,183
Pine	1,221,749	873,861	2,095,610
Hardwood	5,612,927	.....	5,612,927
Timber	* 68,273	.....	.....
Lath	.....	12,029,000	12,029,000

* This amount is in cubic feet.

CHAPTER XXIII.

PRINCE EDWARD ISLAND.

Nine miles off the coast of New Brunswick at its nearest point, lies Prince Edward Island in the Gulf of St. Lawrence. At one time it was covered with a considerable forest growth. It was visited in 1534 by Jacques Cartier on his first voyage to the new world. In the "Relation Originale," a description of Cartier's voyage, is found the following concerning Prince Edward Island:

"That day we coasted along the said land nine or ten leagues, trying to find some harbor, which we could not; for, as I have said before, it is a land low and shallow. We went ashore in four places to see the trees, largely of the very finest and sweet smelling, and found that there were cedars, pines, white elms, ashes, willows and many other to us unknown. The lands where there are no woods are very beautiful."

Despite Cartier's failure to find a good harbor, the present capital city of Charlottetown is located on one of the most excellent harbors of the Dominion. Georgetown, in King's County, situated at the juncture of the Cardigan, Montague and Brudenell rivers, was formerly called the "Port of Three Rivers," and was the center of the timber trade.

While the island once possessed forests of considerable area, these have been largely removed by forest fires, lumbermen and shipbuilders. At one time the island was quite generally covered with timber, but now all that remain are small growths of balsam, fir and spruce and even smaller quantities of pine, larch, maple, poplar, beech, birch and cedar. The total area of the island is about 2,184 square miles, of which 797 square miles remain in forest woodlands. Of this latter area at least forty percent is timber of merchantable size.

In 1903 a forestry commission was created by an act of the legislature. The Province receives no revenue from forest lands, but hopes to do valuable service in reafforesting denuded areas and conserving the remaining timber.

According to the census of 1901, relating to lumber products, there were in the census year eight establishments of that character in Prince Edward Island with an invested capital of $223,500. These gave em-

ployment to ninety-five wage-earners and paid out $30,772 annually in wages. The cost of materials employed was $49,406 and the value of the annual product, $118,150. The following affords a comparison concerning the lumber industry for a period of ten years:

MANUFACTURING INDUSTRIES EMPLOYING FIVE HANDS AND OVER, COMPARED FOR 1891 AND 1901.

	1891.		1901.	
	Establishments, number.	Value of output.	Establishments, number.	Value of output.
Log products	9	$48,025	12	$ 35,834
Lumber products	3	48,200	8	118,150

CHAPTER XXIV.

THE DISTRICT OF UNGAVA.

Historic association still gives the title of Labrador to the entirety of the great peninsula which forms the northeastern extremity of the North American continent; but, in its political significance, the name has applied since 1809 only to the narrow strip of coast along its eastern edge which drains into the Atlantic.

The Labrador Peninsula has been described as two and one-third times as large as the Province of Ontario, 65 percent of the size of all that part of the United States lying east of the Mississippi River, or nearly five times the area of Great Britain. It extends from the fifty-fifth meridian to the seventy-ninth meridian and from the forty-ninth parallel to the sixty-third parallel. It is contained within a nearly continuous water boundary—the Saguenay, Chamouchouan, Waswanipi and Nottaway rivers at the south, James and Hudson bays on the west, Hudson Strait and Ungava Bay on the north, the Atlantic Ocean on the northeast and the St. Lawrence River on the southeast. From Cape Wolstenholme, at the entrance to Hudson Bay, to the mouth of the Seguenay River the distance is 1,040 miles "as the crow flies;" from Belle Isle on the east to the mouth of the Nottaway River on the west the distance is more than one thousand miles. Roughly described, the peninsula froms a triangle one thousand miles long on each side.

Of the 560,000 square miles embraced in the Labrador Peninsula, the greater part lies within the district of Ungava, a Canadian territory created October 2, 1895. At the time of its organization on the date mentioned Ungava included a much larger area than that with which it is now credited. It embraced all of the Labrador Peninsula north of the Height of Land, exclusive of that part of the Labrador Coast which is a part of the jurisdiction of Newfoundland. Quebec, the province to the southward, which is itself largely a part of the Labrador Peninsula, later had its boundaries extended so that it acquired all that part of Ungava lying south of the East Main River on the west and the Hamilton River on the east. By this order in council Quebec secured a strip of territory which is 250 miles in width at its western end and includes the regions of the Rupert and Nottaway rivers and Lake Mistassini,

embracing important timbered areas. The following is the present area of Ungava: Land, 349,109 square miles; water, 5,852 square miles; total, 354,961 square miles.

