

A HISTORY OF FOREST POLICY
AND ADMINISTRATION IN BRITISH COLUMBIA

by

Alan Moss, C.D., Ph.D., R.P.F.

To my wife Rhoda-Blanche

AUTHOR'S INTRODUCTION
A HISTORY OF FOREST POLICY
AND ADMINISTRATION IN BRITISH COLUMBIA

I arrived in Canada in 1951 and worked for fifteen years as Woodlands Manager of S.M. Simpson Limited, Kelowna, British Columbia, also serving during that period in a number of forestry associations and their committees and, in 1956, appearing as a witness, representing the Interior Lumber Manufacturers' Association, before the Sloan Royal Commission.

These experiences developed in me a keen interest in the forest policy and management practices of countries. The opportunity to follow this interest, virtually on a full time basis came in 1966, when I was enrolled as a Ph.D. student in the Department of Forestry and Natural Resources, University of Edinburgh, under the Programme of Special Study and Research of that university.

As a part of the study, I was to make a comparison between the forest policies and management practices applicable in British Columbia and Scotland. The first year was spent in British Columbia, studying the policy and management of that province. It very quickly became evident that this was a major task, since the information needed lay in a large number of reports, documents, and papers rather than in consolidated form. However, as a result of this work, I was urged by a number of colleagues to publish a history of forest policy and administration in British Columbia, on the basis that such a publication was needed for educational and other purposes.

The objective of the history is to trace for the reader an outline of the development of forest policy and some aspects of administration in the province with comments on the motivation for some of the development. The original notes for the history occupied more than 2,500 foolscap, double-spaced typewritten notes and it will be appreciated that, in order to arrive at a reasonable length of publication much potential content had to be dropped and much detail eliminated. The work is not intended to be a comprehensive history of all aspects of British Columbia forestry but to deal with British Columbia Government policy and administration, its aims and results. It does not mention many of the individuals who have made significant contributions, nor does it deal with the internal administrative organisation of organisations such as the British Columbia Forest Service.

In recent times, forest policy has undergone very rapid development indeed and, whilst some of the recent developments are described, some of them are treated in quite a general way since, in a historical sense, their influence and outcome cannot be fully appreciated at the present time.

Whilst it has been suggested that I should include a chapter dealing with possible future policy developments and whilst the main directions of policy development appear to be stable at the present time, I have not done so. Policy is highly dependent upon political, social and economic change and should the present relative stability be disrupted, a variety of results could ensue which could not reasonably be predicted at the present time.

I would particularly like to thank Doctor C.J. Taylor of the Department of Forestry and Natural Resources, University of Edinburgh, who urged me to write this history. Also, special thanks are extended to Lorne F. Swannell, R.P.F., Chief Forester of British Columbia and Doctor J.V. Thirgood of the Faculty of Forestry, University of British Columbia, who read the first typescript and suggested a variety of corrections and amendments, most of which are included in the final work. A considerable number of others assisted in the provision of literature and advice, without which the result would be the poorer.

Last, and foremost, I have to express my gratitude to Doctor C.I. Orchard, former Deputy Minister and Chief Forester of British Columbia, who approached me one day in 1966 in the Hotel Vancouver and suggested that I write this history, at the same time offering his own notes to serve as a basis for it.

Alan moss, C.D., Ph.D., R.P.F.

Kelowna
British Columbia
July, 1971

MINISTERS OF BRITISH COLUMBIA IN CHARGE OF FORESTS

<u>Years of Appointment</u>	<u>Name</u>	<u>Title</u>
1912 - 16	W.R. Ross	Minister of Lands
1916 - 28	T.D. Patullo	Minister of Lands
1929	F.P. Burden	Minister of Lands
1930 - 32	N.S. Lougheed	Minister of Lands
1933 - 44	A. Wells Gray	Minister of Lands
1944 - 52	E.T. Kenney	1944 - 45 Minister of Lands 1945 - 52 Minister of Lands and Forests
1952 - 56	R.E. Sommers	Minister of Lands and Forests
1956 -	R.G. Williston	1956 - 62 Minister of Lands and Forests 1962 - Minister of Lands, Forests and Water Resources

DEPUTY MINISTERS OF FORESTS OF BRITISH COLUMBIA

1945 - 58	C.D. Orchard	(Also Chief Forester)
1958 - 65	R.G. McKee	
1965 - 69	F.S. McKinnon	
1969 -	J.S. Stokes	

CHIEF FORESTERS OF BRITISH COLUMBIA

1912 - 16	H.R. McMillan	
1916 - 20	M.A. Grainger	
1920 - 35	P.Z. Caverhill	
1936 - 41	E.C. Manning	
1941 - 58	C.D. Orchard	(Also Deputy Minister 1945 - 58)
1959 - 65	F.S. McKinnon	
1965 -	L.F. Swannell	

THE FOUNDING OF THE ASSOCIATION
OF BRITISH COLUMBIA PROFESSIONAL FORESTERS

(by F. Malcolm Knapp, R.P.F.)

The late Fred D. Mulholland initiated the action which led to the establishment of the Association of British Columbia Foresters by an Act of the Legislature passed on April 3, 1947. On February 15th, 1945 a draft of the proposed "B.C. Foresters' Act" prepared by Mulholland accompanied a letter in which he stated "it seems to be certain that following the report of the Royal Commission, circumstances will require a much greater number of qualified foresters in this Province, both in Government service and private employment, and it is not too early to take steps to see that we are properly organized and take our place on a level with the other professions."

Copies of this letter and the draft were sent to:

L.R. Andrews, B.C. Lumber Manufacturers

R.M. Brown, President, C.S.F.E.

H.H. Baxter, 1944 Chairman, Vancouver Section C.S.F.E.

J.D. Gilmour, H.R. MacMillan Export.

M.W. Cormely, Chairman, Vancouver Committee, Royal Commission brief.

E.E. Gregg, 1944 Chairman, Victoria Section C.S.F.E.

H.J. Hodgins, Pacific Mills Ltd.

F.M. Knapp, Professor of Forestry, U.B.C.

C.D. Orchard, Chief Forester B.C.

M.L. Prebble, 1945 Chairman, Victoria Section C.S.F.E.

J.E. Liersch, Aero Timber Products.

Following this, a number of letters, phone calls and meetings of individuals or small groups took place but no meeting of a majority of the group names was ever held.

This was followed by a printed "Circular to the Forestry Profession in British Columbia" which included the draft of the Act under dateline March 20th, 1945, and signed F.D. Mulholland, 514 Government Street, Victoria, B.C., as follows:

"Attached hereto is a draft of a proposed "B.C. Foresters' Act" for your attention and comment.

"Discussions have proceeded spasmodically for more than twenty years between members of the Canadian Society of Forest Engineers and the Professional Engineers of B.C. with regard to registration of foresters by the latter under the B.C. 'Engineering Profession Act.'

"These discussions have not resulted in the amendment of the 'Engineering Profession Act' necessary to include the activities of foresters. After so long a period it must be assumed that such amendment is not probable nor desirable.

"With the increased importance expected to accrue to the forestry profession as a result of the Sloan Royal Commission and public recognition of the urgent need for better forest practices, the time is ripe for statutory recognition of the profession of forestry in its own right.

"This draft act has met with the general approval of the following committee, and it is being distributed to members of the Canadian Society of Forest

Engineers, and other interested parties, for study and comment:

L.R. Andrews, Forester, B.C. Lumber Manufacturers Association
 R.M. Brown, Dominion Forest Service, President, C.S.F.E.
 J.D. Gilmour, Forester, H.R. MacMillan Export Co.
 M.W. Gormely, B.C. Forest Service, Vancouver.
 E.E. Gregg, B.C. Forest Service, Victoria.
 H.J. Hodgins, Forester, Pacific Mills Ltd.
 J.E. Liersch, Production Manager, Aero Timber Products.
 F.D. Mulholland, Director, Land Utilization Survey.
 C.D. Orchard, Chief Forester, B.C. Government.
 M.L. Prebble, Forest Entomologist, Dominion Science Service.

"If and as approved or amended by general consensus of the forestry profession, it is proposed to make arrangements for it to be introduced in the B.C. Legislature.

"It is hoped that all foresters in the Province will associate themselves with the above in order to expedite the necessary action.

"Kindly send such comments as you care to make to the undersigned at your early convenience."

The Bill in essentially its original form was presented to the 1946-47 Legislature and was sponsored by the Hon. H.J. Welch, and passed its third reading at about 3:00 A.M., April 3, 1947, after an all-night sitting of the Legislature.

The first Council of the Association of B.C. Foresters was named in the Act as follows:

"The following persons, namely, Frederick D. Mulholland, Victoria; Chauncey Donald Orchard, Victoria; John E. Liersch, Vancouver; Roscoe M. Brown, Vancouver; Leonard R. Andrews, Vancouver; John D. Gilmour, Vancouver; Hugh John Hodgins, Vancouver; Elwyn Emmerson Gregg, Vancouver; Marcus W. Gormely, Nelson; and Hector A. Richmond, Victoria, all of whom have been engaged in the practice of forestry in Canada for fifteen years or longer, are constituted a body corporate with perpetual succession and a corporate seal under the name of the "Association of British Columbia Foresters."

This Council met for the first time at 2:45 p.m. on Monday, April 14th, 1947 in the offices of L.R. Andrews, 817 Metropolitan Building, Vancouver, at which time F.D. Mulholland was elected President, C.D. Orchard, Vice President, and F.M. Knapp, U.B.C., was appointed to the position of Registrar and Secretary-Treasurer. A Committee of L.R. Andrews, Chairman, J.D. Gilmour and F.M. Knapp was appointed to draft the By-laws. The first Board of Examiners was composed of J.E. Liersch, Chairman; H.J. Hodgins and R.M. Brown. The Registration fee was set at \$10.00 and the annual fee \$15.00 and examination fee \$25.00.

TABLE OF CONTENTS

<u>Chapter</u>	<u>Title</u>	<u>Page</u>
	Introduction	i
	Ministers, Deputy Ministers and Chief Foresters of British Columbia	iii
	Founding of the Association of British Columbia Foresters	iv
1	Early History Prior to 1871	1
2	General Forest History 1849 - 1912	3
3	Forest Legislation in British Columbia 1849 - 1910	12
4	The Royal Commission of Inquiry on Timber and Forestry 1909 - 1910	29
5	The Forest Act of 1912	45
	<u>The Period From 1913 - 1945</u>	
6	Development of the Forest Industry and its Markets	48
7	Forestry Developments	61
8	The Royal Commission of Inquiry into the Forest Resources of British Columbia 1945	104
	<u>The Period From 1946 - 1970</u>	
9	The Forest Act of 1945	125
10	The Introduction of Tree Farm Licences and Public Sustained Yield Units Under the Sustained Yield Policy	132
11	The Introduction of Pulpwood Harvesting Areas	170
12	The Close Utilization Policy	172
13	Tree Farms	174
14	The Forest Inventory and Sustained Yield	198
15	Fire Protection and Fire Fighting	203
16	Reforestation	213
17	Timber Berths, Leases and Licences	221
18	Forest Utilization	223
19	The Uses of British Columbia's Forests	226
20	The Role of the Canadian Government in British Columbia's Forest Policy and Administration	230
ANNEXURE I	References	236
ANNEXURE II	Forest Tenures of British Columbia	239
ANNEXURE III	Forest Industry Production in British Columbia	261
	Table 1 - Summary of Expansion in the Pulp and Paper Industry of British Columbia 1966 - 75	262
	Table 2 - Saw and Shingle Mills of British Columbia 1915 - 1969	263
	Table 3 - Export of Round Logs from British Columbia 1915 - 1969	264
ANNEXURE IV	Forest Production in British Columbia	265
	Table 1 - Total Amount of Timber Scaled in British Columbia 1915 - 1969	266
	Table 2 - Total Scale of Logs Cut in British Columbia Segregated to Show Land Status of Origin 1925 - 1969	267
	Table 3 - Average Annual Cuts by Species for British Columbia 1915 - 1969	268
	Table 4 - Total Scale of Products from Areas Under Sustained Yield Regulation in British Columbia 1956 - 1969	269

ANNEXURE V	Planting Operations in British Columbia	270
	Table 1 - Summary of Planting Operations in British Columbia up to 31st December, 1969	271
ANNEXURE VI	Forest Protection in British Columbia	272
	Table 1 - Forest Protection Expenditures in British Columbia by the B.C. Forest Service	273
	Table 2 - Estimated and Known Costs of Forest Production in British Columbia to Agencies Other Than the B.C. Forest Service 1935 - 1968	274
	Table 3 - Damage to British Columbia's Forests Caused by Forest Fires	275
	Table 4 - A Comparison of the Damage Caused by Forest Fires in British Columbia 1915 - 1969	276
	Table 5 - Damage Caused by Forest Fires in British Columbia to Property Other Than Forests 1915 - 1969	277
	Table 6 - Summary of Snag Falling, Slash Disposal and Slash Burning Damage in the Vancouver Forest District of British Columbia	278
	Table 7 - Relationship of Crown (Provincial) Contributions to Forest Fire Protection to Total Crown Forest Revenues and Total Crown Forestry Expenditures in British Columbia	279
ANNEXURE VII	Forest Finance in British Columbia	280
	Table 1 - British Columbia Government Forest Expenditures (Fiscal Years 1915 - 1916 to 1964 - 1965)	281
ANNEXURE VIII	Glossary	282

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CHAPTER ONE

Early Forest History Prior to 1871

The first recorded glimpse by a white man of the territory that was to become British Columbia was of the Queen Charlotte Islands, sighted through lowering cloud from the Spanish vessel "Santiago."¹ The North American Pacific seaboard had been under European occupation for many years but for more than 300 years from the beginning of that occupation, the seaboard's largest island (Vancouver Island) remained practically untouched.² Only a few casual visitors had sailed to and visited the coast of the future British Columbia.

In 1778, Captain Cooke visited Nootka and his mention of bartering for sea otter furs in his journal of 1784 stimulated the organisation of British joint stock companies to finance trading in the furs in the lucrative Chinese market.¹ Russian and American traders were also involved in this fur trade, a trade which ended in the virtual extinction of the sea otter from the malpractices of the American traders. The first recorded trade in forest products was by Captain Meares³ who built a ship in Nootka Sound and, along with a cargo of furs, took ships' spars to China in 1778.

It is interesting that Archibald Menzies, a surgeon of the Royal Navy, accompanied the famous Captain Vancouver on his voyage of 1792 with the purpose of collecting botanical specimens for King George III's "very valuable collection of exotics at Kew" (Kew Gardens, London, England).¹ Menzies took specimens of Douglas fir [*Pseudotsuga menziesii* (Mirb) (Franco)] back to Britain in 1795, where it was described and illustrated in "A description of the genus *Pinus*" by Lambert in 1803.⁴ But it was David Douglas, a Scottish naturalist, who first collected cone specimens and seed from which the tree was first actually grown in Britain, in 1826 - 1827. One of these trees and some second generation trees are to be found at the present day in the Pinetum at Scone Palace, Perthshire, Scotland, the ancient seat of Scottish kings. David Douglas, as a youth, was employed as a gardener at the Palace before taking botanical training with the famous Doctor Hooker. The trees at Scone Palace are of value to British forestry by providing information to geneticists concerned with the growing of Douglas Fir in Britain.

The untouched Coastal forests of British Columbia in these early days impressed the traveller with their very large area and with the size of trees which they contained. In 1808, Simon Fraser and his party, in their gruelling attempt to reach the Pacific Coast from the vicinity of Prince George arrived at Yale and marvelled at the size of "Cedars five fathoms in circumference and proportionate height."¹

Amabilis fir [*Abies amabilis* (Dougl.) Forbes] was discovered by David Douglas in 1825 and later reported by John Jeffrey, a collector for the Scottish Oregon Society, from the Fraser River region in 1851. In spite

of this, botanists doubted its existence for a long time, since those who visited northwest America failed to see it. Although the species was catalogued for several years by authors who relied on the reports of Douglas and Jeffrey they came at length to doubt. In 1879, the well-known Doctor Engelmann, who was elaborating on the Abietineae (the Fir Tribe), boldly declared that there must have been some mixing of the specimens collected by Douglas and Jeffrey and the "lovely fir" was therefore a myth. However, in the following year (1880), Engelmann found the tree.⁴ During this early period of British Columbia's history, many tree species were translocated and introduced into Britain as exotics. Eventually, the success of these species under British conditions led to a revolution in British forestry.

Spain had long claimed territorial rights to the northwest Pacific Coast, based on Pope Alexander VI's Bull "Inter Caetera" of 1493, which divided the known world between the two great Catholic powers, Spain and Portugal. The British, Americans and Russians disregarded this arrangement and persisted in their trading activities. The Spaniards, working northward from Panama, then built and maintained a fortification at Nootka and violently opposed the British and American traders. However, the Nootka Convention of 1790 and a meeting of Cuaderna and Captain Vancouver in 1792 started a process of conciliation leading to the restoration of the area to the British in 1795, when the Spaniards left the area. Up to this time, none of the mariners, traders, diplomats or troops had remained as permanent settlers.¹

Meantime, the North West Company, based in Montreal, was becoming interested in extending its fur trading network (mainly in beaver pelts) to the west of the Rocky Mountains onto the Pacific Slope. The North West Company was an interloper into the Hudson's Bay Company's trading preserves but its explorers (the "Nor'Westers") were to pioneer routes of trade and travel through the Interior Region of the Province-to-be.

In (1879),⁷ Alexander MacKenzie explored into British Columbia and the Northwest Territories, reaching the Arctic Ocean via the MacKenzie River. His greater adventure, the overland voyage to the Pacific Ocean, started in 1793 and his party reached Bentinck Arm via the Bella Coola River. David Thompson and James Finley carried out more exploration for the Company, after which Simon Fraser was chosen to open the new western area for trade. Fraser later established Fort Saint James, Fort Fraser and Fort George, all of which, later, became settlements.¹ Eventually, the Hudson's Bay Company and the North West Company amalgamated.

In 1849, following the settlement of the "Oregon Territory Question" with the Americans*, Vancouver Island was declared to be a Crown Colony and was leased to the Hudson's Bay Company.² By the terms of the instrument the Company was made "Lordes and Proprietors of the Land forever", subject to the domination of the British Crown and to a rent of seven shillings per year. Lands for a naval establishment and certain other Government purposes were reserved and, if, after ten years, in 1859, the British Government so desired,

*under which the International Boundary was fixed at the 49th parallel, with the exception that all of Vancouver Island remained in British possession.

it might repossess the lands. In fact, it did and "forever" lasted only until 1859.

During the early period of British Columbia's history, little of significance to the future Province's forest policy and forest management occurred. The fur trade was the only commercial activity of importance and the exploitation of the vast and seemingly limitless forests had scarcely begun. The land and forest lay quiet, used only by the low population of native Indians whose demands were not great. The millions of trees grew and, if they did not fall victim to the uncontrolled devastation of forest fires lived through their life span, to succumb eventually to the power of the wind or to the ravages of insects or disease.

CHAPTER TWO

General Forest History. 1849 to 1912

Prior to the discovery of gold in the 1850's, the white population of what is now British Columbia consisted of a few traders and packers—a few hundred at the most.⁵ During 1857 and 1858 there was an influx of from thirty to forty thousand people. It has been said that three thousand would-be miners arrived in Victoria in the course of one day² although few actually settled there. Some individuals embarked upon projects to endeavour to support this population and supply food to it. Some grew farm crops and others imported cattle from the United States and so started the beef cattle and grazing industries. Although many of the new arrivals were quickly disillusioned and left the country, many remained. It was this sudden surge of population which led to the end of the Hudson's Bay Company's fur monopoly and to the repossession of the Colony by the Crown. The fur trading economy quickly gave way to the new gold boom economy which, in its turn, failed. It was only then that the population turned to the vast timber resource as a means of livelihood and the great volumes of timber available to the small population led, almost inevitably, to excessive and careless waste.⁵

Since the time of this early gold rush influx of people, a steady growth of population has occurred, as is reflected by the following statistics:—*

<u>Year</u>	<u>Population</u>
1871	36,247
1881	49,459
1891	98,173
1901	178,657
1911	392,480
1921	524,582
1931	694,000
1941	818,000
1951	1,155,000
1961	1,629,000
1970	2,190,000 (estimated)

In the early days, of course, there was no forest industry to speak of in British Columbia and the history of its growth, difficulties, endeavours and accomplishments are an integral part of the Province's forest history.

*These figures are quoted by Orchard.⁵ Up to and including 1921, they are taken from the Canada Year Book, 1921; From 1931 to 1962, both years inclusive, they are taken from "British Columbia Facts and Statistics 1962", page 6.

Without its industry, the Province could not have thrived as it has, nor is it possible that modern Governmental policies and the science and art of forest management could have reached their present state of development.

After Vancouver Island became a colony in 1849 with Blanshard as the first Governor, the Island was leased to the Hudson's Bay Company. James Douglas was appointed in 1851 to serve in the dual capacity of Governor and Chief Factor for the Company. He believed that the Company held a genuine interest in promoting colonisation but it must have become increasingly clear to him that the Company intended the new Colony to serve only as a protective bulwark for the fur preserve on the Mainland.¹ Even before he was aware of this intention, however, he concentrated most of his attention on expanding trade, particularly lumber exports. It has been said that the first sawmill in British Columbia was built in 1846 or 1847 by the Hudson's Bay Company on Esquimalt Harbour and the Company built a second at Millstream, near the present Parson's Bridge, about six miles from Victoria, in 1848.⁶ Shipments to the San Francisco market started from these mills in 1849 and little of the output was retained for domestic consumption.¹ The early files of the "Colonist" newspaper, published in Victoria, contains many reports of sailing ship movements in the export trade to many parts of the world, including California and the East Coast of America.⁵ A movement of private capital into a number of enterprises on Vancouver Island took place, with most of it probably being directed into the lumber business. James Douglas himself, with other Company employees, made plans to launch a private sawmilling venture, an attempt which has been described as "a most signal failure."⁷

Captain Grant built a sawmill at Sooke in 1850 and this industry thrived and grew with the passage of time. Also, Captain Cooper and Thomas Blinkhorn selected land at Metchosin, about seven miles from Fort Victoria and shipped piles, spars and squared timber to San Francisco. Their success attracted the attention of others and at least one San Francisco trading house placed an agent on Vancouver Island to purchase supplies of lumber. The settlers in the Colony generally took advantage of a ready market for logs, poles, roofing shingles and shakes.

These were the early beginnings of what was to become the major industry of the Province. Throughout Canada as a whole the timber trade developed at a late stage in Canadian economic history. The impetus was initially provided by substantial preferences afforded to Canada, as a vital support to the naval strength of Great Britain.⁸ Supported by these British preferences the Eastern Canadian lumber trade gained momentum and its strength was evident in the struggle of this trade against the abolition of preferences. After their disappearance, the trade gave a warm welcome to the United States - Canada Reciprocity Treaty of 1854. This Treaty, together with the shift from wind, wood and water transportation to steam and iron, hastened the expansion of the lumber trade to the United States. Thus, lumber shifted from being an export to the existing metropolitan areas of Great Britain to being an export to the less mature and rapidly expanding metropolitan areas of the United States. An economy which had been built up to meet the economic demands of Great Britain now supported the expansion of the United States.

The trade with the United States exposed the Canadian economy to the effects of the market fluctuations which were incidental to the cyclical disturbances of American business but on the other hand it was released from the dependence on long-term credit arrangements involved in the trade with Great Britain. The colonists of Canada shared in the general expansion of world trade which occurred in the 1850's,⁹ and the new and growing wood industry of British Columbia was subject to these influences. In addition, much of the early growth of the lumber industry in British Columbia has been attributed to demands arising from the Gold Rush in the late 1850's. Ships bringing in supplies and population during the Gold Rush found lumber to be a profitable return, or "back-haul" product.

In August of 1858, the Mainland was created the Colony of British Columbia and, in 1866, the two Colonies were united into one. These actions were to be followed, in 1871, by Confederation with the Dominion of Canada. At Confederation, it was decided to make natural resources the cornerstone of Provincial finance. Self-government and with it certain rights of assets including the public lands had been conceded to each of the provinces by the Imperial Government.

Ormsby¹ has given a lucid description of what the British Columbia lumber industry was like at this period when she writes of the industry at Burrard Inlet in 1869:

"... on both shores, ox teams were engaged in drawing logs down skid roads to the waterfront, Moody's new sawmill was run by steam, and at Hastings and Moodyville barques were loading heavy cargoes of spars and sawn timber for markets in Australia, San Francisco and South America and lighter ones for Mexico, China, England and the Hawaiian Islands."

In 1886, the first passenger train from Montreal arrived at Port Moody over the new Canadian Pacific Railway track.¹ This track opened the way for British Columbia to develop an extensive market on the Canadian Prairies and hastened the construction of sawmills both in the Interior of British Columbia and in the Coastal Region. The arrival of rail transportation also had other effects. Large numbers of Chinese labourers who had been employed on railway construction work in the Province drifted into sawmill and logging work, where they were welcomed by the employers because of the low wages at which they were willing to work. However, they were resented by white employees. The Government of British Columbia endeavoured to solve the problem in the Timber Act of 1886, by forbidding the employment of Chinese and Japanese persons on timber licences. The history of this dismal episode will be related in a later chapter.