This great Labrador Peninsula, the largest peninsula in the world, is of historical importance, for it was the scene of the discovery of America by white men. There is little doubt that its coast was touched by Norsemen as early as 1000. June 24, 1497, a year previous to the first continental discovery by Christopher Columbus (an Italian sailing under the Spanish flag) Giovanni Cabot, or Cabotto, a Genoese in the employ of the English, visited the eastern coast of North America; and in the following year Sebastian Cabot, his son, discovered Hudson strait. In 1500 Gaspar Cortereal, a little known Portuguese, landed and gave the name of Labrador, or "laborers' land," to the peninsula. In 1576 Martin Frobisher visited the region and in 1585-6-7 John Davis explored arctic Canada, including the vicinity of Labrador. To the westward, in Hudson Bay, occurred in 1611 one of the most tragic of the many tragic events linked with the story of the New World. Henry Hudson, the explorer, upon determining to winter in the region in order that he might continue his search for a northwest passage the following spring, was cast adrift in Hudson Bay with his seven-year-old son and seven seamen and died a miserable but unknown death.

The exploitation of the timber of Ungava has never been seriously attempted, beneficent natural conditions of climate serving to keep in reserve these timbered areas until the demolition of the forests farther south shall render the utilization of more northern forests necessary. The southwestern portion of that part of the peninsula contained within Ungava was early, however, the scene of extensive trading by the Hudson Bay Company, which had posts at the mouth of the Rupert River, at Great Whale River and Little Whale River and on Lake Mistassini and at other points in the interior. This company was incorporated in 1670 and was headed by Prince Rupert, a cousin of Charles II., of England. It had the exclusive trading rights on Hudson Bay. Two employees of the Quebec fur-trading monopoly, Groseillers and Radisson, conceived the idea of exploiting the Hudson Bay region. They failed successively to interest their own employers, a coterie of Boston merchants and the French court and finally had recourse to London, where the Hudson Bay Company was organized. It was capitalized at £10,500 and Prince Rupert and his seventeen associates received a charter May 2, 1670. This was granted to "The Governor and Company

of Merchants-Adventurers trading into Hudson's Bay" and gave the company the exclusive right to trade in the bay and on the coasts, power to expel trespassers on these rights and the privilege of building forts and fitting out privateers and armed ships for the purpose of making war on any non-Christian people..

From the time of its occupation until the present the company has been a potent factor in the history of Canada, no less in Ungava than elsewhere. In the district it gave the name to Rupert's River and established Rupert's House at the river's mouth early in its corporate existence. It established in the interior of Ungava in later years Mechiskun House, Waswanapi House and Mistassini House and, on the west coast of Ungava, posts at Great Whale River, Little Whale River and elsewhere.

While the early operations of the company were carried on with profit, they were never so large, in the earlier years, as to render these profits exceptionally heavy. In 1676 it handled £19,000 worth of furs, giving in exchange to the Indians £650 worth of goods. In 1748 the amount of business had increased to only £30,000 from which had to be deducted £17,000 for operating expenses and £5,000 for goods for the Indians. At that time the business required the employment of four ships and numerous garrisons. A French claim to the territory embroiled the Hudson Bay Company in difficulties from 1682 until 1713. In 1682 and 1686 the French captured several of the company's forts. These troubles were ended by the treaty of Utrecht in 1713 and thenceforward the company enjoyed prosperity. It was not until 1763 that the operations attained any great magnitude, however, and then they were vastly increased by the opening of all the Hudson Bay country by the session of French Canada.

The Declaration of Rights, which guaranteed free and open trade to all British subjects, produced the first serious competition which the company was forced to encounter. In 1782 the Northwest Fur & Trading Company was organized in Montreal. It invaded the old company's territory and the competition eventually became actual warfare. In 1821 these evils were cured by a union of the companies. The later history of the great enterprise concerns more particularly its westward progress.

It will be observed by this history of the operations of the Hudson Bay Company that a great fur trade was early developed in Ungava. The forests remained untouched, and in a consideration of the forestal

wealth of Canada the southern part of Ungava should be considered among its resources. Along the southern border exist important areas of hardwoods and from these forests the growth gradually lessens until the barren shores of Hudson Strait are reached.

The interior of Ungava is a plateau of less than 2,500 feet elevation and broken by a network of lakes and rivers which make water transportation in any direction possible. A portage of two or three miles will generally serve to move a canoe from one river to the waters of another. The plateau rises precipitously from the Atlantic Ocean at the east but slopes gradually to James Bay at the west. The longer rivers are, therefore, in the western part of the peninsula. The chief rivers of Ungava are the Koksoak and Leaf rivers, emptying into Ungava Bay, the Hamilton and Northwest rivers, flowing into Lake Melville, and the Great Whale and Mistassibi rivers, flowing into Hudson and James bays. Grand Falls on the Hamilton River has a drop of 302 feet and a volume of 50,000 cubic feet a second. The important lakes of Ungava are Mishikamau, Kaniapiskau, North Seal, Clearwater, Apiskigamish, Nichikun, Manuan and Payne.

The district of Ungava possesses a considerable forest area which will be of commercial importance when the provinces shall have been denuded. In the consideration of this forest ground, however, the northwestern projection of the peninsula may well be eliminated, as the forest is of no value. Even as far south as Richmond Gulf the region takes on the characteristics of the Labrador Coast, the hills rising abruptly 500 to 1,000 feet. These hills are barren on top, small trees growing only in the lower gullies and about the edge of the water. Clearwater Lake, to which reference has already been made, is in the same locality. It is thirty-five miles long from northwest to southeast and eighteen miles across at the widest point. The bare and rocky hills are clothed only with lichens and arctic shrubs. The trees about the lake are very small black spruce or larch. At North Seal Lake the trees are even smaller and the barren areas more extensive.

The chief forest areas occupy the valleys of the streams flowing into James Bay at the westward and the Atlantic Ocean and the Gulf of St. Lawrence at the eastward. This wealth has, unfortunately, been much lessened by forest fires which have, within the last quarter century, destroyed one-half of the timber of the interior. In some places this destruction has been so complete that two hundred years will be required to restore the soil to its old fertility. These fires are attrib-

uted generally to Indians. A. P. Low, of the Geological Survey of Canada, whose explorations of unknown Ungava have been highly valuable, says that the fires occur annually and often burn during the entire summer. In 1894 he wrote: "These fires are due to various causes but many of them can be traced to the Indians, who start them either through their carelessness or intentionally." However, settlers, tourists and hunters are equally culpable. Many of the fires may be traced to their lack of care in building camp fires in places carpeted with gummy leaves and resinous twigs. On the upper canoe routes notices printed in English, French and Indian have been posted at every portage. These appear to have had some effect.

Despite the destructiveness of forest fires and the barrenness of the northern part of Ungava, the district contains a large amount of excellent timber, particularly adaptable to pulp manufacture. Ungava forests embrace spruce, larch, balsam fir, scrub pine, poplar and birch, distributed according to the altitude, latitude, distance from the sea and character of the soil.

Black spruce *(Picea nigra)* constitutes 90 percent of the forest growth of Ungava and extends northward to Ungava Bay and Hamilton Inlet and westward to the sparse growth of Richmond Gulf, although in the northwest it does not exist in merchantable quantities. In the southern part of Ungava black spruce grows in thickets, which habit prevents it from obtaining any considerable size. Farther north the trees are more distributed and of larger girth.

White spruce *(Picea alba)* is found in smaller quantities throughout the peninsula wherever there is well drained soil.

Black larch *(Larix americana)*, or tamarack, ranks second to black spruce in the extent of its growth. It also extends the farthest north of any of the Ungava trees, growing to a considerable height in regions so arctic that the spruce is stunted to a mere shrub. It is the largest of the trees found in the interior and makes the cold swamps its particular habitat. The European larch saw fly has been working northward in recent years and doing some damage to the tamarack growth.

The balsam fir *(Abies balsamea)* seldom grows farther north than the fifty-sixth parallel and is found in considerable quantities on the east shore of James Bay and eastward to Hamilton Inlet. It is particularly abundant on the lower Rupert River, where it grows in company with the white spruce, aspen and canoe birch.