Orchard has written of the United States at this period

"... the wholesale theft of publicly owned timber, (the ravages of) fire and the general wholesale abuse of the land and timber resources ... assisted by inadequate law, personal greed and public apathy and popular Government, subject to pressure, looking always to the popular course with a view to the next election--led eventually to some effective control measures."

These measures, taken in the United States, influenced sentiment and outlook in Canada. Sir John A. MacDonald, Prime Minister of Canada had, in 1871,

written to the Premier of Ontario expressing his concern:

"We are recklessly destroying the timber of Canada and there is scarcely the possibility of replacing it."

The British Columbia Legislature, about 1896, was not so alarmed at this possibility as it was desirous of achieving the rapid economic development of the Province.¹ The Legislature was composed largely of merchants, lawyers, industrialists and landed proprietors who had prospered during the era of railway construction. All of the major political figures had an assured social position but they lacked the vitality of men of an earlier generation, clinging tenaciously to the system of personal alignments which formed the basis of the Province's non-party tradition. The wealth of the governing groups, derived chiefly from investment in land, transportation systems, mines, lumbering, salmon canneries and flour mills had accumulated quite suddenly because the railway and the steam boat had provided access to additional markets. Ample evidence that transportation would continue to hold the vital role in the economic development of the Province was to be seen in the incidence of the new prosperity. With the building of the new railway, new towns had sprung into existence--Golden, and Farwell (now Revelstoke) were now engaging by steamboat in the trade of the Kootenay; Ashcroft had succeeded Yale as the depot for the Caribou; Kamloops had been transformed into the commercial hub of the Thompson River Valley; and, on the lower mainland, Haney was competing with New Westminster for the trade of the western Fraser River Valley. Impressed by these changes, and particularly, by the sudden emergence of Vancouver (located at the railway terminus and a seaport) as a commercial centre, the legislators were prepared to accord favour and protection to those companies and individuals who would risk capital in building new railways and steamship lines.

The result of this mode of thinking left much to be desired.⁵ As a part of the terms of Confederation, the Province ceded, to the Dominion, Railway Grant Lands to border the route of the trans-Continental Railway. One of the important, if not dominating, conditions of Union with Canada in 1871 was that the Dominion Government should build a railway connecting the seaboard of British Columbia with the railway system of Canada. When the terms of Union were under review, the people of Vancouver Island thought that the term "the seaboard of British Columbia" meant that the western terminus of the proposed railway would be in Victoria. The railway was visualised as coming through an appropriate pass in the Coast Range--Knight, Loughborough, Bute or Toba, bridging the various channels between the complex of islands there and then running southwards on Vancouver Island to the capital of Victoria. This vision, of course, did not materialise and, in order to satisfy Vancouver Island's claims, the Legislature provided for a compensating railway--the "Esquimalt and Nanaimo Railway"--and incorporated it into the Island Railway, Graving Dock and Railway Lands Act of 1884. The railway was to be constructed by the Dominion but the work was actually conducted by a private company with the aid of a cash subsidy from the Dominion Government. As its contribution to aid the construction of this railway the Province conveyed to the Dominion the well-known "E. and N. Land Grant". The Dominion administered the Grant, containing some of the finest timberlands

in British Columbia, for three years, holding the land in trust. They were then conveyed to the Canadian Pacific Railway Company under date of 21st April, 1887, upon completion of the railway. The E and N Block is clearly delineated on modern Provincial maps and more will be written of it in a later chapter.

From 1884 to about 1912, the Province freely granted lands in aid of railways. The Province contained two hundred and thirty-four million acres, only a few people*, an alarming public debt and, entering into the twentieth century, an annual budgetary deficit.⁵ The process of obtaining a grant is of interest. Almost anyone of standing in the community could obtain a railway charter and the valuable rights that accompanied it. In a small community like that of British Columbia, where businessmen and property holders sat in the House and where every prominent businessman was known to the legislators, it was difficult for a Premier, who himself had extensive investments, to refuse requests made by his friends and political associates. The Smithe Government had established a precedent in using public lands, a seemingly inexhaustible asset, to bonus the construction of wagon roads and railways and to pay the costs of reclamation schemes. The succeeding administrations dispensed subsidies of land, mineral and timber rights with bold and munificent gestures.¹

In order to obtain a railway charter and the accompanying rights, the applicant was required to insert on a printed form the names of the Directors of his company, the locations of the termini and the registered office; obtain the sponsorship of a private member of the Legislature for a railway bill and of a Cabinet Minister for a Subsidy Act. The system led to the most extraordinary and deplorable situations. Ormsby¹ has quoted the case of two Victoria merchants, acting in conjunction with two members of Parliament and a Senator, who secured, in 1889, the grant of fourteen million acres to build a railway from the Yellowhead Pass to Nanaimo and who proposed to bridge the channels of the island complex between the Mainland and Vancouver Island. The project did not materialise, any more than did most of the two hundred and ten schemes which won legislative approval before 1913. Possibly, the ultimate folly was one described by Orchard⁵ in which a grant of seventy-eight thousand acres was made to aid the building of a useless canal linking the Kootenay and Columbia Rivers at Canal Flats. The canal was built between 1883 and 1888 and, proving to be impractical, it was closed by filling it in, with the local Government paying the contractors \$2,500.00 for the purpose.

Some of the Railway Grants which were made have been listed by Orchard,⁵ as follows:

SOME BRITISH COLUMBIA RAILWAY GRANTS

<u>Name of Railway</u>	<u>Thousands of Acres</u>
Esquimalt and Nanaimo	2,110
Nelson and Fort Shepherd	500
B.C. Southern	3,755
Columbia and Western	1,348
Kaslo and Slocan	250
Columbia and Kootenay	188
Canadian Pacific Railway - Dominion Railway Belt	10,970
Peace River Block	3,500
Crow's Nest Pass	50

*The population was 178,657 in 1901 and 392,480 in 1911.

Ormsby¹ has recorded that the Government of John Robson, faced with an outcry from the merchants of Nelson over the granting to the Canadian Pacific Railway of valuable silver properties in the "Slocan Reserve" and, faced by the fact that the Canadian Pacific Railway acquired seven hundred and fifty thousand acres which his Government had granted in aid of three railway schemes in the Kootenay, became more cautious. By 1892, the Government had removed practically all of the major weaknesses in the Land and Mineral Acts; coal and water resources had been vested in the Crown; minerals were exempted from railway charters; a limit of six hundred and forty acres was placed on each private purchase of Crown land; and timber lands had been described in a legal fashion, with a limit being placed on their sale. In 1912, the Province repossessed by purchase four million acres of the Railway Grants and in 1930, another fourteen million four hundred and seventy-six thousand acres in the Railway Belt and the Peace River Block, at the time of the return to the Province of the Dominion Lands. The history of the Railway Grants and their repercussions is not yet over and more will be written of them in a later chapter.

In terms of the overall Canadian timber trade, it has been mentioned that there was a shift of Canadian exports of lumber to the United States, started by the Reciprocity Treaty of 1854. The slight difference in bulk between sawn lumber and unprocessed, round logs when transported resulted in the imposition, by the United States, of tariffs which favoured the export of logs rather than lumber. The effect of these tariffs, of course, was to encourage the movement of logs from Canada to assist the United States sawmills which would saw them, rather than importing lumber sawn by a Canadian industry. These tariffs were countered by the Canadian authorities, with export taxes and embargoes on the export of Canadian logs, in order to compel United States mills to migrate into the Dominion. The arrangements made at Confederation for the control of resources by the Provinces, as strengthened by Privy Council decisions, limited the value and effect of export taxes levied under Federal direction and the result was that, in 1898, following the Dingley Tariff, the Province of Ontario imposed embargoes on the export of sawlogs cut on Crown lands within the Province. This experiment was adopted by other Provinces and British Columbia restricted export of logs in 1906, from which time continuous export control has been exercised.

Whilst these various policy and administrative factors were operating, the growth of trade and industry continued. It has been remarked that the period from 1895 to 1920 were 25 years of expansion such as had not been achieved before by the Canadian economy.⁹ British Columbia was well to the fore in this expansion. The Canadian value of exports of wood and paper products was multiplied by nine and external trade per capita by four. At the beginning of this period, British Columbia's products were virtually all lumber, with no pulp or paper products. The enlargement of the United States market and the removal of the United States duty on newsprint in 1911, added to other favourable circumstances, resulted in a rapid expansion of the pulp and paper production in the province, from almost no production of these items prior to 1911.

During the earlier part of the period from 1884 to 1912, the forest

policy of the Province amounted to nothing more than an effort to control cutting and to collect some forest revenue from industry. There was still a very large excess of overmature and mature timber in relation to the size of the industry and stumpage values* were too low to permit of much thought of conservative forestry practices.

Motive power in the woods was provided by slow-moving oxen. Only the best quality logs in commercially desirable species such as Douglas fir and western white pine (Pinus monticola, Dougl.) were taken out of the woods for utilisation and butt logs frequently had to be left at the stump because the oxen could not move them to the skid road or because the sawmills did not have saws big enough to cut them. In many cases, the sawmills were driven by water power. Normally, none of the tree was cut for logs above the level of the first limbs. Markets were almost all export markets of a selective kind and the lumber was shipped on slow-moving sailing ships.

Eventually, oxen were replaced in the woods by faster horses and in the Coastal Region at least, after about 1890, horses gave way to steam. The oxen and horses did have the merit that they did not cause excessive damage to those trees which the logger did not cut but left standing—they were not strong enough—but with the advent of steam power, all young, immature stands and any trees of less than about twenty inches diameter at breast height were liable to be pulled down to add to the accumulation of debris on the ground. The amount of slash or debris left on the ground after steam-power logging was incredible and it generally contained more sound wood than had been removed as logs.

It was in the United States that experiments had been conducted in the use of various pieces of power machinery for logging, including rebuilt and adapted farm steam tractors. The first practical machine was the "Dolbeer" donkey, custom built in the first instance for Dolbeer and Carson, redwood loggers of Eureka, California. This machine came to British Columbia in the early 1890's.

Just after 1900, Ormsby has recorded that the westward sweep of American lumbermen across the pine forests of Michigan, Wisconsin, and Minnesota reached Oregon and Puget Sound and then extended northwards to the British Columbia Coastal and East Kootenay forests. From these two areas of the Province timber cruisers brought back enthusiastic reports. The Fernie district of the East Kootenay, close to the lucrative and expanding market on the Canadian Prairies, felt the American investment first. Near Coal Creek, the Canadian Pacific Railway had been cutting timber since 1894 to supply its needs for the building of new branch lines and the repairing of old lines. But it was American interests from St. Paul, Minneapolis who really exploited the area's timber resources by building large mills (for their day), capable of cutting 75,000 to 150,000 board feet of lumber per day. Labour costs were reduced, as described previously, by the introduction of steam locomotives, donkey engines and other

*The stumpage value, or purchase price of the standing tree, was fixed at fifteen cents per tree, with the exception of western hemlock (Tsuga heterophylla (Rafn). Sarg.) for which there was no charge.

power machinery. Only the highest grades of logs were used. Some of the lumbermen obtained Timber Licences from the Government but did not log them very much, preferring to hold them for speculative purposes, in anticipation of a rise in stumpage values. These lumbermen also entered into mutual, price-fixing agreements and, by 1905, most of them owned their own lumber yards in Canadian Prairie towns.

In 1903, there was an acceleration of the period of growth and prosperity which had started in the Province in 1895. By 1908, following the successful introduction of fruit trees into the Okanagan Valley by Lord Aberdeen, about a million fruit trees had been planted and land that had been selling, ten years before, for one dollar per acre was selling, planted to fruit, at the unprecedented price of one thousand dollars per acre. The mood of the population was buoyant and optimistic. These and other favourable portents attracted still more American capital and American settlers.¹ It has been stated that, from 1907 to 1910, American interests increased their investments so rapidly that the total American investment in British Columbia timberland and mills reached the figure of five million dollars. A few examples of American and Canadian investment in British Columbia during this period have been mentioned by Ormsby.¹ After acquiring five million board feet (B.C. Log Scale) of pine timber in the neighbourhood of Harrison Lake and further holdings at Jordan River, Quatsino Sound and Powell Lake, M.H. Scanlon of Minneapolis founded the largest pulp and paper company in the West at Powell River. The Rockefeller interests took up timber within the E & N Railway Belt. Prominent Eastern Canadian lumbermen including the McLarens from the Ottawa Valley, George McCormick of Orillia and John Hanbury of Grandon, also made large investments. Colonel A.D. McRae of Winnipeg, in conjunction with Senator Peter Jansen of Nebraska purchased an important sawmill at New Westminster. In association with the Swift brothers (the Chicago meat packers), William MacKenzie, Donald Mann and D.B. Hanna, an American industrialist, McRae organised a company with a capitalization of twenty million dollars, purchased seventy-five thousand acres of standing timber between Comox and Campbell River, transferred the assets of his first company to the Canadian Western Lumber Company and soon expanded that company's timber holdings until they became the largest, for a single company, in the world. European capital also entered the Province. As an example, Baron Alvo von Alvenslehen, acting for German investors, acquired six large logging camps, a number of booms of logs and a large acreage of high quality timberland. Whilst this influx of capital was a primary factor in the development of industry, it must not be thought that development was entirely dependent on imported capital. Particularly in the Interior, a number of lumbermen were establishing small usually portable, mills and some of these men achieved financial success at a later time. An example of a man who started without capital, built a substantial lumber and plywood company and subsequently became a benefactor to his community was the Ontario-born S.M. Simpson, who established in Kelowna.

This chapter has been devoted to describing the background and some of the more important events in the forest history of British Columbia during the period from 1849 to 1910. Fundamentally, the extensive forests of the

Province were undergoing increasing utilization by a growing industry. The process was destructive to the forest but since the extent of utilization, in terms of acreage and volume was not great in comparison with the large forest resource, the Government and the public were slow to react to the inherent danger of the process. To the contrary, extensive grants of timbered land were made, frequently with largesse, to subsidize railways and attract industry. With increasing settlement, the destruction caused by forest fires increased and many burned unchecked, particularly in inaccessible areas. The large quantities of logging slash added to the hazard of fire. The losses from forest fires during the period under discussion are unrecorded but Orchard⁵ has asserted that fires, on a disastrous scale, continued in the forests of the Province to a peak of destruction about 1908, after which the situation was progressively improved.

CHAPTER THREE

Forest Legislation in British Columbia. 1849 - 1910

The legislation governing the forests of British Columbia, as enacted by the successive Legislatures has had a profound effect upon forestry. The Province is the major owner of forest land (96%), private forests forming a very small percentage of the total, to an extent that has no equal in the western world.

The first legislation in British Columbia, based on its present boundaries, was a Proclamation (No. 241) of the Colony of British Columbia and dated 11th April 1865, which permitted the Governor to grant any size of lease of unoccupied land to an authorised party who was engaged in cutting spars, timber or lumber. The rent, terms and provisions of these leases were those considered to be expedient to the Governor.

On the first of June, 1870, this first legislation and all existing land laws were consolidated into "An ordinance to amend and consolidate the laws affecting Crown lands in British Columbia." Apart from the granting of leases, as permitted under Proclamation No. 241, there were a series of provisions, in the Ordinance, which dealt with pre-emptions but there was no mention of the timber which stood on pre-empted lands. This left the way open, in effect, for settlers to pre-empt timber land, thereby gaining ownership of both the land and the timber. However, there was another provision (No. 47) in the Ordinance which said that unless it was announced otherwise, a conveyance of land would include all the trees on it and all mines and minerals under it. The exceptions were gold and silver mines and any gravel, rock etc., that might be needed by the Crown for public works.

It is a remarkable fact that at this time (1871) and in the early legislation of the Province relating to timber, the law did make provision to lease and not to sell timber. In spite of this, timber lands were sold or were given away as subsidies, such as grants-in-aid of railways. Orchard⁵ thought it doubtful that the legislators of 1870 had any clear-cut ideas of forest management or any particular convictions about it. It seems likely, though, that they would not tolerate timber theft or trespass, of which numerous had examples had occurred in Eastern Canada and the Eastern United States and were currently occurring in the Western United States. There was a strong feeling that the timber industry must be encouraged. However, since it was accepted that the industry must not use timber as it saw fit, some means must be provided so that it could acquire timber easily--hence the provision for leases. As a secondary issue, the leases might prove to be a source of much-needed revenue and arrangements were made for taking possible rental revenue and for applying special terms and conditions to a lease. It was only at a later stage that the catastrophic damage caused by forest fires would change the thinking of Government and public alike and become a major factor in the introduction of forest management into the Province. At the time (1870 - 71) both legislators and the public held lingering hopes for the success of the gold economy and the illusion, in common with most North American thought, that the forests were an inexhaustible resource.

The "Land Act" of 1874 authorized the sale by the Province, of unappropriated land for one dollar per acre. In the same year the Legislature approved "An Act to prevent the careless use of fire in woods and forests," the short title of which was the "Bush Fire Act, 1874." This was the first British Columbian forest fire law. Under this law, if a person had started a fire on another person's land and left before it was thoroughly extinguished, he was, liable to a maximum penalty of one hundred dollars. In a somewhat similar vein, if a person lit a fire or allowed it to be lit on his own land and the fire escaped onto someone else's land where it caused damage, a similar penalty applied. However, the Act also specified:

"This Act shall not be enforced in any District unless a petition be presented to the Lieutenant Governor in Council, signed by at least two-thirds of the settlers of such District."

In effect, this provision made the Act useless and there is no record that it was ever invoked by the required two-thirds majority. Perhaps the Act's real significance lay in its demonstration of an awakening forest consciousness on the part of the people and the legislators.

In 1875, as an administrative measure, all of the previous land enactments were repealed and then incorporated into a new consolidated "Land Act." The purpose of this action was to clarify and simplify the laws of the Province. Thus, during a year of consolidation, all laws as revised by any amendments are published as the "Revised Statutes" which then are the current legal authority. There were "Land Act Amendment Acts" in 1879 and 1882 but no significant changes occurred in the sections concerning forests.

As has been mentioned in a previous chapter, an important or dominating condition of the Union of British Columbia with Canada was the construction of a railway connecting the seaboard of British Columbia with the railway system of Canada. When the people of Vancouver Island discovered that "seaboard" did not mean the capital city of Victoria they were compensated by the passage of "An Act relating to the island railway, graving dock, and railway lands of the Province" in 1884. This Act incorporated the Esquimalt and Nanaimo Railway and granted two million, one hundred and ten thousand acres of high quality timberland in aid of the construction and operation of the Railway.

Also in 1884, there was approved "An Act relating to the cutting of timber upon Provincial lands and for the purpose of deriving a revenue therefrom," also known as the "Timber Act, 1884." This Act was of 32 sections, covering a multitude of provisions, among which there was authority to grant cutting licences or leases which could not exceed 1,000 acres each in extent. Also they could not be granted for a longer period than four years at an annual fee of ten dollars. In effect this authority simply continued that which was specified in Proclamation No. 241 of 1865 but it specified the maximum size of lease which could be granted, the duration of the term of lease and the annual charge, all of which, previously, had been discretionary. Before and after 1884 the Colony and the Province continued to issue Timber Leases, although, after 1884, they were few in number. All of the Timber Licences which were issued were based on the authority contained in the "Timber Act, 1884" and thus,

obviously, were issued after that date. As will be described later, Timber Licences have been and are an important form of tenure in British Columbia's forest history. They were issued in large and, as it proved, excessive numbers.

Without wishing to become too legalistic, it is important to understand the significance of the change from Leases to Licences. Orchard⁵ mentioned the comments of the legal counsel for the Forest Service* in an address to the Forest Club at the University of British Columbia in 1954. Cooper expressed the opinion that a lease is a form of tenure of freehold, governed by complicated rules of law, which in substance is a lease of the soil, carrying with it exclusive and quiet possession. This, in Cooper's opinion, exceeded what was needed in making sales of timber. In his view, a licence was adequate to provide the buyer of timber with the right to enter on the lands and to cut and remove timber without interruption. He defined a licence as "a form of grant of rights and privileges made by one person to another to take, use and enjoy the property of the party granting, on the terms stipulated in the grant. Where valuable consideration is involved, it becomes a type of contractual right, what is known as a specialty contract, and is an ideal and proper form of contract for the sale of timber." To the layman, this statement might be paraphrased in general terms to mean that a lease involved a holding of land and timber, whereas the licence involved only the timber.

Under Section 9 of the "Timber Act, 1884," the timber licensee was required to keep

"an account in writing of the number of trees felled,"
and, at the expiration of every six months, to furnish a sworn statement
"and shall then forthwith pay . . . in respect of each tree felled the
sum of fifteen cents."

Wood was very cheap indeed, especially when one considers that Section 31 of the Act added:

"This Act shall not apply to the cutting of trees known as hemlock."
To digress for a moment, it was only in the year 1914 that western hemlock began to appear as a revenue producing species. A sale of 6 million board feet, British Columbia Log Scale, was reported in the Forest Branch Annual Report of that year, at an average price of 52 cents per thousand board feet. The Forest Service Annual Report of 1962 reported that somewhat more than one hundred and twenty million cubic feet by log scale were sold at \$2.51 per cunit,* approximately equivalent to seven hundred and twenty million board feet at \$4.18 per thousand board feet.

The "Timber Act, 1884" also provided for the free use of timber by persons such as travellers and miners and in domestic uses, schools and steamers. There was a penalty for "trespass" (unauthorized cutting of timber on lands owned by the Province or by another party) of one dollar per tree, although materials used for making up log rafts--"rafting stuff"--was exempted from this penalty.

* Clarence Cooper, a lawyer and forester.

* a cunit is one hundred cubit feet.

To enforce these and other provisions, timber inspectors could be appointed and the first of these appointments was made in 1888, when appropriations were made for

"forestry inspector \$1,500.00 and one inspector at \$125.00 per month."

For the first time in British Columbia's forest history, the scaling or measuring of logs was required. The Act specified that logs must be scaled before they were sawn. British Columbia's first official scale rule was described as follows:

"The rule laid down and prescribed Scribner's lumber and log book as copyrighted in 1882 by George W. Fisher of Rochester, New York."

Actually, this was the Doyle Rule, as it was later described in Section 21 of the Land Act Amendment Act of 1888. It is no longer in use in British Columbia.

In addition to the stumpage charge of 15 cents per tree (excluding hemlock), the 1884 Act provided for additional dues of 20 cents per^M board feet. In effect, this was the first timber royalty to be levied in British Columbia, even though the term "royalty" did not appear in the Statutes until the "Land Act Amendment Act" of 1892. It is extraordinary, in view of these facts that at the present day a Royalty impost on timber in British Columbia is deemed by the Government to date from the "Act to amend the Land Act, 1884" which became law on 7th April, 1884. In simple terms, the distinction between royalty and stumpage is that the rate of royalty is a fixed charge set by the Legislature, which may only be changed by the Legislature. At the present day stumpage is a variable charge which is calculated by Forest Service appraisals of the value of a particular area of timber. Stumpage may be increased by bidding above the level set by the Forest Service appraisal. There are regulations which complicate this simple distinction and there is one school of thought that regards royalty as an historic legal anachronism, and the two charges are commonly lumped as "stumpage and royalty." However, because of the legal background of some of the early forms of tenure granted by the Provincial Government, it is necessary to retain the distinction. At the present day, three applications of royalty are recognised, and these are:

1. On lands granted before 7th April 1887—no royalty.
2. On timber from lands granted on and after 7th April 1887 but before 1st March 1914—a royalty of 50 cents per thousand board feet, as imposed by the "Land Act Amendment Act" of 1888.
3. On timber taken from lands granted on and after 1st March 1914—current rates as set out in the "Forest Act" which may be changed from time to time by the Legislature.

It may be concluded from these remarks that the "Timber Act, 1884" was notable for establishing the first specific stumpage charge and detailing how it should be paid; for recognizing, for the first time, the principle that logs should be scaled before sawing; for imposing the first royalty; and for establishing the first official log scale.

The "Timber Act, 1886" made a few insignificant amendments to the 1884 Act and was repealed in 1888. However, it did forbid the employment of people

of Chinese and Japanese races on Timber Licences. The basic reasons for the introduction of this prohibition have been described in Chapter Two but more detail of this social problem can usefully be given at this point. A condition is written into all timber licences issued subsequent to the "Timber Act, 1886" that

"No person of the Chinese race who is not a British subject and no person of the Japanese race shall be employed in or upon the cutting or removal of any timber of this licence subject, however, to the rights of any such person under any treaty having the force of law in Canada."