Banksian pine *(Pinus banksiana)* variously known as the gray pine,

scrub pine, jack pine, Labrador pine and "cypress," has attained considerable growth on the burned-over area south of the Whale River and it is found in the swampy regions southward in the vicinity of James Bay.

The aspen *(Populus tremuloides)* grows south of the fifty-fourth parallel and is assisting to restore the burned-over areas. It conserves the soil on steep slopes and affords shelter to the seedlings of coniferæ.

The balsam poplar *(Populus balsamifera)* grows as far north as Clearwater Lake and is partial to the clay soil of the river valleys. It reaches a diameter of ten inches on the Kaniapiskau River.

The white, or canoe, birch *(Betula papyrifera)* is common to the southern part of the peninsula. It reaches ten inches in diameter at Hamilton Inlet, but up the river seldom attains more than eight inches. As it extends northward it is dwarfed in size.

As a source of future pulpwood supply Ungava takes important rank among the more northern districts of the Dominion of Canada. It is peculiarly well endowed with water power and means of water transportation and will eventually be the scene of extensive and profitable pulpwood manufacture.

CHAPTER XXV.

CANADA—ITS LUMBER INDUSTRY IN 1874.

History is a kinetoscopic repetition of events. It is interesting to stop the film of time occasionally and to view in detail the conditions prevailing during a particular period. It is for that reason that here is interjected a chapter showing with considerable detail the extent of the Canadian lumber industry in 1874. This chapter is drawn largely from an article prepared by a representative of the *Lumberman's Gazette*, a predecessor of the *American Lumberman*. The following is a pen picture of the Canadian lumber industry in 1874:

Canada, as a whole, must be regarded as possessing within her borders the most extended and connected chain of lumbering establishments in the world; and, from the location of her forests, adjacent to and facing the great continental markets, with such grand maritime facilities, we must pronounce them the most important, for the general markets, of any yet developed.

Respecting sensational documents prophesying a timber famine in the near future, which have been industriously put forth, it is sufficient to say that they have a tendency toward good by their restraining influence. But, in an excursion through the whole field, a mention of these prophesies will be promptly met with decidedly derisive ejaculations, the general expression being, "We have stock enough secured for our mills for fifty years or more," and that the mills now erected in Canada could cut their present yearly aggregate for that time and still have forests left. Exceptions in old districts will doubtless occur, but new ones are opening yearly, and forests yet unexplored for lumbering will be made accessible when required. In the North Simcoe section there are forty-nine mills of good construction, having 182,000,000 feet capacity yearly (rating low at that), which last year [1874] sent to Toronto 140,000,000 feet; and yet experts at woodcraft, thoroughly acquainted with these regions, say these mills (including other small ones) can be stocked probably fifty years longer.

We find, by careful computation of statistics given by parties of known credibility, that within the reach of these mills there is still of forest timber fit for the saw 4,550,000,000 feet of a merchantable character; also that the Georgian Bay mills, seven in number, have a still more extended and much less pillaged field to look to—all that region watered by the French, Spanish and other north shore streams, spread out many hundred miles, much of which country is yet unsurveyed and consequently unappropriated for any purpose. This section is estimated low at 20,000,000,000 feet, without including areas beyond those comprised within present explorations. It sent to the various points accessible by water no less than 90,000,000 feet in 1874, besides square timber. Its outlet is to Chicago, Buffalo

and Tonawanda, for the United States, and Collingwood and thence by rail to Toronto, for the Dominion. Taking the other side of the Bay, running over the whole of western Ontario, we have a vast area of settled country, with many small but high grade pineries interspersed, owned and protected by private parties, counting at least 2,500,000,000 feet, none too much for home supply, and not one foot of which should ever seek a foreign market. Yet twenty-nine mills, mostly of limited capacity, together with thirteen quite insignificant ones, send 70,000,000 feet of lumber and logs (embracing some square and spar rafts) to Cleveland, Erie, Buffalo and Tonawanda.