Under the "Land Act Amendment Act" of 1901, difficulties which had arisen because of the specific naming of races were dealt with by amending the offending section to specify that no person was to be employed in or on a Licence of the Crown who could not read "in a language of Europe this section." However, in spite of this devious approach the Legislature again minced no words by adopting a resolution in 1902 to the effect

"that in all contracts, leases and concessions of whatsoever kind entered into, issued, or made by the Government, or on behalf of the Government, provision be made that no Chinese or Japanese shall be employed in connection therewith."

The resolution was acted upon by the passing of two Orders-in-Council which implemented its intent. In the "Labour Regulation Act, 1905" the "No Oriental" labour policy was extended to cover a wide variety of employment dependent upon the Government, with effect from 1st August, 1900.

In the light of the present-day emphasis upon non-discriminatory labour practices, the Canadian Bill of Rights and public sentiment generally, the Government policy described is remarkable. The expropriation of property and imprisonment of Japanese aliens during the Second World War is, nowadays criticized as having been unduly harsh. Even so, the latter actions took place during a crisis of war, whereas the actions of 1888 to 1905 took place in peacetime and, apparently, were supported by a considerable segment of popular opinion within the Province. However, in 1920, Brooks, Bidlake and Whittall Ltd. refused to accept the existing legislation and persisted in their employment of Oriental labour. As a result, the Provincial Government referred the "Oriental Clause" to the British Columbia Appeal Court in a case commonly known as the "Brooks-Bidlake" case. The Appeal Court decided, in favour of the company, that the clause was invalid because it conflicted with the British North America Act and the Japanese-Canadian Treaty of 1913.

The Government did not give up. In 1921, it attempted to validate the Orders-in-Council by an Act of the Legislature—the "Oriental Orders in Council Validation Act." Brooks-Bidlake also persisted by applying to the Supreme Court of British Columbia, from which Court it obtained an injunction against the Province based on the earlier 1920 decision of the British Columbia Appeal Court. The Province then appealed the decision to the Supreme Court of Canada. In 1923 the Supreme Court decided that the British Columbia Act was invalid but upheld the Province's case against Brooks-Bidlake. The latter then appealed to the Privy Council in Britain which decided that the Province's "Oriental Act" was invalid. From 1923 to 1947 the Province continued to use the Oriental clause without the sanction of law. Orchard⁵ has remarked:

"Whilst this problem is not connected with forest policy, it caused much difficulty for forest administration in British Columbia."

It is perhaps difficult to visualise, in the year 1970, the persistence of the Province in regulating the "right to work" on a racial basis, when recent events and opinion, particularly in the United States, tend to the antithesis. Ormsby has indicated that labour strongly supported the ban on Oriental labour. She has explained how, in British Columbia, the concentration of capital in a few hands, the sharper definition of class lines and the indifference of the Legislature to social reform accelerated labour organization. In 1886, the Working Man's Protective Association (founded in Victoria in 1879) presented candidates in Victoria and Nanaimo in the Provincial Election. Labour was not well organised but succeeded in making Chinese exclusion and "landlordism" the two chief issues in the campaign. Later, the Nanaimo miners organised the "Miners' and Mine Labourers' Protective Association" to fight for an eight hour working day, Union recognition, the arbitration of industrial disputes, the limitation of Chinese immigration and other benefits." It is clear that, in the Oriental labour episode, the Government received the strong support of the white workers of the Province and that all classes of society were generally in support.

The Oriental episode was concluded in 1947, following the internment and dispossession of property which Japanese underwent during the Second World War. At the present day the antipathy, in terms of public attitude, has disappeared and does not influence forest legislation or policy.

The year 1887 saw the passage of an Act to amend the "Bush Fire Act, 1872" but it contained nothing of current importance or interest. Another act of the same year amended the "Land Act" of 1884 and embodied the important provision that lands chiefly valuable for the growing of timber should not be sold. This amending act, however, was not very effective in its results. Its importance lies in being the first legislation to implement a policy to reserve forest lands in public ownership, a policy which has remained in effect up to the present day. The Act provided that:

"Notwithstanding anything in the "Land Act, 1884" contained, none of such of the public lands of the Province as are chiefly valuable for timber shall be disposed of by public or private sale."

It was also specified that:

"Before any Crown Grant under the "Land Act, 1884" is given to any person, he shall subscribe and make a solemn declaration before some Justice of the Peace that the land in question is not chiefly valuable for its timber."

To anyone who has a sound knowledge of the intricacies of land and forest valuation, this latter provision will be most extraordinary and it was unrealistic to impose it upon the farmer or average settler in a newly developing country, where land and timber values were liable to fluctuate rapidly and unpredictably. It also had the administrative weakness that it is not reasonably proof against malpractice. In practice, it was ineffective.

During 1888, a "Land Act Amendment Act" repealed the "Timber Act, 1884", the "Timber Act, 1886" and the "Land Act Amendment Act, 1887" but re-enacted the repealed provisions with some elaboration. It continued the authority for

the Government to issue leases and licences and imposed a rental of 10 cents per acre upon them. The royalty of 20 cents per thousand board feet of the Act of 1884 was replaced by one of 50 cents.

A new feature of policy was introduced, designed to induce the manufacture or conversion of timber within the Province, rather than encourage log exports. It was also designed to prevent or discourage the accumulation by one, or a few persons or companies, of excessively large timber holdings. The feature was to be introduced into all leases, to the effect that all timber leaseholders must build "somewhere in the Province" a mill capable of cutting not less than one thousand board feet of lumber per twelve hour day, for every 400 acres of land within the leases." Whilst this provision was not too onerous in practice it was, nevertheless, not very effective. Under present conditions of integrated industry, the utilization of smaller and smaller trees (known as "close utilization"), specific economic sizes of manufacturing units and increasing sophistication of the conversion processes, a provision of this kind is quite impractical and is poor policy, since it is both economically unsound and is out of step with social demands on the forest industry. The provision is still contained in the leases but, at the present time, it is disregarded by both industry and Government as being unrealistic and impractical.

Under the Timber Act, 1888" the authority to issue timber licences continued, the size of each licence being limited to a maximum of one thousand acres. No more than one licence could be issued to any one person and, a highly significant provision as will be seen later, they could not be transferred from one person to another.

Hand Loggers' Licences, which could be obtained at a fee of ten dollars per annum were introduced for the first time. A hand logger's licence was a personal licence catering to the very small logger and has since been abolished. It was restricted to a described area and the use of power tools of any description, with the sole exception of a "jack" was prohibited. No stumpage, ground rent or forest protection dues were paid. The licences were usually selected to lie on ground sloping steeply down into sea water so that a log would slide down easily and float by itself. Although they were common at the beginning of the twentieth century their numbers dwindled as suitable vacant Crown land carrying good quality timber became more difficult to find. The licences were quite popular since when working on a "good chance," the hand logger could earn several times the amount of the day wages paid in the logging camps. Whilst the provisions which have been mentioned governed the licences throughout most of the time that they were issued, originally, in 1888, the hand logger was permitted to log anywhere on unoccupied Crown land and he was unrestricted in the use of his equipment. In addition, the rights conferred by a licence were personal and could not be transferred. It was in 1906 that an amendment of the "Land Act" forbade the use of steam and in 1908 when another amendment confined the licensee to specified areas. The latter restriction was removed in 1909 but, thereafter, the area of operation was described in the licence document itself, a more flexible procedure. The Royal Commission of

1909 - 10, which will be described later, strongly recommended the discontinuation of this type of licence but no action was taken on this recommendation until 1966. At the time of their abolition, the hand loggers' licence cost \$25.00 per annum.

The following two tables show the increase and decline of the licences:

RATE OF ISSUE OF HAND LOGGERS' LICENCES IN SELECTED YEARS
FROM 1900 to 1962

<u>Year</u>	<u>Number of Licences Issued</u>
1900	158
1907	573
1909	65
1953	4
1962	2

THE DECLINE IN THE NUMBER OF HAND LOGGERS' LICENCES AND
VOLUME OF TIMBER SCALED FROM THEM, 1915 TO 1956

<u>Year</u>	<u>Number of Licences</u>	<u>Volume scaled f.b.m.</u>
1915	222	Not reported
1920	261	Not reported
1925	111	10,542,541
1930	63	5,413,150
1935	43	5,324,156
1940	15	1,520,297
1945	6	401,085
1950	4	352,623
1955	1	139,733
1956	1	--

Thus, hand loggers' licences, in spite of the Royal Commission's recommendation, were not abolished by legislative action. Rather, they disappeared under the pressures of changing technology, economics and society and are an excellent example of the effects of these forces of change upon the practice of forestry in British Columbia. In the "Land Act Amendment Act, 1888," the Doyle Rule was continued as the official log scale of British Columbia, in much the same terms as were employed in the Act of 1884.

In 1890, a new "Bush Fire Act" was introduced into legislation but it did not result in much progress being made. The new Act fixed a closed season, although it was not described in these words, from 1st May to 30th September, during which time anyone starting a fire for cooking or for comfort was required to select a suitably safe spot, free from debris. If such a fire during the closed season did any damage "by reason of gross carelessness or negligence," the culprit was liable to a fine of between \$50.00 and \$150.00 or to imprisonment for three months. In 1889, an amendment to the "Bush Fire Act" had introduced the questionable provision that, when a miscreant was reported for starting a forest fire

"one moiety of the penalty be paid to the informer."

The "Bush Fire Act, 1890" continued this practice of paying one-half of the fine to the informer.

In another sector, fire prevention measures were strengthened in 1890 when a "British Columbia Railway Act" required railways to provide spark arresters on their engines and to provide other protective measures. However, this Act could only apply to railway operations which were conducted under Provincial Charter, such as logging railways, and not to those which were under Dominion Charter. Also, the "Timber Mark Act, 1890" was passed which required that official marks should be stamped into logs floated in waters of the coast as a means of identifying them. However, the law did not extend, at this time, to the Interior Region or to "dry land" logging.

Up to this time, no attempt had been made to classify Crown lands according to their value but the "Land Act Amendment Act" of 1891 made a classification for the first time in the Province's history. "First class" lands were described as lands

"which contained timber suitable for lumbering purposes (ie. lands which contain milling timber to the average extent of 5,000 (board) feet per acre to each 160 acres)."

"Second class" lands were those that carried less than this amount of timber. In 1894 the "Official Scalers' Act" became law. Official scalers were appointed into Government employ and industry paid the Government Official Scaling Fund for their services. The Province was divided into six scaling districts for this purpose. The Act was rudimentary and ineffective at first but later it was applied successfully to the Coastal Region where it is still in effect. Although there are some official scalers in the Interior at the present day, most of the scaling there is done by licensed scalers. These are men employed by the companies and who are licensed by the Government. The licensed scaler is regarded in some quarters as a curious concept. The scaler's work requires him to establish the volume of wood which the Crown is selling to a buyer and yet the scaler is paid as an employee of the buyer. There have been individual instances of corruption of licensed scalers and it is perhaps remarkable that corruption is not more widespread.

Up until 1894, the Doyle Rule had been the official scale of British Columbia, as has been mentioned previously. However, a Commission was appointed to evolve a British Columbia Log Rule, with R.H. Alexander, A. Haslim and M. King as its members. The Commission reported to the Chief Commissioner of Lands and Works on 28th September 1894 and its recommendations were adopted by Order-in-Council No. 104 of 9th September 1895. The Official British Columbia Log Scale has been in use since that date, at first only on the Coast but, later, in the Interior. The British Columbia Cubic Foot Scale was later introduced but not to the exclusion of the Board Foot Scale. However, in the autumn of 1970, the Minister of Lands, Forests and Water Resources announced that, from 1st June, 1972, all scaling which involved the Government would be in firmwood cubic scale only. The announcement came as a result of recommendations of a committee composed of L.F. Swannell, Chairman (and Chief Forester of British Columbia), G.A. Dunbar and J.D. Sexton made during 1970.

In 1896, another Fire Act became law and the "Bush Fire Act, 1890" was repealed. The new Act provided for the formation of fire districts by Order-in-Council and laid down safety rules for the various kinds of fires, including land-clearing fires. As before, half of any fines were still to be paid to the "prosecutor" and the burden of proof was upon the defendant. It is a good indication of the great concern of the Province to effect the control of forest fires and reduce losses that the latter requirement, apparently contrary to the principles of British justice, should have become law.

A "Land Act Amendment Act" of 1896 declared that, if any payment of royalty became overdue, a Crown lien could be placed on the mill and timber. This same Act defined "Timber Land" as any land carrying an average of eight thousand board feet of timber per acre west of the Cascade Mountains (ie. the Coastal Region) and five thousand board feet of timber per acre east of the Cascade Mountains (ie. the Interior Region) for each one hundred and sixty acres and it forbade the sale of any such timberlands. This particular definition with the reservation from sale is one of the important landmarks in the forest history of British Columbia and in the development of the Province's

forest policy. It resulted in the Province retaining the highest percentage of forest land under State ownership in the western world. In North America, the more recently the settlement of an area occurred, the greater is the percentage of State ownership of forest land. In 1957, in the United States (including Alaska), State (public) ownership accounted for twenty-seven percent of the forest land ownership. In the more recently settled West Section of the United States (encompassing eleven States and part of another) sixty-six percent of the land was in public ownership. In British Columbia, 94.4% was owned by the Province¹⁰ and a small additional amount (0.8%) was under Dominion of Canada control.

In 1897, an ambitious "Lumber Inspection Act" was enacted and proposed to create a Lumber Inspection Board, appoint Surveyors of Lumber and draw up lumber grading rules. This particular act was to have come into force on a date set by proclamation of the Lieutenant-Governor in Council but there is no record that it was ever implemented.

During the year 1899, a "Land Act Amendment Act" stated that timber leases (containing the clause mentioned previously, that a mill with a capacity of one thousand board feet for each four hundred acres of lease must be built) would pay a rental of fifteen cents per acre and a royalty of fifty cents per thousand board feet, all of which must equal not less than fifty cents per day throughout the year. The leases were to be granted only after public competition, to the party tendering the "highest cash bonus."

The "bonus" bid provision is of considerable interest. A bonus system for the sale of timber was in wide use in Eastern Canada at the time and was also used by the Dominion Government in its sale of timber berths. An interested party would offer a cash bonus in excess of the statutory dues, such as rental and timber stumpage price. In the case of a large cash bonus, the purchaser was permitted to pay by instalments. However, the bonus system was repudiated in the "Forest Act" of 1912 and was never actually used in British Columbia.

The "Land Act Amendment Act" of 1901 authorised the issue of twenty-one year renewable pulp leases and permitted proposed lease areas to be reserved for two years pending the selection, by the applicant mill, of the pulp lease areas. The conditions which governed a pulp lease, where it was of the long (twenty-one year) term were comparatively lenient and favourable to industry. The rental was set at two cents per acre and the pulpwood sold for twenty-five cents per cord. The lessee had either to have or to build a mill of a daily capacity which was not less than one ton of pulp or half a ton of paper for each square mile of the lease.

The same Amendment Act permitted Special Timber Licences, not larger than six hundred and (fifty) acres in one rectangular block (80 x 80 or 40 x 160 Gunther chains), to be issued. They could only be issued for one year and were not transferable. However, they could be reserved at the discretion of the Chief Commissioner of Lands (the Minister) for a fee of one hundred dollars per year. These tenures were the forerunners of the Special Timber Licences that still exist and are of special interest in view of later developments. The "Land Act Amendment Act" was repealed and re-enacted in an amended form in 1903 - 04.

The "Bush Fire Act Amendment Act" of 1902 established a legal forest fire season from 1st May to 1st October annually, making it unlawful to start fires during this season in any fire district unless the person who lit it, or his servants

"constantly watched over and cared for such fire and observed every reasonable care and precaution to prevent such fire from spreading."

In the enactment, the term "culpable or intentional negligence" was removed from the law, since it was very difficult to prove in most cases when someone was accused of starting a forest fire and was replaced by a lack of "reasonable care and precaution." At this time the Government still employed no forestry field staff and the "Bush Fire" laws only applied in proclaimed fire districts, of which none are known to have existed. The theoretically admirable fire laws were somewhat futile in practice.

Also, in 1902, the "Official Scalers' Act, 1897" was repealed and the "Timber Measurement Act", of much the same import, was enacted. Under the new act, the use of the British Columbia Log Scale was obligatory for all timber on which royalty was due but the Act only applied to the region west of the Cascade Range (the Coastal Region).

The "Land Act Amendment Act" of 1903 instituted a timber tax which goaded the Provincial wood industry to take the Provincial Government to court. In an attempt to stimulate timber conversion or manufacture within the Province or perhaps to raise larger amounts of revenue, the Amendment Act levied a stiff tax on all timber on which royalty was not payable. The tax could be as high as \$5.50 per thousand board feet on long, graded logs. If, however, the timber on which the tax had been paid was manufactured within the Province and therefore not exported as logs, then the payee was entitled to a refund of all except one cent per thousand board feet. The tax was levied and paid for 26 years, until 1929, when the MacDonald-Murphy Company Limited refused both to report, or to pay tax on, a sale of logs for delivery in the neighbouring state of Washington, U.S.A. The amount of tax involved was \$2,025.24. The Province stopped the shipment and the company took the case to the Supreme Court of British Columbia which decided that the long-standing tax was an indirect tax and, therefore, that it was ultra vires of the Provincial Legislature under the terms of the British North America Act. Thus, the appeal was sustained and the Provincial Tax was judged to be illegal. The Province appealed the case to the Privy Council in London where the British Columbia Supreme Court decision was upheld. As a consequence, the Province repealed the offending law in the "Forest Act Amendment Act, 1930".

The "Land Act Amendment Act, 1905" stated that Special Timber Licence boundaries should be not less than forty chains in length, in straight lines and in cardinal directions, presumably to ease boundary demarcation and mapping. The annual/^{renewal} fees were increased to \$140.00 per year for each 640 acres west of the Cascades and to \$115.00 per year for a similar area east of the Cascades. These rental rates were increased, in 1965, to fifty cents per acre.¹¹ In another important change, these six hundred and forty acre Special Timber Licences were made renewable and transferable. Originally, the licences had been issued for twenty-one year periods but they eventually developed into one year, renewable tenure licences. There was a report⁵ that the Premier, the Rt. Hon. Sir

Richard McBride, was attempting to obtain revenues to cover Government expenditures of one and a half million dollars per annum and was advised that the desired results could be obtained by making timber licences transferable and renewable. The 1905 Amendment Act tried out the idea, with startling results.

An immediate rush to acquire licences ensued, in the belief that values would increase rapidly, after which easy capital gain could be made under the transferable clause, by selling the licence to another party. Syndicates were formed in Eastern Canada and British Columbia and took up many licences in the Coastal Region and a few extensive blocks of licences in the Interior. H.R. McMillan and Aird Flavelle first visited the Province together as "surveyors" in 1907, for the express purpose of locating timber areas for such a syndicate. Both subsequently became influential businessmen in the Province's wood industry and H.R. McMillan served, for a period, as Chief Forester of the Province. Examples of the licences which were taken up in the Interior are the Cargill blocks on the Willow River and on the MacGregor River. In the course of three years, fifteen thousand licences were taken up, encompassing a volume of timber which could not be cut by the industry of the time within a reasonable period of years. In consequence, the Government withdrew any more grants of renewals of Special Timber Licences under Order-in-Council number 901 of 23rd December 1907, which read

"That from and hereafter, the date hereof all lands in the Province of British Columbia not lawfully held by pre-emption, purchase, lease or Crown Grant (that is to say, all vacant Crown Lands) be reserved from alienation under the Land Act by way of timber licences."

The anticipated rapid increase in the values of Special Timber Licences did not occur and the holders of the Licences, required to pay rentals of \$140.00 or \$115.00 per year, were quickly in financial difficulties. Relief measures followed almost annually, the first being in Chapter Thirty of the Provincial Statutes of 1908, allowing renewal without payment. In all, there were 28 years of this kind of relief up to 1938. Prior to 1938, Section 42 of the "Forest Act" (later Section 44 and repealed with effect from 1st April 1938 by Chapter One of 1937) had provided that, in the event of any hardship being imposed by the cancellation of timber licences, the Lieutenant-Governor could renew the licence, notwithstanding any law to the contrary. However, if the licence ground had been used for other purposes during the period of lapse of the licence, then the licensee had no recourse and no renewal action could be taken. In practice, the latter situation did not arise because political policy forbade the use of a lapsed licence for any other purpose, in case the former licensee should, one day, want to renew it, pleading hardship. It was considered, by the Government, that there was hardship to the licensee in losing a licence on which he had paid dues. The result of this policy was "once a licence, always a licence" and a situation in which thousands of square miles of the best timber land in the Province, mainly in the Coastal Region, were lying idle, not producing any revenue and removed from the possibility of rational administration.⁵ However, it is probably also true that these licences gave to the developing Coastal industry a distinct financial advantage over the Interior industry and resulted in the rapid growth of industry on the Coast. At the time of the repeal of

Section 44 in 1908, licencees were given a "period of grace" of two years after a failure to pay the annual dues, during which time the licence would be renewed by payment of the delinquent dues, plus certain penalties, without recourse to the Lieutenant-Governor in Council. Thereafter, the only way to reinstate a Licence which had lapsed was by a special act of the Legislature and only a few of these were passed.

The importance of Timber Licences in Government forest policy is evident from a speech made by the Hon. W.R. Ross, the then Minister of Lands in the Legislature on 23rd January 1912.¹² He said, in part:

"In 1905, the administration realised that the leasing system was an extremely bad one, the timber being sold for twenty-one years ahead at the low prevailing rates. It was obvious that public timber was being sold at a sacrifice price. It was decided to substitute a constructive forest policy which would revolutionize conditions in the Province. This marked the beginning of the modern forest policy.

"For years, the Province had been in a bad way. The public revenue was insufficient. Development was starved for want of money. The credit of the Province was low and immigration had been reduced to a trickle. These conditions could not do more than retard the progress of the lumbering industry, but the cut was small. So also was the forest revenue, which was only \$455,000.00 in 1904. There existed then the extraordinary situation that in a country of magnificent forest resources, the revenue derived from them was only about one-seventh of the scant Provincial revenue of \$3,000,000.00."

Ross described the growing pressure from investors outside the Province to acquire timber which would affect the dwindling reserves in other parts of North America and continued:

"It was a moment of danger for the Province. Modern history is full of sad examples of young countries determined to get capital at any price, at any ruinous sacrifice of their future.

"The administration of 1905 nailed its colours to the mast; its motto was 'public ownership of forests.' But it was essential to encourage one of the mainstays of the Province, the lumbering industry; also, it was essential to give a supply of timber for the future operations of existing mills; to encourage by the same means the building of new mills."

He went on to describe the introduction of licences, involving only timber cutting rights. The fifteen thousand square miles that were quickly taken up yielded no less than thirteen million dollars to the treasury in seven years.

"By the end of 1907 an annual revenue of two and a half million dollars had been secured (from the forest). This being sufficient for the opening for settlement of central British Columbia and other new regions, the Government ceased to issue timber licences and placed the remaining timber lands under reserve until further sales should become necessary."

This speech clearly sets out two fundamental features of British Columbia's forest policy which have been consistently pursued by the successive Governments from the earliest days up to the present time. Firstly, the existing, virgin forests have been used to stimulate industrial expansion with an increasing emphasis upon raising Government revenues. Secondly, these revenues have largely been used for many facets of provincial development and operation, other than forestry. The policy has resulted in forest liquidation, albeit on a decreasing scale, because of the inadequate return of funds to forestry.

The relatively few licences which remain in good standing at the present day were mostly bought from the original registrant, former owner or succession of owners at bargain prices.⁵ The fees were, and are, generally too heavy to permit the licensee to hold a licence for many years without utilising the timber. The owners were frequently inclined, therefore, to sell for the best price they could get and sustain their resulting losses.

From the time of the Order-in-Council of 23rd December 1907 until the passing of the "Forest Act" in 1912, the authority to issue timber leases continued but only one of them was issued during that time.

The large-scale issue of Special Timber Licences had a peculiar side-effect, resulting in what was to be known as the "Hand Loggers' War." The "War" is of importance as the first example to come to the public notice of divided viewpoints and internal disagreement between sections of the forest industry. From about 1905 onwards, the best logging chances were being taken up in Special Timber Licences and, in the Coastal Region, the licence holders took strong exception to the policy of allowing hand-loggers to cut the most easily logged timber on the waterfront. Special Timber Licence holders took action against six hand-loggers and had them arrested for trespass. The trial took place in Vancouver. The policy position was soon accepted by those involved in the dispute but, for a time, feelings ran high and there was much talk of "monopoly", the end of the "small man" and charges made that the Government was favouring the "moneyed few".

The question of the export of logs from British Columbia has been mentioned previously. In 1906, the "Timber Manufacturing Act" stated:

"All timber cut on ungranted lands, or on lands . . . which shall hereafter be granted . . . shall be . . . manufactured in this Province."

This ban on log exports only applied to the Coastal Region and it was amended in 1909.

The passage by the Legislature of another "Timber Measurement Act" in 1906 authorised the appointment of a Supervisor of Scalers and as many official scalers as were needed and it stated:

"It shall be a term of every sale or other dealing with timber or sawlogs that have not been scaled that the sale shall be based upon the scale by an Official Scaler."