The above area includes the coast down to the lower wharves of Toronto, from whence we may take a run up the route of the Lake Nipissing railway and find a fair sweep of territory covered with fine forests, much of which is yet untouched and can not be utilized until the road is completed to its proposed terminus at the lake, where it is supposed it will be in line with the Great Pacific. The forests on this line are estimated of sufficient value to induce a board of astute capitalists to make a large outlay of money. Yet, from a cursory glance at the timber, we judge its grade scarcely warrants present handling, if immediate pecuniary margin is the object of the operators. The 11,000,000,000 feet which this division proposes to throw into the great aggregate of forest product will count with good results, if the cutting of it is not too hurried. This road is already constructed nearly ninety miles, and has drawn to it a considerable outlay in mills, about thirteen in number, mostly of small capacity, which sent to Toronto in 1874, 15,000,000 feet; and this will increase year by year, as other and larger mills are constructed.

Proceeding along the shore line of Ontario past Ports Whitby, Hope, Coburg, Trenton, and Belleville to Kingston, thence backward into the outlying country, embracing that extended chain of waters known as the Rice and other lakes, including the Trent, Moira, Scugog, Otonobee, Marmora, Napanee and other smaller rivers, reaching 150 miles toward the Grand Ottawa, we have a large area of country rich in timber, villages, farms and even iron and gold. Many first class sawmills are in operation, while the streams, many of them navigable to small steamers, are filled with floating logs and square timber for the use of mills all along the front. Several competing railroads cross each other within this stretch, having the posts before named, the large interior towns and the forests for objective points. Although it has been settled and worked for fifty years or more, the country still has many valuable timber precincts, which, although largely run over by the spar hunter and hewer, yearly send a vast amount of the same class of product, with logs and lumber, to the market. This product counted in 1874 285,000,000 feet, and the same grounds are computed to possess yet 7,750,000,000 feet for stock for her fifty-seven mills. This section has had the repute of yielding as fine a grade of stock as any portion of Canada, and holds its own very fairly in that particular.

The country in the rear of Kingston, Brockville, Prescott, Cornwall, etc., is also of great importance, as being the location of thirteen good sawmills, whose yield for 1874 was 106,000,000 feet of a good quality, together with considerable hardwood and basswood, while there remains on the main streams 2,250,000,000 feet of good, marketable pine, beside no mean amount of other woods of but little less value.

In all this stretch of country there is no thought of catering to other than the

United States trade, save in the sections where a portion of the square and spar timber goes to Quebec and thence to Europe. We have not herein intrenched upon groves on streams that flow to the grand center, Ottawa. It will doubtless be a surprise to many, even in Ontario, to learn that on these grounds, many of which have been long worked, there remains tributary to the Great Lakes the amount of 45,550,000,000 feet. Yet Ontario is sparsely settled, and in all that vast range all was originally forest and water, with no prairie. Remembering this, the investigator is led to think that there should be even more timber than we have counted, and we think the future will prove that there is more. The country we have been considering extends 750 by about 436 miles, making 327,000 square statute miles, equal to about 209,280,000 acres in area.

We approach Ottawa City next, as the great lumber and mill center. We find here, within a radius of about ten miles, twenty-four mills, nearly all of superior grade, embracing over a hundred gangs and six large circulars. These mills represent a capacity of over 400,000,000 feet annually, without night work, and have such timber limits attached to each establishment that scarcely one of them need have any fear of lack of stock for the next twenty-five, fifty, or one hundred years, even if an enlarged demand should decide them to run the whole twenty-four hours. Although many of these mills are located in Ontario, still they draw nearly all their stock of logs from Quebec. The Grand Ottawa is the dividing line between the two provinces. It receives from both sides a very large number of extended water courses, which drain an immense territory of densely timbered land. These mills have been erected mostly for, and are run to subserve, the American market, yet they annually contribute something to the European trade.

The Grand Ottawa is a very large and important river, over 750 miles in length, and draining an area of 80,000 square miles. It receives many tributaries varying from 100 to 400 miles in length. The whole valley has been, and is now, mostly covered with dense forests of white pine and red pine, and is held or allotted by the Government as timber limits, with but small exceptions. Besides furnishing stock for these mills, vast quantities of logs are cut and run to Montreal and other mills scattered along the St. Lawrence engaged in cutting deals. This is the great source from which the large timber houses and other concerns of Quebec draw their supplies for the European trade. It is estimated that the Gatineau alone can send to Ottawa over 12,000,000,000 feet, the Madawaska 4,000,000,000, the Upper Ottawa waters 75,000,000,000, the Reviere du Lievre to the mills below 4,000,000,000, all of a good quality of white pine and red pine. The spruce and hemlock timber seem boundless and, although not now regarded of much value, will eventually be the basis of more real wealth than the pine has been, if not ruthlessly destroyed by man or fire. All these sections, though showing large by the figures above, will doubtless yield through the same channels, from adjacent higher lands and more northern regions when necessity demands it, enough more to duplicate their present claims.