This Act also applied to the Coastal Region until such time as it might be proclaimed for application to the rest of the Province, which it has not been.

A "Bush Fire Act Amendment Act" (Chapter Twenty) of 1907 spread the responsibility for enforcing the fire laws widely amongst officials of the Provincial Civil Service when it stated:

"It shall be the special duty of every Government Agent, Gold Commissioner, Timber Inspector, Forest Ranger, Mining Recorder and Provincial Police Officer or Constable, or any other officer appointed under the provision of this Act, to enforce the provisions."

A "Land Act Amendment Act" (Chapter Twenty-Five) of 1907 made sure that a right-of-way could be obtained over public or private property to reach timber and to haul out logs or forest products. Lands under the jurisdiction of the Dominion Government, such as Indian Reserves or National Parks, of course, were unaffected by the arrangement.

An amendment to the "Timber Measurement Act, 1906" was also made in 1907 and made provision that, in the event of the act being applied to the Interior of the Province, it might be specified that the Doyle Rule should be used rather than the British Columbia Log Rule. The significance of this amendment is unknown but, as has been stated, the act was not applied to the Interior and the Doyle Rule was not reinstated.

In 1909, there was another amendment to the "Bush Fire Act", requiring that anyone starting a fire for land-clearing would need a permit issued by the Province. The amendment was another attempt to gain control of forest fire occurrence and it was the first fire permit legislation in British Columbia.

Also, in 1909, a Royal Commission of Inquiry on Timber and Forestry was appointed. In 1911, the Chief Commissioner of Lands, an appointment which included responsibility for forestry, became the Minister of Lands and in 1912, the first "Forest Act" was passed by the Legislature.

It will be useful, at this point, to summarise the forest policy and the legislation which has been described, for the period from 1849 to 1910. The policy (and such management as there was) stressed the social and economic need to develop communications and industry. To this end, the forests were allocated as a form of subsidy and encouragement to potential investors and manufacturers. Large areas were sold or given away notably in the railway land grants but, at the same time, a general policy of public ownership was established, partly because the railway land grants did not achieve their full purpose. As a result of the public ownership policy, the emphasis, in providing encouragement to the industry, was changed from the leasing of forest land and timber to the licencing of the cutting rights alone.

The financial difficulties of the young Province led to another policy development, that is, the issue of timber cutting rights not only to encourage the growth of industrial capacity but also, to obtain direct revenue to be used for general Governmental purposes other than forestry. To phrase this in another way, the capital obtained from the liquidation of forests was increased and diverted to purposes other than forestry. A major method which was employed to rescue the Province from financial difficulty was the issue of licences which could be renewed and transferred but the Province made the carrying fees so high that, when an anticipated increase in the capital value of the licences did not occur, the system was withdrawn altogether within three years of its introduction. An entirely new system of timber disposal was adopted in 1912 which, still in force at the present day, retained all unalienated forest lands under Crown (public) ownership.

Another principle of policy which evolved during the period was that all timber from Crown lands must be manufactured within the Province although later, under the "Forest Act" of 1912, a method was made available for the distress export of logs, if approved by an Order-in-Council. Throughout the period which is being considered, the administration of the forests was a function of the Department of Lands and all of the timber disposal legislation was embodied in the "Land Act". Progressive changes and developments occurred under the Land Acts of 1874, 1875 and 1884 and the amendments that were made

to them almost every year. The "Land Act" progressed through sales of land, at various prices from one dollar per acre and up, to leases, licences and pulp licences; the charging of royalty, the introduction of a lien for unpaid royalty and the one cent tax; provision to secure rights-of-way to gain access to timber; the classification of timber land as first and second class according to the timber volume on it; the introduction of ground rent for land and stumpage for timber and the provision of Hand Loggers' Licences for small operators were all established.

Apart from the timber and land disposal provisions of the "Land Act," other forestry matters were made the subject of specific legislation. Among the more important were

- The Railway Belt Act (Chapter 14) of 1884
- The Timber Acts of 1884 and 1886
- The Act of 1886
- The Timber Manufacture Act of 1906 and three amending acts in 1909, 1910 and 1911
- The Oriental Labour Act
- The Labour Regulations Act of 1898
- The Labour Regulations Act of 1905
- The Lumber Inspection Act of 1897
- The Official Scalers' Act of 1894
- The Order-in-Council of 1894, adopting the Official British Columbia Log Scale
- The Lumber Measurement Act of 1902
- The Lumber Measurement Act of 1906 and amendments of 1907 and 1908
- The Timber Mark Act of 1890 and amendments of 1910

In addition, various "Mining Acts" and amendments had a forestry significance. The "free miner" of British Columbia was initially given the rights to the timber on his mineral claim and, until 1958, a Crown Grant of the mining claim surface carried with it the ownership of the timber. This principle was misused to gain title to timber lands. The "Mining Act Amendment Act" of 1895 sets out the rights of a miner to timber during the period of development of his claim. He was then entitled to all of the surface rights, including the use of all the timber standing on the surface for mining and building purposes intended to develop the mineral for mining.

At the end of the period of years being considered, in 1911, legislation affecting forestry was contained in some ten acts of direct application, two or three Orders-in-Council and some allied or related acts, such as the "Mining Act."

The other important facet of policy, impelled by social and economic demand, was the effort to reduce the destruction caused by forest fires. In all, a total of eleven "Bush Fire Acts" and amendments were passed. From the rudimentary and ineffective act of 1874, there followed three new acts and seven amendments. Two devices were employed--the payment of half the fine to the informer and placing the burden of proof of innocence on the accused--which were contrary to the principles of British law. However, it is a common principle of British Forest Law. The various acts introduced a fire season, laid down detailed preventive measures for controlling campfires, eliminated the requirement to prove "gross carelessness and negligence" in favour of proving a lack of "reasonable care and attention," imposed fire protective measures on Provincial railways and steam power equipment in

the woods and required fire permits to be obtained for lighting some kinds of fires during the fire season. By 1911, British Columbia had a reasonably comprehensive act, embodying all of the foregoing features.

In spite of these various developments, the forest policy of the Province, viewed from the present day, can only be described as rudimentary. Policy was a subject of the exigencies of the moment, a series of reactions to changing social and economic pressures and it lacked long-term coherence. Useful ideas and legislation did emerge but it gradually became clear that a better coordinated policy was needed. As a result, the Royal Commission of 1909 - 10 was appointed.

From 1894 to 1910, forestry staff was almost insignificant. In 1888, the appropriation of only \$3,000 paid for the entire staff of two timber inspectors. By 1910, the staff appropriation had risen to \$61,793 for a staff of twelve. Also, in 1910, there were expenditures on scaling of \$47,500, two launches cost \$8,000, the Royal Commission cost \$12,500 and the Canadian Forestry Association received a grant of \$200.

Some specific appropriations were also made for fire protection and fire fighting but not before 1905, as follows:

FIRE PROTECTION (INCLUDING FIRE FIGHTING) APPROPRIATIONS (INCLUDING SUPPLEMENTARY APPROPRIATIONS) IN BRITISH COLUMBIA. 1905 - 1910.*

<u>Year</u>	<u>Appropriations (\$)</u>
1905	1,500
1906	6,200
1907	27,500
1908	15,000
1909	42,500
1910	97,208

* compiled from figures given by Orchard.⁵

CHAPTER FOUR

THE ROYAL COMMISSION OF INQUIRY ON TIMBER AND FORESTRY. 1909 - 1910.

During his speech in the Legislature on 23rd January 1912, the Minister of Lands, the Honourable W.R. Ross stated, in part:

"The issuance of cutting rights over 9,500,000 acres (in the form of timber licences), placed the Government in a position of very heavy responsibility, both as trustee of the people's timber lands and in respect of its duty of fostering the lumber industry and recognising the just rights of licencees. In consequence, in 1909, it appointed a Royal Commission of investigation (Hon. F.J. Fulton, K.C., Chairman). The Commission collected an immense mass of evidence, visiting every important centre of the Province. After a most painstaking inquiry for a year and a half, the Commission reported in 1912".¹²

There was another reason for the appointment of the Commission. During the first decade of the twentieth century, settlers in British Columbia started many fires in their land-clearing efforts. The graziers believed that fires, lit in the spring, improved the ranges and they carried out grass-burning at that time. Electrical storms, particularly in the southern districts of the Province were (and always have been) a prolific source of forest fires. The year 1904 was the commencement of a series of particularly severe series of fire seasons which culminated in the destruction of the town of Fernie by a forest fire, in 1908. The people of the Province demanded action and the appropriations for fire protection, noted in the previous chapter, showed a rapid increase in expenditure between 1905 and 1908. Concern about forest fires was a main reason for the appointment of the Royal Commission.⁵

H.R. MacMillan,¹³ who was at one time Chief Forester of British Columbia, said in 1944 that the original appointment as Secretary to the Commission went to one Charles Gibbons, who had a strong predilection for the flowing cup and, because of this, was not available to the Commission when it first met. MacMillan has indicated that the Commission had come into being due to the efforts of F.J. Fulton, Chief Commissioner of Lands and, in private life, a lawyer from Kamloops. A second Commissioner, A.C. Flummerfelt, was reported to be a good politician but a poor speaker and had retained one M.A. Grainger to write his speeches. In the absence of Gibbons, Flummerfelt urged the induction of Grainger as Secretary pro tem and the change was made. It was Grainger who wrote the final Commission Report and he contributed to the ideas expressed therein. MacMillan¹⁴ wrote in January, 1952:

"There probably would have been no Forest Act in 1911 (author's note—actually 1912), if it had not been for the flaming zeal of Grainger. Any Forest Act prepared without Grainger's zeal would have been like any other legislation—an ineffective dead letter.

"Grainger worked day and night for over two or three years preparing the report of the Royal Commission, putting ideas and words into the mouths of the Commissioners, persuading the Government to employ Overton Price to bring the best American thought and experience, searching all relevant legislation and administrative policies of the day, from which he drafted the Forest Act with Overton Price's help.

"It was an extraordinary coincidence that he found in the Minister of Forests (author's note—actually Minister of Lands) of that period, Hon. W.R. Ross, an unique ally who had been born and raised in the

Northland, who was full of ideals for the country, and whose imagination was stirred and supported by Grainger.

"Grainger wrote Ross' speeches and pushed Ross much further than the latter realised. It was Grainger's strength of character that got the 'Forest Act' passed. The Government gave wide powers to technical administrative staff ahead of any other part of Canada. By the passage of the Forest Act, and the appointment of the technical staff, the administration of the forests was taken out of the hands of the local politicians, before they knew it. When these gentlemen woke up, there was nothing they could do about it.

"By standing up against the politicians in East and West Kootenay and in the Fraser Valley and Coastwise District, the Minister sacrificed his own potential support and came in collision with the "hard boiled" politicians of the Government. He could not have done this if it had not been for Grainger.

"If the Minister had not stood up so strongly for the Forest Act, and the Chief Forester during the years 1912 to 14 (author's note—the Chief Forester 1912 - 14 was the writer, H.R. MacMillan), the Forest Service would never have taken root."

This illuminating comment by a knowledgeable contemporary illustrates, in several ways, the process of evolution of forest policy in British Columbia. Grainger was actually a trained mathematician from Cambridge University but became an outstanding forester. He had injured his feet whilst packing in the Northwest Territories and was noted for wearing moccasins on all occasions.

The Royal Commission of Inquiry on Timber and Forestry 1909 - 10 was appointed on the 9th day of July 1909, under the authority of Chapter 99 of the Revised Statutes of British Columbia, 1897. The Chairman, Fred J. Fulton has been mentioned and in addition to his other duties he was, at the time of his appointment, Acting Attorney-General of the Province. The Commissioners were A.S. Goodere and A.D. Flummerfelt and the Commission Report was submitted to the Hon. T.W. Paterson, Lieutenant-Governor. The Commissioners corresponded to make themselves familiar with the forest policy and practice of the older Provinces of Canada and of the States of the Union. Sittings were held at various lumbering centres throughout the Province. Also, the Commissioners attended the National Congress on Conservation of Natural Resources in Seattle and met Gifford Pinchot, Chief Forester of the United States, to discuss forest matters with him. Later, they consulted with Dominion Government officials at Ottawa and then submitted an Interim Report. More interviews were then held with Pr. Fernow and Aubrey White, Deputy Minister of Lands, Forests and Mines for Ontario. Finally, the Chairman again interviewed Pinchot and officials of the United States Forest Service at Washington, D.C.

The Commission noted that the first crude attempt to obtain statistics on the subject of forest resources dated, on the American continent, no further back than the United States census of 1870. In the United States the uneasy feeling that timber was not so abundant as supposed had led to the formation of forestry associations and, in turn, to commissions of inquiry, whose reports prompted the establishment of State Boards of Forestry. It was as a result of these developments, the Commission considered, that the Federal Government of the United States was led to reserve one hundred and sixty-eight million acres of national forest and to create a vigorous forest service. In British Columbia, the Commission reported

"conjecture has not yet become tinged with the same hues of certainty."

It was plain that the Province did not possess the means of making a sound estimate of its resources. For years, the forests of Canada had been supposed to cover eight hundred million acres, even though the London Daily Mail of 6th June, 1910, had quoted

"1,657 million acres, more than all other timber countries combined."

Dr. Fernow had put the "truly merchantable area" at three hundred million acres. The Commission gave other examples of estimates of the forest resource but continued:

"It is evident, however, that the lack of reliable statistics has a serious bearing on forestry problems. Inflated estimates of the present supply of timber cause people to be careless of the waste of it; distorted theories of annual destruction, by fire and by lumbering, enable alarmists to harm the common-sense campaign for conservation by their exaggerations; uncertainty is created in business conditions; and, in general, from every point of view, the task of the governments that are labouring to construct sound forest policies is made extremely difficult."

Insofar as private ownership was concerned, the Commission found that there were some eight hundred and seventy thousand acres in private hands and an additional three hundred and seventy-five thousand acres in the possession of the Esquimalt and Nanaimo Railway Company. The Canadian Pacific Railway Company controlled a very large area, the acreage of which the Commission was unable to ascertain.

When dealing with land under Crown ownership, it was found that, after the abandonment of freehold Crown Grants of timber and the adoption of a leasing system to encourage the sawmill, pulp and tanning industries, there were one million, five thousand six hundred and seventy-six acres held under various leases at rentals which varied from two cents to twenty-five cents per acre. Besides this leasehold system, designed to encourage the industry at "cheap rates", there were the Hand Loggers' Licences.

According to the Commission,¹⁵ the position of lands in the ownership of the Crown had been affected by a revolution which took place in 1905, when there was an agitation amongst Special Timber Licensees for renewal of their licences. It had become clear to the Government, by that time, that the future of the industry would be dictated by market requirements and by business laws. Thus, the provision of cheap stumpage prices (in the form of leases) as a bonus to the industry had ceased to be necessary. Moreover, the leasing system had come to be recognised as wasteful. The choicest patches of timber could be selected, by the lessee, to make up a lease composed of several areas with the intervening, lower quality mature areas and unmerchantable, immature areas being left in the hands of the Crown. In the case of granting leases to persons who were not industrial operators, at high rentals, it had been realised that it was a poor way to draw immediate profit from the "immense idle area of Crown forests."

The Commission Report continued:

"The legislative problem was solved in a most ingenious manner by the abolition not only of the leasing method but, also, of the non-transferable licences and by the adoption of an entirely new principle in forest policy. That principle was the reservation of a share in the increment of value of standing timber as it should accrue. It is

true that other Provinces in Canada had attempted something of the kind by leaving uncertain the amount of royalty that they should levy in future years upon the timber sold by them under their auction-licence systems. But tardy recovery of some of the public's share in the risen value of the licenced timber bears no comparison, as a policy, with the effective and subtle control that British Columbian Government retained in 1905 over future alienations of Crown timber. This power was secured by the issue of transferable licences, options to cut during a twenty-one year period on specified square miles of forest, and the essence of the idea lay in the fact that it was left entirely to the Government to fix, from year to year, what annual payments should be made for the renewal of these options."

These transferable licences, as has been noted previously, were granted in large number. The Commission continued:

"Though the effect on the public revenue was most gratifying (the revenue from licences in the calendar year 1904 was \$179,814 and in 1907, \$1,339,351) the insatiable nature of the continental demand for standing timber aroused a certain uneasiness and the Government, at the end of 1907, decided to impose a reserve upon all remaining Crown timber."

The Commission estimated that nine million acres of forest land were held under timber licences.

The twenty miles of railway land which the Province had ceded to the Dominion Government, under the terms of Union, on either side of the roadbed of the Canadian Pacific Railway, was roughly estimated to cover about eleven million acres. The extent of timberland within this territory was unknown in 1910, although the Commission was able to report that one million two hundred and eighty thousand acres of it were under timber licence or permit, as at March, 1910. In addition, the Commission was quite unable to gauge with certainty, from witnesses or available maps, what areas remained in the Provincial Crown reserve. Consequently, they adopted the "more or less popular belief" that one-quarter of the timber under Provincial control—(almost three million seven hundred and fifty thousand acres) had not been alienated, commenting at the same time that it was "a pure conjecture."

The Commission made it abundantly clear that the estimates of the volume of merchantable, standing timber in British Columbia were based largely on guesswork. Nevertheless, they did make an estimate, as follows:

MERCHANTABLE STANDING TIMBER IN BRITISH COLUMBIA. 1909

<u>Tenure</u>	<u>Acreage</u>	<u>Average Stand Per Acre f.b.m.</u>	<u>Total Stand Volume f.b.m.</u>
Vancouver Island Crown Grant Timber	318,000	35,000	11,130,000,000
Mainland Crown Grant Timber	552,000	10,000	5,520,000,000
E. & N. RAILWAY COMPANY C.P.R.	375,000	14,300	5,380,000,000
Timber Leaseholds	619,000	UNPUBLISHED	
Special Timber Licences	9,000,000	20,000	12,380,000,000
Mill Timber on Pulp etc., Leaseholds	387,000	12,000	108,000,000,000
			4,640,000,000
TOTAL	11,251,000	with a stand of	147,050,000,000
Reserved timber land (conjectured to be one-quarter of the total forest area) under Provincial jurisdic- tion, roughly	3,750,000		45,000,000,000
TOTAL	14,001,000		192,050,000,000

In addition, there was supposed to be a merchantable stand of timber of between forty and fifty billion f.b.m. under the control of the Dominion Government in the Railway Belt, nearly one-half of which appeared to have been alienated.

These estimates were based upon the standards of utilisation practised by the industry of the day. With a touch of sarcasm, the Commission commented that

"restrictions placed upon the present liberty to destroy and waste may increase this amount (the total volume of 240 billion f.b.m.) appreciably."

In its deliberations, the Commission reviewed the depletion of the forest areas of North America and found that British Columbia contained probably half of the merchantable timber of Canada. It also faced a rising market for its products, since exhaustion of the local supply within the United States would cause the tariff barriers imposed by that country against British Columbia manufactured wood products to disappear. The bulk of the standing timber in British Columbia which would supply the anticipated future demands were mostly under the control of the Dominion and Provincial Governments, the average growth rate of trees on the Pacific Coast was twice that of the average for the United States and "provincial policy has made the Government the sleeping partner in forest exploitation—a sharer in the profits of the lumbering industry."

"Two things are therefore plain; one, that the value of standing timber in British Columbia is destined to rise to heights that general opinion would consider incredible today; the other, that under careful management heavy taxation need never fall upon the population of the Province.

"The profits from a permanent Crown timber business should make British Columbia that phenomenon of statecraft and good fortune—a country of semi-independent means."

After this prediction of halcyon days to come, the Commission turned its attention to the more prosaic but essential task of studying reserves and expenditures. More detailed financial statistics are given in the Annexures to this history. However, the following table, although it contains some approximations resulting from the accounting system, has been assembled from

data contained in the Royal Commission report.

RELATIONSHIP OF FOREST REVENUE TO TOTAL PROVINCIAL REVENUE AND
RELATIONSHIP OF FOREST EXPENDITURES TO FOREST REVENUE FOR BRITISH
COLUMBIA DURING THE FISCAL YEARS 1900 - 01 TO 1909 - 10

<u>Fiscal Year</u>	<u>Total Provincial Revenue \$</u>	<u>Forest Revenue \$</u>	<u>Percentage Forest Revenue of Provincial Revenue</u>	<u>Total Forest Expenditure \$</u>	<u>Percentage Forest Expenditure of Forest Revenue</u>
1900 - 01	1,605,920	115,594	7.2	not given	--
1901 - 02	1,807,925	161,071	8.0	not given	--
1902 - 03	2,044,630	298,217	14.6	not given	--
1903 - 04	2,638,260	405,748	15.4	not given	--
1904 - 05	2,920,461	486,516	16.7	not given	--
1905 - 06	3,044,442	643,827	21.1	not given	--
1906 - 07	4,444,593	1,305,329	29.4	34,572	2.6
1907 - 08	5,979,054	2,424,668	40.6	49,748	2.1
1908 - 09 (9 mos.)	4,664,500	1,920,349	41.2	58,787	3.1
1909 - 10 (approx.)	8,000,000	2,448,150	30.6	91,072	3.7

- Notes: 1. The figures for 1908 - 09 are for nine months. In previous years the fiscal year had ended on 30th June but, in 1908 - 09, it was adjusted to end in March.
2. The figures quoted in the previous chapter are for Forest Protection appropriations, whereas the forest expenditures given above are actual expenditures, accounting for an apparent discrepancy.

The rapid rise in the contribution of forest revenues to the total Provincial revenue is notable as are the extremely low expenditures on the forests. A consistent feature of British Columbia's forest policy has been the diversion of large amounts of capital raised by exploitation of the forest to other purposes such as schools, road construction and other needs of a developing country. The process has involved the loss of a considerable acreage of productive forest which, after logging, was replaced by hardwood scrub of no value. There was no reforestation programme of any significance. In other cases, stands of timber were degraded by the removal of the best trees, leaving the ground occupied by the inferior ones. The problems created have not, as yet, been solved.

Quite apart from the guesswork involved in estimating the volume of merchantable timber in British Columbia, the Commission had difficulty in establishing the amounts of lumber and logs which were being cut. Little was known, officially, of the extent of the logging operations being conducted in the Province, although the records of Official Scaling in the Coastal Region showed that in 1907 a volume of 407,065,223 f.b.m. was scaled, in 1908 the figure was 397,312,425 f.b.m., and in 1909, 481,260,174 f.b.m. In the opinion of the Chief Timber Inspector, the total cut of the Province, including the Dominion Railway Belt, was probably about double these figures in each year. The uncertainty extended into the export of logs, for which no reliable figures were available prior to 1910, when 60,261,395 f.b.m. were exported in the first eight months. In September of 1910, a total of thirty-six logging camps were logging for export.

Most British Columbia Governments have demonstrated a concern to achieve maximum revenues from the forest, although the ^{immediate} desire has always been constrained by the wish to encourage the establishment of new industrial capacity. The Royal Commission of 1909 - 10 found that the assessed values of, and taxation on the 829,900 acres of Crown Granted Timber Lands, in 1909, were:

Average valuation	\$	6.41 per acre
Average taxation		.13 per acre approximately
Total assessed value	5,317,335.00	
Total taxation	106,346.00	

The Commission had previously commented in its Report

"Under the new Assessment Act that came into force in 1906 separation was made, for the first time, between 'wild' and 'timber lands'. The rate of taxation upon the former was raised to 4% on value; the rate on the latter was reduced to 2% . . . Upon the mainland there are holdings that cover mountain tops and barren areas, the valuation of which per acre may be but a few cents. It appears that there is a tendency among owners to pay 2% instead of 4% by signifying such property with the title of timber land. Hence, from the point of view of forest statistics and finance the average valuations in some districts are meaningless. Moreover, the average valuation for the Province is made too low."

So as to arrive at a more satisfactory basis for assessment of value and thus, to obtain a proper tax return to the Government, the Commission recommended that a complete survey of the timber standing on Crown Granted timber lands should be made by the Government; that in future the (proposed) Department of Forests should cooperate with the assessors; and that an annual return should be made of the valuation of all of these timber lands.

Next, the Commission considered the position of Timber Leases and recorded the existence of the following areas;

Leaseholds with a right of perpetual renewal	386,458 acres
Leaseholds without a right of perpetual renewal	<u>232,567 acres</u>
Total area under timber lease	<u>619,025 acres</u>

Leaseholds held with an obligation to operate sawmills	478,049 acres
Leaseholds held without an obligation to operate sawmills	<u>140,976 acres</u>
Total area under timber lease	<u>619,025 acres</u>

As described previously, before the introduction of the system of licencing timber in 1888, timber could only be obtained, legally, by a Crown Grant or Lease. The Crown Grant method was abolished in 1896 and leasing continued until 1905 when the relevant provision of the Land Act was repealed. Timber leaseholds thus included land the leases of which were granted prior to 1905. In 1901, however, the Legislature had granted to all current leaseholders the right of lease renewal in successive periods of twenty-one years and the majority had taken advantage of the privilege. The Commission pointed out that the question of renewal of leases was causing difficulty. The Act of 1901 had specified that at the expiry of the original period of any renewable lease, the timber would continue to be held by the lessee

"subject to such terms, conditions, royalties and ground rents as may be in force by Statute"

at the time of expiry. But no provision for these items had been in force by

Statute since 1905. In consequence, leases covering 56,450 acres were awaiting the imposition of fresh rental, royalty and conditions, and the term of years of others were about to expire. It was clear that Statutes were needed and the Commissioners set out two principles which they considered should apply:

- "(1) There must be recognition of the fact that timber taken from leaseholds will come into competition with timber cut from licenced lands. Therefore, at no time should there be placed upon lessees any burden or impost greater than that born by licensees.
- "(2) As far as the rights possessed by lessees under their contracts with the Government permit, equality must be established between the two classes of stumpage holder."

In conformity with these principles, the Commission recommended, firstly, that the annual payments of rentals and royalties by leaseholders and licencees should be equalised. Secondly, timber leases should be made subject to all the regulations in force from time to time dealing with logging methods, the disposal of logging debris, protection from fire and other forestry matters. Thirdly, since three-fifths of the lessees had a right of renewal in twenty-one year periods and since the privilege of indefinite renewal had also been given to the holders of special timber licences at the last Session of the Legislature, it was recommended that the remaining lessees should be given the same right under the same conditions as the other lessees.

Because British Columbia retained such a high percentage of land in Crown ownership and because the Forest Service has never, in its history, possessed the number of professionals or the overall staff strength to manage the forests on its own, there has been a constant pre-occupation in the Province with devising forms of tenure which would permit forest utilisation by the industry, ensure a fair rate of return to the Government, avoid obvious abuse of the forest and involve a minimum of Government supervision. The transition from Crown Grants to leases and to licences has continued since through a spectrum of tenures as each achieved popularity in its turn and then fell from favour. As will be seen as this history progresses, successive Governments have not excelled at devising tenures, although many have been devised, and within relatively short periods of years efforts have been made to undo what was done before.

The Royal Commission, after dealing with Crown Grants and Timber Leases, turned its attention to Timber Licences. It noted that 15,160 licences had been issued and that, legally, each should have been 640 acres in extent. However, by 18th August 1910, 1466 licences had been surveyed and it had been found that their average area was only 593 acres or about 7.3 percent less than the legal area. From these figures, the Commission concluded that there were probably about nine million acres within the total number of licences which had been issued. The history of the licence system up to 1910 has been recounted. In the earlier part of 1905, there were probably less than 1,100 licences in existence and the Commission figures for 1909 illustrate in a convincing manner their rapid increase after the Act of 1905 made them transferable. The growth of population in the West and the consequent increase in the lumber trade were reasons which did not fully account for the rush for timber licences. The real reason lay in

the recognition by far-sighted lumbermen of the limited extent of North American merchantable forest and the near-exhaustion of supply in some Regions. The value of stumpage (the value of standing timber) was rising quickly in nearly every part of the North American Continent. The staking of transferable licences in British Columbia thus ceased to be a mere matter of local expediency. It aroused avid interest outside the Province and rapidly assumed the proportions of a boom. Within less than three years there were fifteen thousand licences in existence, covering the great majority of the Province's forest land which was, at that time, accessible for logging.

In 1907, when all of the Crown land which had not already been alienated was reserved, the ultimate effects of the great financial depression of America were felt in British Columbia and the lumber industry suffered from the inertness of its markets. Nevertheless, standing timber still seemed to be a desirable acquisition and, within three years, no less than twelve thousand transfers of timber licences occurred. However, the terms of the licences at that time gave holders the cutting rights for twenty-one years at most, a restriction which decreased the merchantable value of the licences. The Operators' Associations had estimated that there were no less than one hundred and forty billion board feet of timber (an exaggerated figure) on the seventeen thousand, seven hundred licences then supposed to exist and they placed the annual industrial output of the Province at less than one billion feet. Even allowing for a reasonable increase in cut, it was evident to the Commission that the marketing of such an immense body of timber could not be attempted, profitably, within the twenty-one year tenure of the special licences. The licence holders agitated over this point and the Commission made an interim recommendation which was later confirmed in the final Report, as follows:

" . . . that the extension of the tenure of the special licences is desirable and will tend to the Conservation of the Crown forests and, under proper safeguards, would not work to the disadvantage of the Province.

"that the licence rentals, fees and royalty should not be fixed for any period beyond one calendar year at any time; that the present right of the Government to regulate and adjust rentals, fees, royalties and other charges on timber property shall in no way be restricted or limited; and that all conditions appertaining to the control of timber lands by the Province of British Columbia shall remain forever distinctly subject to such enactment of the Legislature or Order-in-Council as circumstances, at any time, may demand."

The latter principle, expressed cogently by the Commission, has been a guideline of Government policy since. The principle is simpler than its application. In point of fact, experience has indicated that the Courts of Law will not always permit Government to change its contractual obligations in a retroactive manner even though the wording of a contract may indicate that the Government can do so in a unilateral way.

In 1901, as noted previously, the Provincial Government decided to encourage the establishment of pulp and paper industries in British Columbia by granting leases of land carrying timber suitable for pulp (smaller in diameter than that suitable for lumber) upon very liberal terms. The Chief Commissioner of Lands was authorised to make agreements with companies incorporated for the

purpose of manufacturing pulp and paper. Under each of these agreements, districts of the Province could be reserved from pre-emption by settlers or others, sale or any other form of disposal for a period of two years, in order to enable the company concerned to select and survey, in each reserved area, the lands suitable for its purpose. Leases were then granted for a period of not more than twenty-one years. The annual rental was two cents per acre and a royalty of not more than twenty-five cents per cord was payable on all of the pulp wood which was cut. The company was required to agree to erect, equip and maintain, within the Province, a mill with a daily output capacity of not less than one ton of pulp or half a ton of paper for each square mile of the lease.

A number of companies were formed at once to take advantage of the provisions of the Act. By the end of 1902, several agreements had been made and "large districts" of the Province had been placed under temporary reserve. In 1903, the Government, appreciating that existing companies had contracted to produce more than eighty thousand tons of pulp per year, called a halt, repealed the legislation of two years before (Statutes 1903, Chapter 30, Section 2) and brought the granting of Pulp Licences to an end. Four of the companies which obtained agreements located their acreage and, from 1903 to 1907, leases of many scattered areas covering 354,339 acres or 554 square miles, were issued to them.

All of the companies failed to comply with the literal requirements and conditions of the leases and made repeated requests for extensions of the time period within which they were required to fulfil their contracts. The requests were invariably granted, the Government being loathe to discourage the establishment of a new industry. By 1910, at the time of the Royal Commission, all of the leases remained in existence but only one pulp mill had been built. In addition to this problem, each of the companies desired to conduct a lumber and sawmilling business, either as an adjunct to the obligatory pulp business or as one of the main objects of the enterprise. The company/^{prospectuses} laid great stress on lumber being the more profitable business. These printed statements, the obvious expectations of the companies, the statements of witnesses before the Commission and letters to the Government indicated to the Commission that the pulp leases contained a high proportion of merchantable saw timber, in certain cases possibly as high as eighty-five percent. Also, embarrassingly enough, the Act of 1901 (Statute 1901, Chapter 30, Section 6, amending Section 41 of the "Land Act") had contained the proviso:

" . . . all timber cut on Crown timber limits (ie. within a timber licence) under such lease and not used for the manufacture of wood pulp or paper will be subject to the provision of the Land Act governing timber licences or leases in respect to royalties and returns."

Interpreting this proviso, the companies claimed the right to cut and manufacture sawmill timber from their pulp licences. The Government had, to some extent, recognised this implied right. A letter to one pulp licence holder in February, 1903 from the Chief Commissioner of Lands had said, in part,

"I was careful to inform you that by acquiring special timber licences your company would get the right to log which is not conveyed, or attempted to be conveyed, by pulp lease."

Moreover, in addition to all this, some of the later leases which were issued contained the provision that:

"The lessee shall not be entitled to cut, carry away or use, for any other purpose than for the manufacture of pulp, any of the timber on the lease unless a special licence has first been taken out in that behalf, paying therefor the fees provided from time to time by the Land Act."

The Royal Commission embarked upon a detailed discussion of the relative views of Government and the claims of the pulp lessees but, evidently, they had little choice to make in the face of the evidence. Almost unwittingly, the Government, in endeavouring to encourage the pulp and paper industry had actually encouraged increased lumber production with only very limited progress in pulp and paper. The Commission recommended that all of the pulp lessess should be required to apply for a licence to cut sawmill timber within six months of the passage of legislation that would empower the Government to issue these licences. If they did not apply during this period, all their rights to cut sawmill timber would be forfeited. The particular form of licence could only be issued to holders of pulp leases and the licence would be cancelled if the pulp lease to which it applied were terminated or cancelled.

There were in existence, at the time, hemlock or tanbark leases and the Commission proposed that the holders of these should also take out licences to cut sawmill timber from the leaseholds, on the same basis as pulp leases. In addition, it was recommended that the removal of any immature timber from either pulp or hemlock leases should not be allowed.

With reference to all of the alienated lands, the Commission wrote:

"More or less authoratative statements were submitted to the Commission to the effect that a very high percentage of alienated timber lands were held by non-operators (persons not engaged in forestry or the forest industry). Should such a circumstance, or should any combine among operators, lead to monopoly conditions in the Province, and should financial control possessed by the Government over licence rental and royalty fail in any way to subdue commercial symptoms of this character, it might therefore, in that future time, be found expedient to throw areas of reserve timber into the market. A great increase of lumbering operations in the Province followed by a need for increased supplies of standing timber might justify the disposal of other areas . . . Valid reasons might thus come into existence, from time to time, for the alienation of timber standing in the present Reserve."

In this event, the Commission recommended that Government forest officers should explore each berth which should then have its boundaries fixed by an actual survey. The timber should be cruised and an "upset" or minimum stumpage price fixed for it, following which the licence to cut timber on the berth would be the subject of public auction, the bids being the amount per thousand board feet that applicants would pay in addition to the royalty, as and when the timber was cut. A cash deposit of at least ten percent of the total bonus bid should be paid at once by the purchaser, as a guarantee that operations would be conducted in accordance with the regulations. The annual renewal of such a licence should be subject to the same rental per acre, conditions and penalties as those imposed upon special Timber Licences. Also, all of the proposed sales should include a condition that the timber should be removed within five years. These recommendations led to the use of "timber sale licences" which have developed as a form of tenure up to the present day.

Referring to Hand Loggers' Licences, it was appreciated by the Commission

that the licences had given a means of livelihood to many men who otherwise would have found it difficult to obtain employment. But the (then) existing conditions of the lumbering industry made it evident that the licences could be abolished as a form of tenure without serious inconvenience to the small number of men who then possessed them. Therefore, the Commission considered it to be advisable to abolish the licences. However, should the Government deem abolition to be inexpedient, then the operators of the licences should be placed under strict Government supervision and every effort made to compel them to dispose of logging debris properly and to enforce the logging regulations. In the event, the Government did not consider abolition expedient and it was not until 1966, as described previously, that hand loggers' licences were abolished as a form of tenure.

The Commission also recommended regulations for the cutting of standing timber. When logging, all living trees containing merchantable timber, with a diameter of not less than fourteen inches at breast height (four and one-half feet above the ground) should be cut. The top of each tree should be cut off at a point where the diameter was ten inches or, preferably, less and the remainder of the tree utilized, with log lengths being varied so as to make this possible. The stump of each tree felled should be of a height that resulted in the least possible waste and to ensure that the desired results were achieved, a standard stump height should be established for each district of the Province. Any dead trees which were sound enough to yield any grade of merchantable timber or dimension timber should be cut. The Commission preferred the use of a saw, rather than an axe, to cut down a tree, presumably because less waste was involved. Finally, all live trees containing merchantable timber; all merchantable timber left uncut; all merchantable timber cut and not removed from the land; together with timber wasted in tops, stumps, trees which lodged against others when felled and partially sound logs should be scaled and paid for by the logger at the royalty price, per thousand board feet, in force at the time.

These recommendations and penalty provisions continue to form the basis of logging regulations up to the present day, although they have been considerably expanded and diversified in the interim period. Their objective was to ensure that the standards of utilization in the forest were improved, an aim which the Provincial Government still pursues. The disadvantage of fixed regulations of this kind lay in their lack of accommodation to the silvicultural requirements of particular stands of timber. They were most suited to clearfelling. Over the years more flexibility has been achieved but not to the extent, except in a few cases, that permits the use of sophisticated silvicultural systems, particularly selection systems aiming at obtaining natural regeneration. A growing awareness of the need for greater application of silviculture in a more flexible way in British Columbia's forests may well lead, eventually, to a less dogmatic application of cutting and other regulations.

The Royal Commission traced the development of public consciousness toward the evil of forest fires and praised the Government for making money appropriations over the previous four years to combat fire, including a substantial increase in the appropriation for 1910. These efforts should continue

since "the most thorough-going methods are demanded." An item of concern was the condition of forest areas after logging. The amount of debris left on the ground after a machine-logging operation was almost incredible and caused unnecessary risk to Crown standing timber. It would lead, almost inevitably to the destruction of young trees standing on the areas. The Commission proposed that persons responsible for logging operations should dispose of the tops of trees, branches and other debris in a way which would prevent, as far as possible, the danger of fire. The disposal would need to be to the satisfaction of the (proposed) Department of Forest's officers. Also, there was no reason why logging operations conducted on Crown Grant and railway property should not be subject to the same requirements, since there could be no uncontrollable right inherent in the private ownership of timber lands, to conduct logging to the common jeopardy of the surrounding Crown forests.

One of the problems faced by the Provincial Government of the day was the difficulty in obtaining men to fight forest fires. In many cases, men refused the work except at exorbitant rates of pay. To correct this situation, the Royal Commission recommended that Government forest officers who were permanent employees should be given powers to compel men to assist in fighting fires, when necessary. Refusal to obey should result in a penalty being imposed on the individual concerned. The rate of wages paid should be the current rate for labour in the district concerned. These recommendations were generally adopted and forest officers and fire wardens have compulsory powers to compel men to fight fire, certain age groups, professions and occupations being exempted. Refusal to obey is a matter for the Courts with penalties for those found guilty. The recommendation governing the rate of wages has been qualified or interpreted. The wages paid are closely related, at the present day, to the legal minimum wage required to be paid in the Province by Statute, than to the current wages for forest workers. One of the reasons for this is the possibility of arson. During the years of economic depression in the 1930's, fires were lit deliberately so that unemployed persons could earn wages in fighting them. In a sense, therefore, the payment of the "current" wage rate can, under certain circumstances, provide an incentive to the potential arsonist. It is probable that this, as well as reasons of economy influenced Government to keep fire-fighting wages at a lower level than Labour Union rates. Another reason lies in the concept that forest fire-fighting is a public duty for those able to undertake it.

In addition to employing compulsory powers, the Commission recommended that the general protection of British Columbia forests from fire should be a Government undertaking, entrusted to a permanent forest organisation. To implement this recommendation, the Province should be divided into Forest Districts, each with a Superintendent controlling a body of permanent forest rangers. The rangers would act as foremen in charge of patrolling fire wardens for the dangerous months of the year. These basic recommendations were adopted with some qualifications and the Forest Districts and local Ranger Districts within them still form the basic structure for most of the functions of the present-day Forest Service.

Although the Government would undertake the general protection of the forests against fire, it was apparent that under the conditions of the various

forms of tenure which had evolved and which have been described, that the tenure holders and the Government shared as partners, to some extent, the profits of forest exploitation. The Commission concluded that the cost of protecting forests from fire should be shared as well. The recommendation read:

"We recommend that, in addition to local expenditure each district should be charged with its due proportion of office and departmental expense connected with this (fire protection) work; and the total cost thus ascertained should be divided between the interests concerned in the following manner: During the next few years, and in particular until the survey of licenced timber lands has been completed, the Government should pay half the total cost in each district and the holders of timber lands, each assessed in proportion to his acreage, should contribute the other half. But as soon as the extent of the unalienated timber lands in any district has been ascertained to the satisfaction of the (proposed) Department of Forests, the Government should bear the full expense of protecting this portion of the Reserve; such amount being taken to be the same fraction of the total district average of timber land. The remaining expense should be shared equally, between Government and timber holders, as in the previous case."

This recommendation established the principle of cost-sharing, although the details of implementation have been different. Basically, at the present day, the Government imposes a forest protection tax, based on acreage or the volume of log production, on tenure holders and the Government matches the tax revenue. In years of severe forest fire occurrence, however, the Government frequently makes substantial, additional contributions to meet the additional costs. In addition, the private forest industry makes a substantial contribution through its own fire-fighting organisations and resources. The development of these arrangements is mentioned later in this history.

The considerable number of fires caused by railway operations attracted the attention of the Royal Commissioners, who doubted that the Provincial Government had the power to enforce regulations upon any railway company under Dominion of Canada jurisdiction. They urged, however, that regulations should be made, covering such points as the patrolling of railway track after the passing of each train; the inclusion in the regulations of the provisions of the Railway Act which dealt with clearance of rights-of-way for railway construction; the substitution of other railway fuels by oil, where practicable, in timbered areas during the summer; the use and frequent renewal of spark arresters and the inspection of locomotives by fire wardens. The aid of the Dominion Railway Commission should be obtained where the Provincial Government did not have power to act. In point of fact, the Railway Commission had already promised the Royal Commission officials, ^{cooperation} in all matters dealing with the prevention and control of fires. As a final point, in connection with the threat of forest fires, the need to educate public opinion in British Columbia to the need for better protection of the forests was stressed.

The need to survey timber to establish its area and location has been mentioned previously. When the privilege of annual renewal of licences over a long period of years was granted by the Legislature, the Amendment to the Land Act, made in 1905, imposed the specific condition that no holder of a transferable licence

"shall be allowed to cut or carry away any timber from such timber limit until the said licensee has, at his own expense, had the

land surveyed by a duly qualified Provincial Land Surveyor."
(Sub-section 5 of Section 57)

This condition had not met with much compliance and, by August 18th, 1910, less than ten percent of the number of special licences in existence had been surveyed. The Royal Commission recommended that the Chief Commissioner of Lands should direct all of the licencees to start surveys of their timber licences at once, the completion date to be no later than December 31st, 1915. The Commission also stressed the need for more adequate information from licence holders about the quantity of logs which they were cutting and their destination, the exact sites of all the logging operations and other points pertinent to the forest industries.

The preoccupation of the Royal Commission with the control of logging operations, the threat of forest fires and general administration is evident.

Silvicultural matters were hardly considered. They did, however, reach the broad conclusion, albeit a very inadequate one, that, if two conditions were observed, natural reforestation would take place in British Columbia. Firstly, the young growth and old must be protected from fire and, secondly, a firm control must be exercised over the methods of renewal of the existing crop.

"In short, effective re-afforestation depends largely upon effective discouragement of waste."

No specific recommendations were made, however, other than that protection against fire and reduction of logging waste must be pressed and that the proposed Department of Forests should undertake the task of determining what could be done by regulation to prevent inferior species from replacing more valuable species. In retrospect, it is remarkable how the emphases of the Royal Commission of 1910 have persisted to the present day. The lack of real consideration of the biological and silvicultural requirements of the forest is one facet which can still be detected and has led to what has been described as the "clear-cut, burn, and plant syndrome."

In the foregoing description of the Royal Commission's work, their proposal to form a Department of Forests under a Chief Commissioner of Lands and Forests has been mentioned. This body would need finances. In the Commission's view, income from royalty on timber differed essentially from any other form of revenue in the Province and should be regarded as capital rather than current revenue.

" . . . the amount so received, large as it may appear, should be expended by the Government for the protection, conservation and restoration of our timber resources. With our present knowledge regarding re-afforestation, to treat these receipts as other than capital would be utterly unsound in principle and might produce disastrous results in the ultimate impairment of the public estate."

Whilst the Commission had expressed a qualified opinion that natural reforestation would occur in the Province, an opinion supported by many witnesses who appeared before them, they did not consider it to be an established fact and felt that uncertainty would not be removed until thorough investigation by the Forest Service.

By way of a conclusion, the Commission recommended the creation of a sinking fund, consisting of the royalties received in each year, to finance the operation of the proposed Forest Service. If, however, the royalty increased from "existing lands", only a percentage of the increase would be placed in the

fund, as follows:

If annual royalty increased over the existing level of \$264,544	-	40% of such increase
If annual royalty exceeded \$500,000	-	\$500,000 plus 20% of the balance
If annual royalty exceeded \$750,000	-	\$750,000 plus 10% of the balance

In the event, a Forest Branch was formed, as described later but the proposal for a sinking fund was not accepted by the Government.

The roofing shingle industry of British Columbia relied very largely on the export of shingles to the United States. The United States Government had increased the duty on imported shingles following representations made by the lumbermen of the State of Washington which were endorsed by various forestry associations and prominent members of the United States Forest Service. It was held by those concerned that the increased levy on foreign shingles would reduce their import and improve utilisation of tree tops, high stumps and low grade logs in the United States. The Royal Commission felt that this view had proved to be substantially correct and recommended

"that the Government of British Columbia should take such steps as may be within its power to secure similar legislation."

It is not clear what the Commission intended by this recommendation, whether it wanted to reduce waste in British Columbia or to take reciprocal action against the United States tariff increase. The latter would hardly be effective since the Province was exporting far more shingles than were imported and could, also, easily supply its domestic market. On the other hand, if the recommendation was to reduce waste it was remarkably vague. It seems probable that the Commission was asking for reciprocal legislation for the imposition of duty on United States products but felt the need to state the point in an equivocal way, so as not to invite an added retaliation from the United States. The United States Pacific Northwest lumbermen have sporadically continued their efforts to reduce the flow of competitive British Columbia forest products into the United States markets up to the present day.

The Commission endorsed the general principle of a ban on the export of logs. However, witnesses had urged that the export of second and third class cedar logs should be allowed and the Commission did feel that the general principle should be investigated with a view to avoiding hardship on the potential exporter.

The Royal Commission of Inquiry on Timber and Forestry of 1909 - 10 represented the first real attempt to arrive at a coordinated policy and administrative procedures for the forests of British Columbia. It led to the enactment by the Legislature, of the Forest Act of 1912.

CHAPTER FIVE

The Forest Act of 1912

The Forest Act of 1912 was the first Act in the Province to contain the legislation governing the forests. It incorporated the legislation which had existed previously and many of the twenty-one definite recommendations which had been made by the Royal Commission of 1909 - 10. Some recommendations, however, were not included.

The Commission had recommended, in effect, that the rates of land rental and timber royalty should not be fixed for more than one year ahead. One of the major complaints of industry for many years had been toward the uncertainty as to what Government levies would apply to timber tenures in the future.⁵ The industry wanted to have the amount of the levies known for some years in advance and usually wanted them fixed at rates lower than those in existence. The Royal Commission had disagreed with this idea but, in the Royalty Act of 1914, the Government attempted to prescribe rates of royalty for all time to come by establishing schedules of royalty on a sliding scale which operated in five-year periods. The Act came into force in January 1915 and royalties were increased at the expiry of the first five-year period in accordance with the schedule of the Act. At the next revision, due on 1st January, 1925, the schedule proved to be unworkable and the Act was repealed as of 31st December, 1924.

The Commission had recommended the formation of a Department of Forests but the Act of 1912 created a Forest Branch within the Department of Lands. In 1945, the Department of Lands was changed into the Department of Lands and Forests. In the same year the appointment of a Deputy Minister of Forests was authorised so that the equivalent of a Governmental Department was created. At the same time the Forest Branch became known as the Forest Service.

As has been mentioned previously, the recommendation to abolish Hand Loggers' Licences was not included in the Act of 1912. The recommendation that a Forest Sinking Fund should be set up and that royalty revenues should be regarded as capital and not as current income was not included in the Forest Act of 1912 and it has never been recognised as a guiding principle by the Provincial Government.

The full title of the "Forest Act" 1912 was "An Act Respecting Forests and Crown Timber Lands and the Conservation and Preservation of Standing Timber and the Regulation of Commerce in Timber and Products of the Forest"—Chapter 17 of the Statutes of 1912.

The act was divided into fourteen parts, as follows:

<u>Part</u>	<u>Subject</u>
I	Organisation of a Forest Branch in the Department of Lands
II	Trespass
III	Tenures, and sale of Crown Timber
IV	Timber Leases
V	Timber Licences
VI	Rights of Way
VII	Royalties, Taxes and Charges
VIII	Scaling
IX	Timber Marking
X	Manufacture within the Province
XI	Fire Prevention and Fire Fighting
XII	Rules and Regulations
XIII	Penalties
XIV	Repeal of previously existing legislation relating to the forests, contained in the Land Act and various other Acts, dealing with such activities as Protection, Manufacture within the Province, Scaling and Log Marking.