The Ottawa region, unlike the other sections, occupies an enviable position, inasmuch as it has the privilege of choosing the best of three different markets and can ship to them all by water conveyance—to the United States, to Europe, or to South America and Australia. This region has such superb mill establishments and does the work of cutting in such a neat style that it often gets fancy prices for

even a low grade article, because it looks well in bulk. Though its reserve stocks are 30,000,000 feet less than they were in 1873, and the cutting in the woods is exceedingly light, the harbors of this section being filled with held-over logs, members of the trade will be able largely to increase the aggregate for 1875 over that of 1874. It could be done to the extent of 100,000,000 feet if the demand should warrant it. These millmen, with those of the Lower Ottawa, and with the St. Lawrence operators, being in financial circumstances above panic influences, generally can watch and wait, or work as pleases best, and, having no burdens resting upon them in the shape of timber land taxes or interest, they can well afford to rest a season or two if exigencies require. These firms could put into the market for 1875, 450,000,000 feet without straining a single nerve, and the St. Lawrence mills could add 50,000,000 and make the sum 500,000,000, which, however, is not proposed by either party. But there is one feature regarding the Canadian forest product of which sight should not be lost. The square timber trade received such a rude shock that many of the houses have utterly refused to go into the woods at all this winter, which will have a tendency to clean out the stocks on hand and, doubtless, diminish the amount marketed considerably; and, as much of that wood is put into deals after it arrives in Europe, its loss may be required to be made good by the manufacturer.

The river St. Maurice is one of the largest of the St. Lawrence tributaries, and drains an immense scope of country. It is over 400 miles long, receives the waters of fifteen important rivers and numerous lakes, and is supposed to drain a widespread territory of pine, spruce and hemlock timber of great value. The Government claims to have yet on its waters over 3,000,000 acres of unallotted timber lands, on which, if we give but 3,000 to the acre, we have 9,000,000,000 feet outside the leased limits. Gaspé and Bonaventure counties are claimed to have 3,000 square miles of timber limits yet waiting lease, abounding in sawing timber, which, by applying the same rule, will add 6,000,000,000 feet.

The estimate so far gives over one hundred years' stock for all the mills now working in the two provinces, yet, to show the probable accuracy of these details, we will state that Quebec records show in 1872, 192,000 square miles reserved for timber limits, and at that time an allotment of 42,399 square miles had been made, leaving unleased land as follows:

Six thousand square miles St. Maurice territory; 2,000 in the Gatineau; 3,000 in the Upper Ottawa; 139,000 in other sections of the Province, including Gaspé, Labrador, etc. In other words, they say they have 149,000 square miles of timber land to lease; and, if we can award to them 3,000 to the acre, or about 2,000,000 to the square mile, we get 298,000,000,000, which is nearly three times the amount we had set down for the different sections en route, and yet we do not intrench upon the 42,399 square miles allotted. It is no more than reasonable to surmise that no practical millman or lumberman would purchase timber limits, and thus subject himself to a yearly rental for twenty-one years, without first ascertaining that such limits were worth the purchase. Therefore, if we give these men credit for common business tact, we must suppose their 42,399 square miles, or 27,135,360 acres, must yield at least 3,000 feet to the acre, less the amount cut off since their occupancy. This would give an additional amount of 81,406,080,000 feet, which we reduce by 15,000,000,000 as the amount cut off 5,000,000 acres, leaving 66,406,-

080,000. All this, it will be remembered, does not touch the Algoma, nor the Northwest Territory, which we know, from actual exploration, is very extensive and will come in for use when needed, though generations may pass before that time arrives. Neither does it embrace the amount assumed to be still in the Ontario forests, that being about 45,550,000,000 feet.

RECAPITULATION.

	Feet board measure.
Ontario forests	45,550,000,000
Quebec, allotted limits	66,406,080,000
Quebec, not allotted	298,000,000,000
Aggregate	409,956,080,000

If the Government basis is correct those lands will yield all these figures have assumed for them. But it should be stated that the Gaspé and the St. Maurice territory, and what may be left on the Saguenay, embrace the spruce and hemlock as well as the pine. In that region those woods may be regarded as possessing a commercial value equal to the Upper Ottawa pine on its stump. On looking over the whole domain of the Dominion we would be surprised, indeed, if it did not furnish 500,000,000,000 feet of sawing stock, knowing what some of the sections that have been cleared have yielded.