From 1912, when the first "Forest Act" was passed, for some fifty years (until the passage by the Legislature of Chapter 33 of 1963—the "Private Roads Act") all of the Forest Law of the Province was contained in the "Forest Act", as amended from time to time. There was other legislation of importance to the forests such as the "Mining Act" but the inclusion of all forest law in one act was of great significance to both industry and Government administration.⁵

Part III of the Act of 1912 contained a new principle for British Columbia in that provision was made for the sale of Crown timber anywhere, in any quantity and for any period of time by competitive sealed tender. Public auction for the selling of timber was not approved until 1912 (Chapter 25) and it is interesting that the latter method found little favour with Forest Service or industry until about 1940, after which public auction gained favour and sealed tenders were almost discarded. By 1964, the sealed tender was coming back into favour under the influence of a Government policy which gave the industry which was already established in the areas of the newly formed Public Working Circles and Sustained Yield Units certain bidding privileges.

Part III also embodied the first legislation in British Columbia for forming Forest Reserves and it said, in part:

"12(1). The Minister shall cause an examination of Crown lands to be made by the Department for the purpose of delimitating areas of such land as it is desirable to reserve for the perpetual growing of timber, and as a result of such examination the Lieutenant-Governor in Council may, by proclamation, constitute any such area a permanent forest reserve; and upon such proclamation all land included within the boundaries of any such area shall be withdrawn from sale, settlement and occupancy under the provision of the Land Act . . . "

This recommendation of the Commission, incorporated as it was into the Act, could have been the foundation of sustained yield management of the forests.⁵ By the time sustained yield forestry became a practical possibility, however, (about 1945) the reserves were not used for this purpose and the Government took a different approach, considered to be more suitable to the economy of the day, when introducing sustained yield forestry. Nevertheless, the legislation was used and a number of reserves were established, serving a number of useful purposes.

An important provision of Part VI of the Act dealt elaborately with rights-of-way and it provided, in part;

"32. For the carriage and transport of timber and products of the forest, any land may be taken and used for a right-of-way for, or by, or on behalf of any person desiring to transport any timber or product of the forest, without the consent of the owner of such land . . . "

Rights-of-way had actually been assured to the timber owner in earlier legislation but Part VI of the new Act elaborated on the procedures. The provisions of the present "Forest Act" are essentially the same as those written into the Act of 1912.

In Part VIII of the Act, dealing with the scaling of timber, provision was made for "licenced scalers" to be employed throughout the Province. These were and are scalers licenced by the Government and employed and paid by the forest industry. In addition, there was to be a staff of Government-employed

"Official Scalers" in the Region west of the Cascade Mountain Range. The scaling provisions of the modern Act are essentially the same as those of the Act of 1912, although the techniques of determining log volume have undergone change, as will be described later.

Part XI of the new Act dealt with forest fire prevention and it retained and elaborated upon the existing requirements for a fire season and for fire permits. It also imposed regulations upon railways under Provincial control and established a Forest Protection Fund. The latter was made independent of the other finances of the Province. Contrary to all the recognised principles of public accounting it was a continuing fund made up of and replenished annually by a tax on all timber holders and a contribution from the Government. The tax level was established at one cent per acre and the Government contributed an equal sum. Later, in 1921, the equal Government contribution was abolished in favour of a stipulated sum voted by the Legislature each year. The Forest Protection Fund was finally abolished in 1955 (Section 11 of Chapter 27—1945) and other sources of income were provided, as related later. Another provision of Part XI of the Act was that firefighting duty was made compulsory, with a few exceptions made for essential occupations, for all men between the ages of eighteen and sixty years.

There was one important provision of the "Forest Act" of 1912 which did not carry forward to the present day. The Act created a Provincial Forest Board to consist of the Chief Forester (ex-officio) and not more than five foresters, or officials, of the Department. The Board possessed wide powers. It could compel the attendance of witnesses and require that they produce documents and accounts in relation to forestry matters. It had all the powers of "any judge of the Supreme Court (of British Columbia)". It could recommend and make forest orders. It gradually fell into disuse and there was no provision for the Board in the Consolidated Statutes of 1924.

In retrospect, the Act of 1912 was the foundation of modern forest policy and, to a considerable extent, of forest management in the Province. It was the culmination of a period of searching for solutions to a chronic public financial situation in which the vast, largely unknown, forest was used, often in a questionable manner, to find answers to pressing social and economic problems. The Act expounded the policies of public ownership of lands, encouragement for the development of industry and the forest resource and a distant prospect of sustained yield management with immediate provisions for fire protection. In modern terms, it was a minimal forest policy but it reflected a great deal of common sense when viewed against the enormity of the problems of managing the forests properly and the smallness of ^{the} human resource to deal with these problems. Progress from the provisions of the Act of 1912 toward more sophisticated and effective policies and management was slow, since the achievement in practice of the aims which the Act set out was also slow and could hardly be otherwise. It is only in relatively recent years that progress in achieving the objectives of the 1912 policy has enabled policy developments to be made that are effective in practice, at least to a reasonable degree.

CHAPTER SIX

The Period From 1913 to 1945 Development of the Forest Industry and its Markets

The first Chief Forester of British Columbia, from 1912 to 1915, was H.R. MacMillan, who later became a prominent and successful forest industrialist. He was always consistent in his view that a large forest industry must be created. In 1912, for example, he pointed out that British Columbia contained at least 100 million acres of forest land with a total stand of commercial timber of not less than 300,000 million board feet in volume. At the then annual rate of cutting, about 1,250 million board feet per year, without making any allowance for the annual growth rate of the forest, it would have taken the lumber industry of British Columbia nearly 250 years to use the mature timber then standing. Consequently, he urged the forest policy of the Province should be not only to protect the forests from fire but, also, to provide for their adequate use by developing a large lumber industry.¹⁶

However, as MacMillan pointed out, although good logging practices would produce a large amount of low-grade material from both the Coast and Interior forests, in addition to the high-grade material which was already being logged, this material could not, at that time, be profitably sold, with the result that low-grade lumber was burned in the mill burner or used for fuel. Also low-grade trees and logs were left in the forest.

Amongst a number of possible end-products foreseen by MacMillan were Kraft pulp and paper, to be made from edgings, trimmings and other waste of Douglas fir, material which could be secured cheaply and in abundance at such points as Vancouver or New Westminster. Forest Branch studies were started in 1912 to determine the practicability of making wood alcohol, turpentine and resin from the sawmill waste of Douglas fir and ponderosa pine (there was, at the time, a small plant in Vancouver producing turpentine, tar oil and pitch). MacMillan foresaw that the pulp industry would eventually promote "cleaner" logging and closer utilisation of timber. He believed that British Columbia possessed a number of advantages over Eastern Canada in relation to the establishment of a permanent pulp industry. At the time of these observations, in 1912, there were five pulp mills in the Province with a combined daily capacity of about 300 tons but only two of them were operating with a steady level of production. Another potential product mentioned by MacMillan was wood block paving which would have to be properly treated with preservative and properly laid.

A major obstacle to the marketing of British Columbia lumber at this period was the prejudice held against it in both Eastern Canada and foreign markets, a prejudice which stemmed from a lack of knowledge of its qualities. MacMillan recommended that the Government should publish stress tables and other leading characteristics of British Columbia woods, as well as opening a small, permanent exhibit of interior wood finishes at a centre of trade, such as Toronto.

Finally, he stated that minor products such as hemlock bark (rich in tannins) and Cascara bark (the bark of Cascara sagrada, a species of buckthorn growing in the Coastal Region and of laxative properties) might be developed.

In the following year, MacMillan¹⁷ pointed out that the seagoing export

trade in lumber was still in its infancy and that the available market for British Columbia timber was practically confined to the Prairie Provinces. In spite of this, the lumbering industry was the "commercial backbone" of the Province.* However, lumbermen had enlarged the mill production capacities beyond the current market demands and the sawmills and shingle mills, which exceeded 425 in number, were in a state of chaotic overproduction. However, the forthcoming opening of the Panama Canal was expected to broaden overseas markets (it did) and more favourable railway freight rates to Eastern Canada were expected. It was also hoped that ships traveling to British Columbia would have an increased need for outward cargoes and that this factor would encourage the export of lumber to Australia, South America, South Africa, the Orient and Atlantic ports. A less pronounced relief of the existing congestion of cut would result from the removal of tariff restrictions on British Columbia lumber entering the United States. These restrictions were actually removed in 1913.

By the year 1913, the local population of the Province was using less than one-fifth of the Provincial annual production of timber, the other four-fifths being exported. Two broad divisions were recognised in the export trade, one consisting of round logs, piles, poles, mining props, cedar posts and pulp-wood and the other, more important/^{division} consisting of all manufactured items, lumber, sawn dimension timber, hewn and sawn railway ties, shingles and lath. The legislation forbade the export of unmanufactured logs from any lands held under lease, licence or timber sale or from lands which had been Crown-granted after 12th March, 1906. Round logs could be exported from lands which were Crown-granted between 28th April, 1887, and 12th March, 1906, for a payment of fifty cents royalty per thousand board feet. Logs could also be exported from lands which had been Crown-granted prior to 28th April, 1887, upon payment of an export tax, specified in the "Forest Act", which varied according to the grade and size of the log. Virtually all of the logs which were exported moved from Vancouver, Victoria or coastal points to the north to Puget Sound in the United States by water, none leaving the Province by rail. In 1913, the main log export species was western red cedar and included in the trade were 2,562,942 lineal feet of cedar telephone poles. About two million lineal feet of cedar poles went to the central United States by rail from the Nelson Forest District and Cranbrook and another 500,000 lineal feet went from tidewater logging camps, by boat, to California. The total value of cedar pole shipments was 179,406 dollars and mine props at 36,000 dollars. The total value of the logs, poles, piles, posts, ties and props exported from British Columbia in 1913 was 1,321,641 dollars.

The most important item in British Columbia's trade at this time was, of course, the export of manufactured lumber. The trade had grown without Government or public assistance or encouragement in the Canadian Prairies, the United States, Eastern Canada and areas served by the sea-borne cargo trade.

* The total forest revenue to the Provincial Government in 1912 was slightly less than 3 million dollars and in a period of financial stringency, it was highly important to the Government. Half of the industrial capital invested in the Province was in lumbering and woodworking, half of the payroll of the Province was derived from the forests and thirty-seven percent of the annual production of wealth in British Columbia came from the forests.

The Canadian Prairies had been the chief of these markets, taking three-fifths of the British Columbia production. But, during 1913, stiff competition from western Ontario, northern Canadian spruce manufacturers (favoured by freight rates) and the western United States producers (whenever their home market conditions were poor), coupled with a reduction of buying on the Prairies, had had a serious effect in British Columbia. Prices had dropped to an unprofitable level and many mills and logging camps were temporarily closed. From this, MacMillan concluded that all possible trade outlets should be opened in other areas to give greater stability to the lumber business and, consequently, to Provincial prosperity. Eastern Canadian and United States markets in the heavy consumption areas around the Great Lakes and along the Atlantic Coast needed further development. The process would be assisted by the recent removal of all United States tariffs on lumber and by gaining favourable rates for transit through the Panama Canal.

The ocean export trade had shown no signs of growth in the years recently preceding 1913 and it constituted, on the average, less than five per cent of the trade of the Province. It was also less than ten percent of western United States ocean exports.*

The total value of pulp and paper exported from British Columbia in 1913 was about three million dollars. Two mills were operating on a full-time basis, the largest, at Powell River, producing 225 tons of newsprint per day. More than 75% of this mill's production was marketed in the north-western United States where it was admitted free of duty under a clause in the United States Customs Regulations which admitted, duty free, paper valued at less than 2½ cents per pound. A small portion of this pulp production served to meet the local demand, including that of Calgary and Edmonton in Alberta, but shipments were not made to points east of Alberta because of the level of railway freight rates.

The other operating pulp mill, that of the British Columbia Sulphite Fibre Company, produced 40 tons of high-quality fibre per day, selling 75% of it to Japan and the balance to paper mills in the northwestern United States. As with lumber, MacMillan thought it to be essential to expand the export markets of the pulp industry, particularly in Asia, Australia, South Africa and the Atlantic seaboard of the United States. These were areas in which tidewater pulp mills held a distinct, competitive advantage.

The first hints of an outbreak of war, heard in 1914, temporarily paralysed building operations in the markets supplied from the Pacific Coast. The lumber industry was already in a weak condition following the inflationary period of 1913 and it stopped its operations completely. In this climate, the Chief Forester continued to urge that a market extension programme should be conducted by the Forest Branch and he finally made his point.¹⁸ In 1915, the programme was started.¹⁹ An investigation into the reasons for the lack of

* In 1913, the western United States ocean exports were 537,074,775 board feet, whereas those of British Columbia were 51,512,056 board feet. Approximately 26 million board feet of the latter was exported to Australia and 12 million board feet went to the United Kingdom and Europe.

progress in British Columbia's lumber export trade, for the fifteen years preceding 1915, had been made during 1914. The need to extend this investigation to overseas markets was brought to the attention of the Dominion Department of Trade and Commerce, with the result that H.R. MacMillan was appointed to visit these markets as a Special Trade Commissioner. M.A. Grainger was then appointed Chief Forester of British Columbia to replace him.

The results of MacMillan's visits to various export markets are of interest.¹⁹ In the United Kingdom, he found that lack of shipping due to the war had seriously restricted the lumber trade between the Pacific Coast and Europe by the end of 1915. Moreover, such private business as was still being transacted was almost entirely controlled by American agents and private buyers who were not adequately aware of the lumbering industry in British Columbia. The Imperial Government, as a matter of course, was purchasing Pacific Coast lumber through agents of brokers in San Francisco, Portland and Seattle. The arrangement was an unfavourable one from the British Columbia viewpoint. The Imperial authorities were approached by Sir Richard McBride, who was in London at the time, and H.R. MacMillan and at once stopped British purchases of Pacific Coast lumber from all sources except British Columbian mills, the orders being placed through the Provincial Government. All told, in 1915, \$206,000 worth of products, mostly ammunition boxes were shipped to Britain before a landslide in the Panama Canal virtually stopped the business.

MacMillan also visited Holland, France, South Africa and India during 1915. In the same year, the Department of Trade and Commerce cooperated in British Columbia wood product trade extension. A lumber commissioner was located in the new British Columbia House at Regent Street, London. Permanent lumber exhibits were sent to Britain, France, China, Japan, New Zealand, Australia, South Africa and the Argentine and were set up at Ottawa, Winnipeg and Toronto. Another lumber commissioner was placed at Regina, Saskatchewan.

In spite of the export trade, the main markets for British Columbian forest products was the North American Continent, with the prairie market consuming at least 60% of the total production. At this period, the production was the largest of any province of Canada.

LUMBER PRODUCTION BY MAJOR FOREST PROVINCES IN CANADA - 1915.

(Thousands of Board Feet - Lumber Tally)

<u>Province</u>	<u>Thousands of Board Feet Lumber Tally</u>
British Columbia	1,151,903
Quebec	1,118,298
Ontario	1,044,131
New Brunswick	414,808
Nova Scotia	279,044

Although its production was the highest, it is worth noting that British Columbia, unlike Ontario, and as a result of its geographic position relative to markets, had no large wood-working industry. Of the timber sawn in 1914, only about 20 million board feet was used as a raw material for articles of further

manufacture. Of this, 18 million board feet was made into boxes, 1 million board feet into sash, doors and interior fixtures, 200,000 board feet into cooperage and the balance was used in a number of smaller uses such as caskets, cars, boats, etc.

The trade extension activities of the Forest Branch were continued during 1916, although the shipping shortage created by the demands of war still restricted exports. British War Office business was almost entirely in boxes (875,000 during 1916) and the overall volume of wood products shipped to Britain and Europe was only one-half of that shipped in 1915. Under an Imperial Preference System, British Columbia supplied South Africa with 88% of her imports from the north Pacific, with the United States supplying the remainder. However, in the case of Australia, British Columbia supplied only 2% and the United States 98%, of North American shipments. The Chief Forester, Grainger, reported:

"British Columbia has a large and important market in Canada but she cannot allow the lumber trade of the Pacific to remain a monopoly of the Pacific States."

Whilst these efforts to expand trade were being made, a number of significant changes were occurring within the Provincial forest industry. The early methods of logging by oxen and, later, by horses had, by 1916 given way to the almost exclusive use of donkey engines, operated by steam.²⁰ In the Interior, horses were still in general use but logging machinery was being introduced. The adaptation of the steam engine to logging was claimed to have originated in British Columbia about 1875, when two old traction engines brought from Britain for freighting on the Cariboo Road were found to be unsuitable for the purpose. They were purchased and used by the Hastings Mill Company to haul logs to the water at English Bay, now in Vancouver. However, as noted previously, it has also been claimed that the first practical machine for moving logs was the "Dolbeer" donkey.⁵ The successful use of steam power led to the development of the fixed donkey engine which hauled logs in by means of a cable. The first of these, a home-made affair, using a boiler from an old steamship, was used at English Bay. By 1916, two types of engine were in use in the ordinary logging camps. Light engines or "yarders" were employed to haul logs from where they were cut to the main skid road and they were usually restricted to an operating radius of not greater than one-quarter mile. The heavier engines or "Roaders" hauled several logs which had been collected by yarders and fastened end to end by "dogs", to the water or the railway over "skid roads" made of logs. The earlier method of yarding, evidently a survival of the oxen "bull-team" system was to build the road of roundwood cross-skids, placed from six to eight feet apart and firmly braced, with a groove cut out on their upper sides for the log to ride in. This type of road, in 1916, had been largely replaced by the "fore and after" type, consisting of a trough made of logs laid end to end. A "roader", under ordinary conditions, could haul logs for a little more than a mile.

In the Coastal Region, the dragging of very large Douglas fir, western red cedar and spruce logs through the woods caused considerable damage to the young growth, with trees of up to two or three feet in diameter sometimes being pulled over. Ground obstacles such as rocks and stumps caused delay and placed

a heavy strain on equipment. These difficulties led to the development of "high lead" and "overhead" cable systems of extraction, systems which lift the log off the ground. With the high lead system of that day (1916), a pulley or "Block", through which the main cable ran, was attached to a spar tree, near to the engine, at a convenient height, usually 75 to 100 feet above the ground. The block at the outer end of the line was fastened to a tree or stump near to the ground. When a log was hauled in, the front end, to which a "choker" was attached, was lifted off the ground and the obstruction was largely avoided. However, the system did not eliminate heavy damage to young growth in which the coupes are termed "settings". Initially used for clear-cutting very large areas in what can only be described as forest destruction, the high-lead system later became synonymous with "patch-logging", an operation which is usually followed by artificial reforestation (tree planting). The overhead cable system differed since the logs were carried by means of a carriage traveling on a taut cable, both ends being elevated. In 1916, four Coastal and two Interior operators were using overhead cable systems. The system later fell largely out of use as the high lead system was improved.

Log chutes were being used to a considerable extent where the slopes were sufficiently steep to permit the logs to run freely.²⁰ They were considered to be a cheap method of extraction where sufficiently large volumes of timber existed to justify the initial expenditure but they were eventually abandoned as a means of extraction.

The development of mechanical logging methods did, of course, become a vital factor in the economic development of the British Columbia forest industry. In the Coastal Region in particular but, also, in parts of the Interior it is difficult to visualise, in view of log sizes and the nature of the terrain, the successful application of hand methods of logging on anything resembling an adequate scale of operation to utilise the sustained yield capacity of the Provincial forests. The effects of the continuous mechanical logging developments have greatly influenced forest policy and management practices. Another important factor, still of primary concern, has been the question of forest access. The opening of large tracts of forest has, of course, been greatly expedited by the use of mechanical methods.

Up to about 1906, logging in the Coastal Region had been confined to timber close to the shores of the sea or large lakes. The donkey engines could extract logs, successfully and economically, up to a total distance of about three miles. Since about 1906, logging railways had been built to penetrate further inshore and twenty-one were in use by 1916. However, their use has since been abandoned in favour of truck-hauling roads. River driving of logs was employed in parts of the Interior but the Coastal rivers are usually too swift and choked at their outlets with tideland flats and islands to encourage river-driving. Almost all of the Coastal logs, after delivery to sea water, were towed to mills, by independent towing companies, in booms. The cheapness and flexibility of sea transport for logs, as well as for forest products generally, was a major factor in the rapid development of the Coastal industry, as compared to that of the Interior.

The greater part of the Coastal logging, in the 1916 period, was carried out by independent loggers who sold their output to the mills, either directly or through brokers. The trading by brokers formed the Vancouver log market, the price levels of which still influence the standing timber stumpage values of the Coastal Region. In the Interior, a log market did not form, each mill drawing its log supply from its own area of economic log extraction. It was the cheapness and flexibility of sea transportation which permitted a considerable concentration of industry at a distance from the log supply source and made the formation of the Vancouver log market a practical possibility.

The independent logger usually had limited financial resources and had to sell his logs quickly. The millmen were not markedly reluctant to take advantage of this opportunity to depress prices. On the other hand, since mills did not usually carry large stocks of logs, a diminution in the log supply would cause a sharp rise in price. In 1916, logging was gradually being taken over by larger operators, resulting in a more even logflow to the market and more stable prices. However, by 1918 there were 1,429 logging operations being conducted in the Province, 446 more than in 1917 and 585 more than in 1916, an increase which was attributable to the issuance of Hand Loggers' Licences.

Whilst British Columbia's lumber trade with Eastern Canada increased towards the end of the First World War, with a record 150 million board feet of lumber and lath being shipped in 1918, the overseas shipments, including those to Pacific markets, were severely restricted by the wartime shortage of shipping. At this time, the Lumber Commissioner of the Provincial Department of Lands was making representations to the British Timber Controller to secure a full share of the lumber supply needed for post-war reconstruction. The British market was particularly attractive since it was the only overseas country with shipping available.²¹ In Vancouver, the Imperial Munitions Board had established a Branch of Aeronautical Supplies, charged with procuring an adequate supply of aeroplane lumber. Sitka spruce was the species most favoured for this use.

In 1919, Great Britain ordered 70 million board feet of lumber from the Province and exporting mills, to deal with this business, formed a new company called "Associated Timber Exporters of British Columbia Limited." Sir James Bell, British Timber Controller and Montagu L. Meyer, British Government Timber Buyer studied logging and lumber manufacturing methods in the Coastal Region.²² The latter man was later to become the head of a major wood product importing company in Britain, a company having close associations with MacMillan Bloedel Company Limited, of which H.R. MacMillan was the head. H.R. MacMillan Export Company had been formed on his return from the tour as Export Commissioner. In spite of the large order from Britain, the occurrence of labour troubles in Canada, along with Prairie crop shortages, severely reduced the consumption of the Canadian market, as well as retarding British Columbian levels of production. However, the demands of the United States became very high and the production then increased and was readily absorbed by this market.

After the War, all commodities experienced a price boom. Lumber was virtually the last item to increase in price and the first to revert to normal²³ but, in 1921, a period of re-adjustment and deflation started. The prices of lumber products dropped from 40 to 50 percent of those which had prevailed in

1920, the demand strengthened and foreign trade increased. In addition, labour accepted reduced wages and the costs of equipment and provisions were declining. Several export companies had now been formed to conduct direct negotiations with foreign buyers, in addition to the one formed in 1919. The total volume of business conducted in 1921 was greater than in any previous year except 1920 whilst the total export volume of 1888 million board feet was a record for the Province.²⁴ The export business, in 1921, exceeded ten percent of the total scaled volume of all of the Provincial forest products and twenty percent of the volume of logs scaled to the west of the Cascade Mountains, after deducting the volume of those logs going to pulp mills, shingle mills and to export as logs. In relation to the total exports from the Douglas fir region of Canada and the United States, British Columbia exported 9.6% of the total, as against 3.1% in 1916 and 8.65% in 1920. Because of the lower market prices, however, the total value of forest production fell off to about 65 million dollars, as compared to about 93 million dollars in 1920.

From 1920 onwards until 1924, the Provincial production of wood products, favoured by good demand and prices in both home and foreign markets, increased steadily. The pulp and paper industry, as well as the lumber industry, had shown a remarkable recovery from post-war conditions by 1922²⁵, especially in the production of newsprint which increased by 14,500 tons or 13% over the 1921 level. Sulphite pulp production was 18,000 tons, or an increase of 20% over the previous year. The Forest Branch continued to engage in trade promotion in eastern Canada, the Prairie and overseas markets. But, in 1925, the increasing production which had again exceeded all previous records, was marred by falling prices.²⁶ The Chief Forester of the Province, P.Z. Caverhill, stated that this condition was attributed to the anxiety of operators to book business to keep their plant running to capacity even at prices lower than the cost of production.²⁶ The industry will do the same thing at the present day, up to the point at which the cost of plant closure is less than the loss of money from the sale of products at a price below the cost of production. Caverhill added, however:

"Had some general curtailment been possible during the early spring (of 1925) there is no question that the price would have strengthened and conditions improved. It cannot be too strongly emphasised that low prices are conducive to waste of low-grade material and tend to retard the introduction of forestry practice. If we are to grow timber the crop must, in some measure, return the outlay and this can be done only by utilizing a larger part of the wood product."

All of the next forty-five years were to see continuous efforts to achieve closer utilization of the forest and of the log. The reduction of waste has been a consistent policy objective of a succession of Governments. In general, up to 1930, the volumes of production were progressively increased or maintained but the prices received for products, with the possible exception of lumber prices in 1928²⁷ continued to be unsatisfactory. By 1928, the pulp and paper industry was considered to be overdeveloped and was undergoing a price decline.

In 1929, in spite of a general slump in economic activities during the last six months of the year, the total value of forest products and the industrial position of the wood-using industry were maintained.²⁸ Pulp and paper products, shingles and boxes were adversely affected by conditions and declined 14% in value.

But lumber, minor products and the woodworking industries had increased the value of production, offsetting the decline. Water-borne trade had reached a record level of 8,800 million board feet. During this year, all of the ground-wood and 50,000 tons of the sulphite pulp made in the Province went into the manufacture of newsprint within the Province. The decision of leading importers in the United Kingdom to purchase the entire export timber supply of the Soviet Union had virtually closed this market to British Columbia.¹

The economic struggles of the Province became more severe. By 1931, it had become clear that the forest industries were in a state of depression which was worldwide. The volume of logs which was cut declined from 2,664 million board feet in 1930 to 1,948 million board feet. The prices offered for sawmill products were the lowest since 1915 and the total value of the industrial production was less than half of that accrued in 1929, being only \$44,447,000. The revenue accruing to the Forest Branch dropped from \$3,436,071 in 1929, to \$2,576,343 but the trend of falling revenues accelerated in 1932 as timber licence holders in increasing numbers did not pay their renewal fees.²⁹ As mentioned previously, relief legislation had been passed in 1931 which permitted the licence holders to postpone payment of their annual renewal fees up to 31st March, 1934. Payment was thus postponed rather than forfeited although it was intended that, if the accumulated backlog of fees were not paid by the expiry date, the timber licences should lapse and revert to the Crown.

The lumber trade extension work in eastern Canada was discontinued in 1932 for economic reasons.²⁹ It was ironic that poor markets and reduced returns led the Province to a point where it could no longer afford this activity. However, the Forest Branch did cooperate with the British Columbia Lumber and Shingle Manufacturers Limited in trade extension in the United Kingdom market. At this crucial period in industrial development, exports to the United Kingdom were actually increasing. In 1930, British Columbia sent 96 million board feet of lumber to the United Kingdom, accounting for 32 percent of Britain's lumber imports from the North Pacific. In 1931, the figures were 91 million board feet (45 percent) and in 1932, 108 million board feet (72 percent).

The case for increasing the lumber trade had been presented to the British Empire Economic Conference at Ottawa and a technical officer had visited China. In point of fact, the export lumber trade had been maintained remarkably well, except for trade with the United States which had imposed a tariff, practically closing the market to British Columbia lumber. In 1932, only 3600 timber licences were renewed out of the 13,684 which had been in good standing in 1914.

In the early history of the lumber trade in Canada, the export trade had swung increasingly away from the United Kingdom market and toward the United States market, as has been described.⁸ By 1913, the United States had removed all tariffs on Canadian lumber. With the beginning of the depression, however, a duty of \$1.00 per thousand board feet was imposed in 1930 and it was quadrupled in the period from 1932 to 1935. The imposition of these tariffs on lumber had tended to accentuate the importance of paper exports to the United States, exports which had been admitted duty free since the Reciprocity Treaty of 1911. As a result of the new lumber tariffs, Canada was compelled to find an export market for lumber in countries other than the United States. At the Ottawa

Conference of 1932, Canadian lumber was given an advantage of 10% on the delivered price, a revision of Imperial Preference that was made at the instance of Canada rather than Great Britain. The embargoes and export taxes, imposed by the Provinces, had been effective against United States import duties in compelling the migration of industry to Canada. Thus lumber was manufactured and exported by Canada, instead of carrying out the export of logs for manufacture in the United States. In a somewhat comparable way, the Imperial Preferences secured by Canada were effective against the new United States import duties, by securing a preferred competitive position for Canada in important Empire markets such as Australia and Great Britain. Also, the bulky, cheap character of the commodity increased the effectiveness of Government policy by tilting the preference of the importer of lumber toward British Columbia and away from the adjacent States of Washington and Oregon. The monetary policy of Great Britain towards the end of the 1930 depression furthered a boom in housing and a marked expansion of the demand for lumber, as well as contributing to the prosperity of Australia. Recovery measures in the United States, on the other hand, were responsible for an increase in the United States' domestic demand for building materials but an advance in prices occurred, either as a result of lack of adequate administrative control or of monetary policy. The price increase further weakened the position of American lumber in the export markets in competition with British Columbia. Thus, the lumber industry in British Columbia gained from the disparity between British and United States' policies.

The overall results of these influences had been a drop in the scaled volume from a peak of 3,300 million board feet in 1929, with a total value of products of 93 million dollars to a low in 1932 of 1,600 million board feet, with products valued at 35 million dollars. In 1934, the scaled volume was 2,215 million board feet and products were valued at 45,461,000 dollars.³⁰

Caverhill pointed out, in 1924:³⁰

"The forest industries are the largest employers of labour in the Province and, over the years, have far exceeded other natural resources in value of production and revenues to the government. They should continue to be a main pillar in the financial structure of the Province."

At this time, the forest products industry was largely centralised on the Lower Coast and Vancouver Island, a Region from which 80% of the annual cut of logs was being secured. The excellent quality and size of the Douglas fir of this Region had given to the Province its existing position in the markets of the world. The standing volume of the species had been estimated at 40,000 million board feet, half of which was considered to be inaccessible to economic logging. The annual cut was just over 1,000 million board feet. Apparently, therefore, the Douglas fir was being seriously overcut, at a rate which could not be sustained by its growth capability and it was hoped that other species would eventually replace it in large quantities for many purposes. By 1934, British Columbia was supplying 92% of north Pacific exports to Australia (as against 16% in 1929); 83% of the Region's exports to the United Kingdom (20% in 1929); 24% to China (11% in 1929) and in all overseas markets it was supplying 54% of north Pacific markets (20% in 1929). British Columbia was now the leading North Pacific lumber exporter.

It was not until 1938 that normal business conditions were felt to have returned to the Province³¹ but the year was still unsettled with its recurrent threats of impending disaster and their failure to materialize. The days prior to the Munich Pact gave some indication of what might be expected to happen in the event of actual war. For a short period, a requirement that Canadian lumber entering the United States be marked to show its grade was introduced. It threatened the trade with the United States and demonstrated the lengths to which "nuisance" restrictions could be extended. At the same time, trade treaty negotiations were being conducted between Britain, the United States and Canada, causing disquiet over possible losses of markets.

For the few years preceding 1938, a growing public interest in the export of unmanufactured logs had been in evidence.³¹ The Government did not consider it advisable to restrict log exports from Crown Grants made before March 12th, 1906, even though the major portion of the log exports were being made from them, since a modification of the terms of these Grants would involve land and stumpage values and, thus, would constitute a major issue of public policy. The Legislature did enact, however, that:

"all timber cut on Crown Land, or on lands granted after the 12th day of March, 1906 ('Forest Act' - Section 90) shall be manufactured within the Province, except that the Lieutenant-Governor in Council may permit export upon such terms and conditions as he sees fit."

This legislation effectively restricted the export of logs from the classes of land concerned but, at the same time, it could permit export where logs were cut for a local market which, by unforeseen circumstance, could not utilise them. Applications for export from the Vancouver Forest District were first reviewed by an Export Advisory Committee, on whose advice the Government acted. The Committee was composed of loggers and millmen, familiar with industry and market conditions.

The import quotas imposed by the United States continued to have a crippling effect on the British Columbia roof-shingle industry. Under the British, American and Canadian Trade Agreement of 1938, the duty free quota of shingles would be changed to equal 30% of the average annual United States consumption for the preceding three years and shipments beyond this quota were liable to a duty of twenty-five cents per square. In 1939, activity increased and 3,400,000 squares were produced in the Province, as against an average of 2,385,000 squares per annum for the preceding ten years. More than 80% of these went to the United States.³²

The pulp and paper industry was in a condition of distress in 1938 with all of the mills operating part-time or not at all. The poor situation continued until the outbreak of war in Europe in September, 1939, when mills recommenced full-time operation.

The United Kingdom, in 1939, continued to be British Columbia's best lumber customer and most of the factors affecting the year's export business of the Province occurred there.³² Amongst the influences which tended to improve business for British Columbia were an early failure of other sources of supply; the policy of the British Government to compensate owners for losses caused by air raids in case of war (a policy which strongly encouraged building); the large Government housing schemes in Britain; the building of defence works, involving

the use of large quantities of lumber in hutments and evacuation camps and, finally, emergency war business. Any one of these factors, in other years, would have been counted of major importance. In housing, for example, England and Wales had about eight million houses at the end of the Great War of 1914 - 18. The four-millionth new house since that time was completed in 1939 and a fair start made towards the five-millionth. Building on this scale was a major business influence in itself. The outbreak of war in September, 1939, put an end to competitive trade with Britain but the British Government confirmed existing orders and placed additional ones for more than 190 million board feet during the last three months of the year. As happened in the Great War of 1914 - 18, however, shipping fell into short supply and the quantities ordered were not moved, with the result that British Columbia's storage facilities were filled and mills were threatened with closure until their products could be shipped. In all, water-borne shipments reached a record 1,409,052,000 board feet with the United Kingdom taking about 956 million board feet or more than 68% of the total.

Minor products such as poles, hewn railway ties and posts were only in moderate demand in 1939. The contract price for cutting poles was only thirty-five cents each, at which price only the most expert "tie-hack" could net "minimum wages." Christmas trees were an exception and they began to develop into an important seasonal business. The Province shipped 1,763,000 trees, worth more than 140,000 dollars to the United States in 1939. It was a wry comment on the affairs of man that the Province should be engaged in the supply of war material and of Christmas decorations to celebrate peace and goodwill among men, at the same time. The Chief Forester, E.C. Manning, expressed some doubts about the cutting of Christmas trees and these doubts remain in forestry circles to the present day:

"Young stands of natural reproduction ordinarily are too thick and require thinning. This is the argument commonly used to justify the trade. But thinning is a nice surgical operation on the forest requiring the judgment of experienced men. It seeks to remove the poorest and preserve the best to grow into a more valuable crop; the Christmas tree cutter is not experienced in thinning and the (Christmas tree) trade demands the best (trees) rather than the poorest. The business to date has meant the destruction of fine stands of young growth from which the best (trees) has been culled and from which thrifty twenty and thirty foot trees have been felled to secure a five foot tree from the top."

Up to and including 1939, Christmas tree cutting had been permitted on Crown lands in certain dry forest areas in the Interior, considered to be incapable of producing "valuable" sawtimber and on two small experimental areas. Otherwise, Christmas tree cutting permits had been refused and virtually all cutting, therefore, had occurred on private lands. Manning considered it to be unlikely that British Columbia could, for an unspecified future period, provide the detailed supervision for safe cutting on Crown land and did not consider that the indiscriminate, destructive cutting which had been practiced was in the public interest, thereby inferring that Christmas tree cutting on Crown lands would continue to be severely restricted. In 1942, however, an innovation was introduced whereby Christmas tree cutting permits for cutting on suitable areas of Crown land were issued to local residents. The areas were capable of giving a perpetual yield of the trees, under proper treatment, and their individual allocation was

an incentive to farmers to secure an income during the off-season in agriculture.³³

During the war years, the wood products industry of British Columbia grew to an unprecedented size. Britain, with all European supplies cut off, imported the majority of its requirements from British Columbia, and much of the lumber was transported by rail, across Canada, to the Atlantic ports, during periods of shipping shortage. By 1941, there were marked increases in United States consumption which added to the unprecedented demand. Prices had become most attractive.³⁴ Canada, had, in 1941, appointed a Timber Controller and a Timber Controller's Assistant (Pacific Coast). H.R. MacMillan filled the former post and E.C. Manning, Chief Forester of British Columbia, the latter. Shortly after appointment, however, Manning was killed in an air crash whilst returning from Ottawa in 1941 and his name is commemorated at Manning Park on the Hope-Princeton Highway.

One of the timber control measures that was taken was the banning of the export of any Douglas fir sawlogs.³⁵ Another was the imposition of market priorities, whereby 40% of British Columbia output was allocated to domestic trade, a like amount to Great Britain and the remaining 20% to the United States.³³ Some revision of this arrangement was made later in the war but control remained. By 1942, the demand for lumber was so great that the industry was officially declared "essential", price ceilings were established for the booming American market and the British Timber Controller made the specifications of products for export to Britain more liberal so as to ease production problems.

Logging had kept pace with this great increase in production without any particular restrictions on volume, species or the area cut. A general concern to introduce a greater degree of order into the utilisation of the forest led to the appointment of the Honourable Justice Gordon McGregor Sloan, Puisne Justice of the Court of Appeal of British Columbia, as a sole Royal Commissioner to inquire into all matters generally relating to or connected with the forest resources of British Columbia. The appointment was made under Section 3 of the "Public Enquiries Act", being Chapter 131 of the "Revised Statutes of British Columbia, 1943". The findings of the Royal Commission are discussed in a later chapter, after considering forestry development during the period from 1913 to 1945.

CHAPTER SEVEN

The Period From 1913 to 1945 Forestry Developments

The Royal Commission of 1912 had experienced much difficulty in arriving at even a general comprehension of the forest and forest land resources in British Columbia.¹⁵ A considerable effort was to be made toward gaining a better knowledge of these resources, as will be described later. One aspect of the problem lay in the determination of what land, currently bearing stands of timber, was suitable for agriculture, particularly since farming and grazing land was in great demand by would-be settlers. As might be expected, conjecture played a part in the estimation of the extent and value of the forest and agricultural land resources.

In 1912, for example, the Forest Branch¹⁶ had claimed that the agricultural possibilities of British Columbia were generally under-estimated and that, when all of the tillable lands were under cultivation and all of the grazing lands were in use for stock-raising, the agricultural industry would easily rank with the lumber industry in importance. Whether or not the agricultural possibilities were under-estimated, the agricultural industry has not equalled the forest industry in economic importance up to the present day.

The governing policy of the British Columbia Legislature was to withhold the sale of timbered agricultural land until the timber crop was removed. In this way they received stumpage and royalty before the land sale. Prior sale could have meant the **holding** of the timbered land for speculative purposes by the purchaser, withholding stumpage and royalty payments to the Government and the availability of the land for agricultural use for an indeterminate period. The prompt removal of the timber crop from agricultural lands within timber leases and licences could, however, be enforced by the Forest Branch so as to release those lands for settlement. There were considerable amounts of the lands held in leases and licences in 1912.¹⁶ Larger areas of land, suitable for agriculture, were held by the Crown in the more inaccessible regions of the Province but these were reserved from pre-emption or sale if the timber on them exceeded 3,000 board feet per acre west of the Cascade Mountains or 5,000 board feet per acre east of the Cascade Mountains. Many applications to pre-empt or purchase land were being held in abeyance in 1912 because timber in excess of these amounts was present on the land.

The Government policy at this time may be summarised as: ^{17,18}

- (1) To prevent the alienation of Crown land chiefly valuable for timber.
- (2) To make available for settlement all timbered areas suitable for agriculture but only after removal of the timber.
- (3) To prevent the acquisition of timber through the pre-emption or purchase of land, ostensibly for agricultural purposes, or, conversely, to ensure that no bodies of merchantable timber could be acquired except by public sale at an **upset** price guarding the public interest.
- (4) To prevent the uninformed, bona-fide settler from locating in some timbered, non-agricultural tract where he could not be successful.

The following table gives examples of progress in land examination by the Forest Branch. It serves to show the trend of the land examination programme which had become much reduced in scale by 1940.

ACREAGES EXAMINED FOR LAND CLASSIFICATION BY THE BRITISH
COLUMBIA FOREST BRANCH IN SAMPLE YEARS 1913 - 1934⁽¹⁾

<u>Year</u>	<u>Total Acres Examined</u>	<u>Recommended for Forest Reserve</u>	<u>Classified for Agriculture</u>
1913	156,416	Not given	Not given
1916	301,429	180,773	34,708
1922	129,481 ⁽²⁾	14,848 ⁽²⁾	41,066 ⁽²⁾
1926	90,000	45,000	45,000
1934	9,875	Not given	1,485

Notes: (1) Data derived from British Columbia Forest Service Annual Reports
(2) Approximate figures.

The programme has never been discontinued entirely since applications for pre-emption and purchase of land are numerous at the present day, particularly in Northern and Central Interior of British Columbia. However, much more sophisticated techniques are being introduced, particularly the Canadian Agricultural Reclamation and Development Act (A.R.D.A.) Land Classification Programme, described later in this history.

Another important function of the Forest Branch was reconnaissance of the forest. Prior to the formation of the Branch in 1912, the exploration of the forests had been mostly conducted by private individuals.¹⁷ One of the first duties of the Branch was to improve the vague knowledge of the resource by organised reconnaissance. A rapid start was made, 5,616,000 acres being reconnoitered in 1912¹⁶ and 12,308,000 acres in 1913.¹⁷ These acreages were in addition to areas mapped by District Foresters and Forest Rangers or cruised by parties under the Land Classification Programme, previously mentioned. Brief reconnaissance reports were published in the Forest Branch Annual Reports. The 1913 Report, for example, contained descriptions of forests at Omineca; the Bulkley Valley, the Columbia Valley; East Kootenay; the Salmon River (Vancouver Island); the Nass River, Cassiar; Bella Coola; the North Thompson River; the Canoe River; Lillooet and Similkameen. Following a hiatus during the 1914 - 18 War, reconnaissance work resumed. During 1928, for example, extensive reconnaissances were made of a portion of the Herrick River watershed with a view to completing information on the whole drainage basin of the McGregor River.²⁷ The Upper Nechako River and the Kingcome River watersheds also received attention in the same year. The forest reconnaissance process was assisted by a Forest Investigation (Research) Programme which included the development of volume and yield tables. As an example, yield tables in board feet for three site classes and a volume table in cubic feet and board feet for Western yellow pine (Pinus ponderosa) were published in 1922.²⁵

In 1923, the second British Empire Forestry Conference had been held in Canada and, amongst its resolutions, the Conference stressed the importance of a definite forest policy for each Government of the Empire, the policy to be administered by a properly constituted and adequate forest service. The resolution continued:

"Survey of Resources--The foundation of a stable forest policy for the Empire and for its component parts must be the collection, coordination and dissemination of facts as to the existing state of the forests and the current and prospective demands on them."³⁶

The reconnaissances in British Columbia were mostly concerned with the forests' potential for utilisation. An account of the Cottonwood River area, near

Quesnel in the Caribou Region, where work was carried out by one party of men, in 1924, illustrated the emphasis.³⁷

"Cottonwood River area—The Cottonwood is a tributary entering the Fraser from the east about 12 miles above Quesnel. The drainage area is approximately 635 square miles and contains some areas of good timber. The party cruised 32,000 acres bearing commercial stands in the main valley situated along the Caribou-Barkerville Road and just south of Cottonwood Post Office. The area is estimated to contain a stand of 414,000,000 board feet, an average of 13 MBM (13,000 board feet) per acre, 67 % of which is spruce, 22% lodgepole pine, 8% (Douglas) fir and 3% balsam (alpine fir). Owing to the small size of the trees the timber is more suitable for the manufacture of pulp and railway ties than for logs for sawmilling purposes.* This tract of timber should make an easy logging show. The Cottonwood River is considered driveable for over a month each year and the timber may be taken down it to the Fraser River.

"On the Swift, a tributary of the Cottonwood, the area of merchantable timber cruised comprises nearly 10,000 acres. This tract lies on the headwaters of the Swift River and has a stand estimated at 110,000,000 (board feet) or 11 MBM (11,000 board feet) per acre, 68% of which is spruce, 25% lodgepole pine and 7% balsam. There is at present an infestation of spruce budworm and tip-moth in this area, but the damage done to date is not serious. Owing to the scattered nature of the timber and its distance from suitable transportation facilities the area cannot be considered a satisfactory logging chance at present."

Prior to 1927, the Province had begun to establish Forest Reserves of Provincial Forests, described later. The data obtained from the Forest Reconnaissance programme was now directed toward the first coordinated attempts at forest management in distinct forest units although adequate regulation of cutting, for example, would not become a reality for at least another three decades. In 1927, for example, the survey of the Babine Forest was completed and the productive capacity of the forest was ascertained so that the preliminary plans of management could be drawn up.³⁸ In 1928, reports were published on the Yahk Forest and the Shuswap Forest.²⁷ The latter gave the acreages of each 20 year age-class (age class - area distribution) and the accessible sawlog timber volumes by species, as well as listing the estimated quantities of minor products. Comments on the sustained yield capacity, after a normal distribution of age-classes had been achieved by regulation of cutting, and on the prospects for natural reforestation were made. Data was also presented for young stands of trees by Compartments which ranged from 900 to 34,900 acres in extent, showing the number of trees per acre by species.

A series of regional reports of forest resources were also published, in addition to reports on individual Provincial forests. For example:

- 1930 The Vancouver Forest District
- 1931 The Prince Rupert Forest District
- 1932 Southern Interior Forest District (approximately the existing Nelson Forest District)
- 1933 Kamloops Forest District
- 1934 Port George Forest District

Thus the collection and compilation of information proceeded almost continuously until 1945, the end of the period now being considered and the available information

*The timber was actually primarily used for sawmilling. Between 1924 and the present day, the economic size of timber which can be utilised for sawmilling has changed a great deal.

was progressively improved. A revised and more detailed version of the Prince Rupert Forest District was published in 1936, only five years after the first publication, noted above.³⁹ Whilst more sophisticated, accurate and detailed techniques for taking inventory of the Provincial forests are now in use, the development of forest policy in British Columbia owes much to the information collected during the period from 1913 to 1945.

In 1918, Whitford and Craig¹⁵ made an estimate of the forest resources of the Province, based on detailed reports supplied to them by the Forest Branch, timber owners, cruisers, surveyors and others. Whilst the approach had defects which, today, can be recognised quite readily it did provide, for its time, a much more accurate estimate of the position than had previously been available. The remaining stands of timber in the Province were estimated to be:

REMAINING STANDS OF TIMBER IN BRITISH COLUMBIA (1918) ACCORDING
TO WHITFORD AND CRAIG²⁰ - MILLIONS OF BOARD FEET

<u>End Product</u>	<u>Coastal Region</u>	<u>Interior Region</u>	<u>Total</u>
Saw-material	214,300	136,535*	350,835
Piling, poles, pulpwood, etc.	<u>15,465</u>	<u>—</u>	<u>15,465</u>
Total forest resources	<u>229,765</u>	<u>136,535</u>	<u>366,300</u>

*Including all classes of timber of merchantable size

Later, in 1937, the Forest Branch published an estimate of the forest resource of the Province entitled "Forest Resources of British Columbia". The author, F.D. Mulholland, estimated that the remaining stands of timber in the Province, based on Forest Branch data, were:

MERCHANTABLE TIMBER OF BRITISH COLUMBIA (1936)
ACCORDING TO MULHOLLAND⁴⁰ - MILLIONS OF BOARD FEET*

<u>Coast</u>	<u>Interior</u>	<u>Total</u>
155,129	99,370	254,499

* Mulholland's estimates included a classification into accessible and inaccessible timber. Since the definitions and concept of what is and what is not accessible have changed very markedly, the figures given in the table are the total of both.

Mulholland conceded, in 1944, that the 1937 figures, which were markedly lower than those of Whitford and Craig in 1918, were a very conservative estimate and that ten percent should be added to the figure for the Coast. As will be described later, Mulholland's qualified figures were generally accepted by the Sloan Royal Commission of 1945.

Another estimate of sorts had been made by the Chief Forester, H.R. MacMillan, in 1912, when he had estimated the stand of commercial timber in the Province as being 300,000 million of board feet and "probably more".¹⁶

The introduction of technical aids for the compilation process began in 1940, when the Forest Service placed its available data onto punch cards for machine tabulation and, since that time, there has been established a continuous inventory, under constant revision.