The year 1874 was the occasion of a sharp and sudden decline in Canadian lumber values. At the opening of the season in 1874, about June 10, the following were the prevailing prices in Canada, a standard deal making 2,750 superficial feet to 100 pieces:

Pine standards, firsts,$108, or $39.28 per M feet board measure.
Pine standards, seconds, $72, or $26.19 per M feet board measure.
Pine standards, thirds, $306, or $13.09 per M feet board measure.
Pine standards, fourths, $28, or $10.19 per M feet board measure.
Spruce, firsts, $44, or $16 per M feet board measure.
Spruce, seconds, $36, or $13 per M feet board measure.
Spruce, thirds, $28, or $10.18 per M feet board measure.
Spruce, fourths, $28, or $7.27 per M feet board measure.

These prices fell off fully ten percent during the season. At the opening of 1874 pine sold at 35 cents to 20 cents per cubic foot, oak at 47½ to 50 cents, elm at 37½ to 40 cents, and walnut at 80 to 85 cents. All of these, except the walnut, fell off 12 percent in price during the summer. At that time the production of square timber was made up of about three-quarters pine, of which one-twelfth was red. Hardwoods manufactured embraced oak, ash, birch, basswood, white tamarack, walnut, maple and hickory. Spruce and hemlock represented about one-sixth of the total production, but the proportion has since very largely increased.

The following is a comprehensive statement of the extent of the lumber industry of Canada in 1874, the names[1] of manufacturers and the location and capacity of their mills being given:

[1] The spelling of the names appears incorrect in many instances, but changes have been made only in a few cases that were known absolutely. The editor does not wish to be held responsible for the spelling of these names in this excerpt.

NAMES AND LOCATION.	Thousand feet.		
	Product.	Held over.	Cutting.
Ross Richie, Nicholet	2,000	1,000	22,000
A. Mayrand, Nicholet	3,000	1,000	3,000
Price Bros., Batiscan	2,000	3,000	10,000
Price Bros., St. Thomas, Metis, Sagencey, So. Du'Cashon	6 000	2,000	40,000
Total	864,000	330,250	855,000

The mills enumerated above manufactured, during 1874, in the aggregate, 112,000,000 deals for the European market.

In addition there are seventy-three mills about and below Quebec which stock almost exclusively for the European market, or the South American and Australian trade, though we find among their product 23,000,000 feet that might, if the demand were good, go to the United States. This stock was made, doubtless, for the southern trade, and, that call being already overstocked, it has mostly been held in reserve. To show the cause, we find the South American, etc., shipments in 1874 have been but 16,975,000 against 41,044,000 in 1873, while nothing to speak of has gone to Australia.

RECAPITULATION OF CANADA PINE LUMBER, DEALS, TIMBER, ETC., FOR 1874.

		Feet board measure.
Stock and siding boards produced by mills enumerated		864,000,000
Stock and siding boards produced by mills not enumerated		23,000,000
Total of United States market		887,000,000
Amount of same grades held over from 1873		346,000,000
Amount on the market for 1874		1,233,000,000
Amount being held over from above mills	330,250,000	
Amount being held over from other mills	17,750,000	348,000,000
Amount of foreign sales		685,000,000
Pine deals produced by above mills		243,000,000
Pine deals by other mills		173,000,000
Pine deals held over from 1873		80,750,000
Amount on the market		496,750,000
Amount now in reserve		150,750,000
Amount sold and shipped		346,000,000
Approximate pine timber made in 1874		192,000,000
Approximate held over in 1873		84,000,000
Approximate amount on the market		276,000,000
Now in reserve		73,000,000
Amount of pine timber sold and shipped		203,000,000
Total pine shipped from the two provinces approximated. This falls 200,000,000 short of the shipments for 1873.		1,434,000,000

In preceding chapters of this history the reader has found figures epitomizing the production of lumber in the districts above named in years later than 1874. A comparison will show the changes in the industry in Canada between 1874 and 1905. Many names of importance in 1874 will be found to have been still prominent in 1905.