Another major objective of policy, during the period from 1913 to 1945, was the creation of Forest Reserves. Prior to 1913, as previously related, a

policy had gradually developed whereby Crown land primarily valuable for forests would not be alienated into other ownership to any greater extent than had already occurred. In order to provide a supply of raw material to sustain and encourage the growth of industry, the systems of pre-emptions, Crown Grants and the leasing of forest land had given way to various forms of licencing under which qualified rights for the cutting of timber did not entail any change of Crown ownership of the land. The question of the reservation of forests within the Province was raised in the first Annual Report of the Forest Branch, in 1912.¹⁶ Evidently, the Government felt the need to establish boundaries which were gazetted of those forest areas which were reserved to the Crown, so as to definitely establish the ownership of the land. The report stated that, out of over 100 million acres of timberland in the Province, 65 million acres were suitable for the production of merchantable timber.* Within the proposed forest reserves, the timberlands of the Province would, first of all, be protected from fire. Secondly, the timber would be cut in such a manner that the maximum yield per acre would be obtained and, lastly, deforested lands would be made productive. It was proposed that the Government should exercise control of grazing privileges in the timberlands and that the creation of forest reserves under the "Forest Act" would not in any way retard the development of any agricultural, oil bearing or mineral bearing lands which might be included within them. However, a restriction was proposed to be placed on coal, oil or mineral lands in forest reserves to the extent that the timber and surface rights of the land would be reserved for timber production. In the event, the reservation of timber standing on coal or mineral claims was not accomplished until after 1956, by an amendment to the "Mineral Act." The prompt exclusion of valuable agricultural lands from the Forest Reserves was proposed and this led to the land classification programme which has been described. As recently as 1970, the Forest Service again started a comprehensive attempt to make all Public Sustained Yield Units into Forest Reserves, using information from the A.R.D.A. land classification scheme and other sources to identify lands suitable for agricultural and settlement with the purpose of excluding them from the Reserves.

The Forest Branch Report of 1912 also mentioned that the Dominion Government had placed more than half a million acres of the mountain lands in the trans-Continental Railway Belt Grant within the Province into permanent reserves (the figure did not include the National Parks) and these forest reserves would probably be extended until all of the timberlands which were not valuable for agriculture lay within them.

The sense of urgency conveyed by the 1912 Report was somewhat diminished by the Forest Branch Annual Report for 1913,¹⁷ when it was reported that it was unnecessary in 1913 to establish any reserves since the greater part of the Province was undeveloped and the protection of areas, bearing a merchantable stand of timber, against alienation was established by Statute. In 1914, the

* The 1957 Provincial Inventory⁴⁸ established a total of 136.7 million acres of timberland, of which 110.1 million acres were productive land (excluding low quality sites) bearing commercial forest. The 1967 Provincial Inventory established a total of 138.4 million acres of forest land of which 131.9 million acres were productive land (ie., good, medium and poor sites, excluding low quality sites).

establishment of a reserve was reported:¹⁸

"On December 31st, 1914 a notice appeared in the British Columbia Gazette to the effect that certain lands in the Elk River Valley have been made a forest reserve. That notice marked the establishment of the first provincial Forest Reserve in British Columbia."

The reserve covered approximately 100 square miles, bearing timber and underlain with coal. It possessed many attractions in the way of scenery and game but none of the land was suitable for agriculture. The principle reason given for the establishment of the reserve was

"because the area as a whole is more useful for growing a forest crop than for any other purpose. This often means that the area as a whole is fit for no other purpose."

As in the 1912 Report, the 1914 Report endeavoured to explain what the form of Forest Reserve used in British Columbia was. Evidently, other land-using interests and Departments of Government needed reassurance that there would be a minimum of interference with their respective activities.

"It cannot be emphasised too strongly that a Forest Reserve does not reserve land from use--does not lock up its resources. It neither prevents nor retards the use of agricultural and grazing land, coal, oil and mineral land and timber situated within the area reserved. Camping, hunting and fishing may be employed just as freely as elsewhere . . . "

"Such a form of reservation differs from a Forest Reserve proper, in that the basis of it is the stand of merchantable timber existing on the land rather than consideration of what the land itself is permanently most useful for. In other words, it is the timber wealth which is reserved rather than the land itself. After the timber is sold and removed, the land may be devoted to whatever purpose it is best suited. Thus, such a reservation may and does include some land suitable for agriculture, when cleared, as well as land which would be of use only for the production of timber-crops."

The explanation is, perhaps, reminiscent of the explanations given in later years in defence of Tree Farm Licences when an outcry against the Licences came from those who felt their own particular interests to be threatened.

Thereafter, progress was rapid, in 1914, a total of 954,958 acres of timberland was reserved and, in 1915, 673,583 acres.¹⁹ By 1940, the Forest Service was able to report that a total of 44 Provincial Forests were in existence, 18 on the Coast and 26 in the Interior, totalling 10,242 and 19,255 square miles respectively, for an aggregate of 29,497 square miles.³⁵ Chief Justice Sloan in his 1945 Royal Commission Report,⁴⁰ noted the same number of Provincial Forest Reserves, as follows:

PROVINCIAL FOREST RESERVES - 1944

Region	Total Area Acres	Mature Timber Acres	Immature Timber Acres	Forest Land Not Restocked Acres	Mature Timber (thousands of board feet)
Coast (18 reserves)	6,554,770	1,670,890	325,470	346,840	51,459,040
Interior (26 reserves)	12,322,970	2,547,880	3,825,340	1,331,760	23,540,250
TOTALS:	18,877,740	4,218,770	4,150,810	1,678,600	74,999,290

Although Management Plans were prepared for a number of the Forest Reserves, the Reserves, in point of fact, were not to be the forest management units of the future but they have served a useful purpose in establishing areas of land primarily devoted to forestry, located within specified boundaries. The opportunity to control cutting by implementation of the Plans was missed and was really not attempted until the 1950's.

The reserves in themselves, however, did not imply adequate forest management Chief Justice Sloan⁴⁰ was to state, in 1945:

"These forest areas are not open for sale for agricultural or other pursuits and, while timber alienation thereon has been through the medium of timber-sale contracts or other forms of tenure into which the forest administration could write any terms it chose to impose, the evidence is clear that no proper programme of forest management has been enforced in these forest reserves. Thus, for example, loggers operating these reserves have not been obliged to leave the cut-over land with sufficient seed-trees to ensure regeneration.

"The result is clearly seen in the acreage classified as "forest land not restocked", amounting on the Coast to 346,840 acres and, in the Interior, to 331,760 acres or a total of 678,600 acres. I should add that destruction by fire has also made its usual contribution to this unhappy picture "

Forest Fire

It is convenient, at this point, to leave the formation of the forest reserves, and to turn to the subject of the last comment by Sloan, the familiar ogre of fire, the constant menace to the forests of British Columbia throughout their history. Prior to 1913, the very great amount of damage done to the forest by fire had come to be clearly recognised by all sections of the British Columbia community, even though reliable estimates were lacking. Poor access and a growing population, employing fire for land-clearing for urbanisation, agriculture and mineral-prospecting, and an accumulating fire-hazard from slash left behind in logging operations ~~had~~ increased the risk of outbreaks of fire. Many references to the problem placed forest fire protection as a major item of forest policy in British Columbia. As described previously, during the period up to 1911, a total of eleven "Bush Fire Acts" and amendments had been passed by the Legislature and, by 1911, British Columbia had a reasonably comprehensive Fire Prevention Act. The Royal Commission of 1909 - 10¹⁵ had made a number of recommendations and had stated:

"the most thorough-going methods (of protecting the forests from fire) are needed."

Although the legislation was relatively sound, the practicalities of the situation were far from satisfactory and an adequate organisation was lacking. The Government expenditures on forestry had risen markedly since 1907 and, upon the formation of the Forest Branch, work to improve forest fire protection started at once.

In 1912, the total fire patrol force of the Province consisted of 2 Supervisors and 16 Divisional Wardens in charge of 149 District Wardens. During the summer season and in areas of extreme hazard, 48 special patrolmen were employed, paid by the day. The distribution of this meagre force and the vast areas that supposedly had to be patrolled by the District Wardens were as follows:

<u>Division</u>	<u>No. of District Fire Wardens</u>	<u>Average Acres Per Warden</u>
Vancouver Island	18	409,722
Lower Mainland	20	235,000
Southern Coast	6	1,794,166
Northern Coast	3	6,193,333
Atlin	1	785,000
Skeena	8	1,616,875
Fort George	7	2,307,157
Quesnel	6	1,620,000
Lillooet	6	2,090,000
Tete Jaune Cache	7	682,757
Kamloops	7	604,285
Vernon	7	514,285
Grand Forks	8	538,750
Nelson	13	241,285

Cranbrook	6	796,666
Fernie	12	170,000
Big Bend	2	1,295,000
Selkirk	11	285,000
	<u>148*</u>	

It is interesting that the Fernie Division had the best coverage, perhaps because the town had been destroyed in a forest fire and had a sensitive citizenry. The principal features governing the distribution of the force were the degree of danger from fire, the number of burning permits to be issued and the available means of communication and transportation. The average area patrolled by one man in 1912 was about 900,000 acres at a cost of about one-seventh cent per acre. The Forest Branch wryly observed:¹⁶

" . . . it is plain that the force in British Columbia will have to be materially increased before good forest protection can be insured." For a brief two years the force, in fact, was increased. The Forest Branch¹⁸ was able to report that 190 regular Forest Guards and 115 patrolmen and lookout men were employed in 1914 but the average area of 500,000 acres patrolled by each man was still considered to be much too large. However, the mobility of the patrols was being improved by providing motor vehicles in areas where suitable roads existed and by the supply of outboard motors for canoes. The guards spent a part of their spring season in clearing trails of fallen trees and shrubbery broken down by snow, 245 miles being cleared, for example, in 1914. The greater the amount of access that was provided by trails, the greater was the amount of annual maintenance required to keep them open. Eventually, as access improved, horse trails have been used less and less and have been largely replaced by "Jeep trails", suitable for four-wheel drive vehicles, as the minimum form of access. In addition to the Government employment of patrolmen, irrigation and mining companies, who recognised the threat posed by forest fires to their interests, employed some. In 1914, for example, privately employed patrolmen numbered at least thirty-three.

During the period of the 1914 - 18 War, the Forest Branch fire patrol strength was progressively reduced as men joined the Forces and conditions of financial stringency appeared.⁴¹ A hazardous fire year occurred in 1915 and, although the hazard was not so great as in 1914, the Forest Service staff was inadequate to cope with the situation.¹⁹ However, logging operators did provide a great deal of assistance in the form of men, well equipped and logistically independent, to fight fires in their neighbourhood. At the worst part of the 1915 fire season the Forest Service staff averaged one man per 740,000 acres.

After the 1914 - 18 War had ended, the emphasis which had been placed on patrolling of the forest on the ground was reduced by the gradual development of a system of lookouts to detect fires. By the year 1928, for example, 32 lookout stations were in operation and, in the Kootenay Region, aeroplane patrols were employed to supplement the lookouts.²⁷ Measures of this sort were more effective in fire detection than was the maintenance of a large ground patrol staff. When a fire had broken out, however, the situation was

* One District Fire Warden is unaccounted for, for reasons which the author is unable to explain from the available evidence.

all too often critical, even though the Forest Branch had the powers of compulsory recruitment of firefighters under the "Forest Act". As an example, in 1929 a condition of severe hazard occurred in the Southern Interior Region. Eighty-seven percent of the area burned in that year and 92.5% of the expenditure on fire control was in this region.²⁸ The Forest Branch reported of it:

"On certain days conditions were so bad that, had we been able to recruit all the labour in the Province and place them on the fire line they would have been helpless to control the situation."

Financial stringency during the early 1930's again cut into the available firefighting forces of the Forest Branch. In the spring of 1932, the Forest Protection Fund was suspended for one year with the result that the Forest Service had to rely on its permanent staff and its authority to call, to a limited extent, on those on unemployment relief for firefighting.²⁹ The patrol staff was thus cut to a level of 131 men below the 1931 strength, making the average area covered by one man, one million acres. This was, of course, an impossibly large area for one man to cover and to detect fires at the incipient stage.

The Forest Protection Fund had been in existence from 1912 up to the time of its suspension in 1931 and its suspension created serious difficulties. Apart from the personnel problems which have been mentioned, tools and equipment were in a worn-out condition and improvements such as trails, telephone lines and lookout stations could not be maintained.

In 1934,³⁰ the Forest Protection Fund was reinstated and an improvement in fire protection staff strength occurred, although not up to previous levels. The temporary summer staff numbered 154, as against 259 in 1931. Rigid economics were still practised and the Forest Branch staff problems continued to be pressing. In 1939, the Branch was to report:

"The history of personnel and organisation since the low of Depression years in 1931 to 1932 has been a record of rapidly increasing responsibilities in volume of work, coupled with a lagging recovery in personnel."

The Young Men's Forestry Training Plan, which is described below, had been in operation since 1935⁴² but it had not materially assisted in the problems of forest fire protection.

During the Second World War, the enrolment of men in the Canadian Armed Services precluded any build-up of the normal forest protection staff. By 1942, with the entry of Japan into the War, it was anticipated that incendiary attacks might be made against the Pacific Coast. The threat materialised in the form of hydrogen-filled, paper balloons, carrying an incendiary apparatus which were launched against the Pacific Coast in favourable winds. Fortunately for the Pacific Northwest, they were generally ineffective. In anticipation of the attacks, however, the Canadian Government allocated a maximum of 1,000 Alternative Service Workers (conscientious objectors) to British Columbia for firefighting, road construction, snag falling, planting, nursery work, seed collection and other work.

By the year 1945, the Forest Service was still organising standby fire suppression crews from Alternative Service Workers and had found them to be, since their inception in 1942, effective protection units.⁴³ Sixteen crews of high school boys were employed in 1944 and 1945, the boys being about sixteen

years old. They were too young to undertake the arduous work and achieve the best results.

Another aspect of Forest Branch activities to combat fire was, from its formation, the task of establishing a series of fire lookout stations. Mountain locations showing a possibility for lookout stations were subjected to visibility mapping and incorporated into area plans. Thus, for example, the Forest Branch Report for 1913¹⁷ included "A Report on (the) Fire Protection Plan for (the) Okanagan Lake Watershed" by L.R. Andrews, District Forester for the Vernon Forest District and a "Report on (the) Mount Baker Lookout Station" by J.D. Gilmour, District Forester, Cranbrook Forest District.* By 1932, there were thirty-two lookout stations in existence²⁷ but, during the Depression, some of these fell into a state of poor repair.⁴⁴ However, by 1938, there were fifty lookout stations, manned during hazardous weather and, although their number was still inadequate, attention was being paid to their efficiency. A new technique for establishing the location of fires from lookout stations, by the use of panoramic photographs bearing overprinted grid lines, had been introduced at twenty-five of the lookouts. The first prefabricated lookout, a type that speeded up actual erection on the site and which, following the development of suitable helicopters, could be delivered by air, came into use in 1944, having been originated by R.G. McKee.⁴⁵

But aerial fire-spotting was also to play its part. As early as 1921 the Dominion Air Board established a seaplane base at Jericho Beach, Vancouver, for cooperation with the various Departments of Government.²⁴ The Forest Branch took the opportunity to test airplanes for forest protection work. A total of 56 flights were made on fire patrol and the results showed conclusively that the airplane was useful as a complement to the protection ground force. In the following year, the use of aircraft was expanded into the following roles:²⁵

1. Supervision of fire-fighting
2. Transportation of fire-fighters and equipment
3. General supervision of the field staff over 22 million acres
4. Fire Detection

The total flying time was 106 hours, 197 passengers being transported for a total of 6,606 miles. The officer in charge of the Jericho Air Station was, unfortunately, killed on this work towards the end of the season and became the first forest flying casualty in the Province. A disadvantage of the use of aircraft in forest protection was experienced in 1922 when the atmosphere became so smoky as to make flying conditions difficult.

The Forest Branch²⁶ reported, in 1925, the inception of the broadcasting of daily weather forecasts throughout the fire season, a service which was first carried out through Radio Station CFYC, Vancouver. In addition, starting in 1926, the United States Meteorological Service at Spokane supplied daily weather forecasts to the District Forester at Nelson.

* At this period there were 11 Forest Districts, as follows: Island; Vancouver; Vernon; Nelson; Cranbrook; Kamloops; Lillooet; Tete Jaune; Fort George; Hazelton and Prince Rupert. Approximately the northern quarter of the Province, all of it in the Interior, was not organised into Forest Districts.

At the end of the period which is being considered, in 1945, the Chief Forester reported:

"Briefly, in the Fort George, Prince Rupert, Nelson and Kamloops Forest Districts, a partial network of primary detection is already established or projected. This network is designed to bring under observation as much as possible the areas exposed to both high lightning and man-caused fire occurrence in these districts. It is believed in certain areas, notably in the Kamloops District, man-caused fire occurrence has been given too little weight, with the result that many fires of this nature occur in areas at present blind to existing lookouts. Likewise, since detection in lightning-risk areas cannot be controlled wholly by ground methods, it appears essential if we are to achieve any appreciable degree of success that increased use of aircraft for detection is indicated

"It is also noted that the transportation system, particularly in the back areas exposed to lightning, has proven strikingly inadequate and, in Interior districts, large fires have occurred whose size has been aggravated, not only by lack of early detection but by inaccessibility to the extent that several days have, on occasion, elapsed before fire crews were able to reach the scene of the fire and begin effective suppression action. Rather than a programme designed to construct great mileages of truck or horse-trails, the development of hovering type aircraft, such as the helicopter, currently appears to offer a means through which this condition will be remedied."

Early in 1945, the Forest Service negotiated a contract with a commercial airline company for the use of two float aircraft during the fire season. The era of aerial fire detection and fire fighting was opening.

The question of access and communications had posed a problem of the first magnitude for the new administration since its formation in 1912. Better access and communications, of course, are not only of significance to forest protection but to a wide range of forestry activity. It is appropriate, however, because of the overriding priority attached to forest fire protection in British Columbia to discuss them at this point. In 1912, access and communications were both poor. The Forest Branch¹⁶ urged the construction of 945 miles of telephone line, there being little chance that they would ever be constructed by private companies or by the Dominion of Canada. The standard of these lines was of the simplest, consisting of a wire supported by insulators attached to standing trees, using a minimum of erected telephone poles. Whilst they were inexpensive to construct they needed frequent maintenance, especially in overmature timber where falling trees commonly broke them. The Forest Branch also expressed a need for Ranger cabins, thousands of miles of horse and foot trails and the use of boats as a means of communication. A rapid start was made. In 1913, the Branch constructed 1,015 miles of horse trails at a cost of \$36.64 per mile; 168 miles of foot trails at a cost of \$24.02 per mile; erected 360 miles of telephone lines at a cost of \$61.80 per mile and purchased 36 launches, boats and canoes.¹⁷ Work continued in a reasonably steady manner thereafter.

In 1921, the year when the first use of aircraft for forest fire protection took place, the wireless telephone was mentioned in the Forest Branch Annual Reports for the first time. It was felt that in areas devoid of ordinary telephone and telegraphic facilities or, in some cases, a fairly frequent postal delivery service, radio was essential to carry out the work of forest protection.

The Depression dealt yet another setback. Much of the extensive effort

expended in making trails and telephone lines had been negated by 1932, because of the financial inability of the Province to maintain them properly.²⁹ The Young Men's Forestry Training Plan, inaugurated in 1935, allowed extensive repairs to be made to trails and telephone lines. In addition, Relief Workers in camps on the Lower Mainland and Vancouver Island carried out development projects, starting in 1936, some projects being for fire protection. However, by 1938, two-way radio was replacing the more costly telephone lines, 40 sets having been purchased in that year. At about the same time, Relief Workers were clearing and opening abandoned railway roadbeds in the Coastal Region to make hazardous areas accessible for forest protection mobile equipment.

The progress which was made in improving access and communications for fire protection during the period 1913 - 45, when viewed against the overall problem, is seen to be very limited. In 1945, for example, although Forest Service suppression crews were able to reach 52 fires in an average time of 37 minutes, from the time of receiving a fire report, it took an average time of 9 hours and 20 minutes to reach another eight fires, because of a journey of unusual distance or inaccessibility. The elapsed time from the start of a fire to the point of attacking it is, of course, highly important and has a great deal to do with the amount of damage which is sustained and the costs of fighting a fire.

But some important achievements had been realised. A fleet of launches was in use in Coastal waters and the Forest Service Fraser River Repair Station had been established to carry out minor overhauls and repairs on them. The holdings of radio equipment were increasing and the more powerful 5-25 radio units were coming into use. Some of the sets were designed and built by the Forest Service. The beginnings of a permanent radio network, for handling much of the active Forest Service communications, not only fire protection messages, appeared with the construction of headquarters' radio stations at Victoria, Vancouver and Nelson. The sets were all of medium frequency and, therefore, subject, in many cases, to interference with or interruption of communications during hot weather. It was believed that ultra high frequency (UHF) transmissions, whether of amplitude modulation (AM) or frequency modulation (FM) type, would play an important part in future Forest Service communications. Experimental work was planned to determine which frequencies would give best results over mountainous terrain, how much noise reduction would be affected, the efficacy of directional aerial systems and the amount of electric power required. It was visualised that if, say, 25% of the medium frequency sets could be replaced with UHF sets, much channel crowding would be avoided and communications improved.

A power driven forest fire pump was tried out by the Forest Branch for the first time in 1920 and it was considered to be effective.²³ In the following year, portable hand-power tank pumps holding five gallons of water came into use and, although improved in design, are still standard equipment at the present day. Whilst the supply of equipment was gradually increased, it became depleted and worn out during the Depression years.⁴⁴ By 1941, the equipment was being augmented again and it included 11 tractors and 7 water-tankers. Portable power pumps were again being increased in number with the acquisition of the MacDonald

Pack Power Pump. At the end of the period under review, in 1945, power and hand-pack pumps were well established as standard equipment and extensive maintenance and rebuild work on them was being effected at the Fraser River Repair Station.⁴³ The exigencies of war made the Repair Station very important, since equipment was worn and a new pump replacement programme, badly needed, had to be deferred.

Great efforts were being made to improve the logistics of forest fire protection and important regulatory action was introduced at the same time. One of the most damaging sources of fire in 1912 was railway construction and operation. It was commonly remarked, at the time, that every timbered region traversed by a railway had been burned over. Gross carelessness on the part of contractors engaged in clearing rights-of-way, by train engineers and firemen who dumped live coals along the track away from railway stations, the failure of companies to equip and maintain efficient spark-arrestors on locomotives and to use other fire protection devices and the failure of companies to fight fires which they had started, had caused many disastrous fires. Whilst the Provincial Government could readily control railways operating under Provincial Charter, the majority of railways in British Columbia were under Dominion Charter. Consequently, an application was made to the Dominion Board of Railway Commissioners for an order regulating the operation of railways in relation to the prevention of forest fires. The Board passed Order No. 16570. In steam locomotives, spark-arresting mesh had to be fitted in the smoke-box and dampers and wetting devices in the ash pans. These devices were to be inspected weekly by Railway Company inspectors and, in case of defects, the locomotive had to be removed from service until repairs were effected. The Board of Railway Governors could conduct its own inspections and order locomotives out of use. The Dominion "Railway Act" already required companies to keep rights-of-way free from unnecessary combustible matter and Order No. 16570 added that no burning could be conducted between 1st April and 1st November of each year. Some of these obligations did not apply when a railway or a section of it were used exclusively by oil-burning locomotives, since these were less dangerous to the forest. Conductors, engineers or trainmen were all required to report outbreaks of fire immediately and the agent or person whom they informed was then required to notify the nearest forest officer and other railway section employees. The section men and any additional men were then required to take immediate action to suppress the fire. These requirements applied to any fire burning within 300 feet of the railway track, unless the railway company could prove that it had not started from the railway. If a railway company did not obey the Board's Order, they could be fined up to \$100.00 for each offence and their employees were liable to a fine of up to \$25.00 for each offence.

The Forest Branch, by mutual consent, actually carried out the inspection duties of the Board of Railway Governors but, in point of fact, the railway companies cooperated well.¹⁶ Also the Forest Branch, acting for the Board, issued specific orders to each Railway Company to maintain patrolmen at specified points.

The lines of the Canadian Northern Pacific Railway located in British Columbia and the Pacific Great Eastern Railway were under Provincial Charter

and they came under the "Forest Act" for fire prevention. The provisions of the "Forest Act" were similar to those adopted by the Board except that the Minister of Lands was empowered to employ patrolmen on any railway at the company's expense, should the latter fail to maintain sufficient patrols.

These provisions, which were effectively applied, resulted in a very marked reduction in the damage caused to the forest by railway fires. However, they remained a serious source of fire occurrence. In 1945, for example, the heavy wartime traffic carrying capacity loads and the type of coal available to the railways caused increased numbers of fires.⁴³ It was not until the late 1950's, when the railways converted entirely to diesel-engined locomotives that further marked improvement occurred.

One of the important methods of reducing fire hazard in British Columbia (and a cause of fire outbreaks, as well) is the burning of logging slash. It is a mark of the dominant position of forest fire protection in Forest Service operations, that the problem of logging slash has always been regarded chiefly as a fire protection problem. In 1912, from the written evidence available, it appears that the question of possible damaging effects of fire on some forest soils did not arise. At the present day, slash disposal by broadcast burning is a well established practice in the Coastal Douglas Fir Region. Some Coastal foresters question the practice because some fires escape and cause damage to adjacent timber stands but it is less frequently questioned in terms of soils or silviculture. In 1970 the British Columbia Pollution Commission decreed that slash-burning must be phased out of practice by 1975 because of the heavy smoke produced each autumn. Some foresters doubt that such a ban can be made effective because of the increased damage they anticipate from forest fires with cessation of the practice. In the Interior, slash burning has not been compulsory in the past, with the exception of burning slash left over from the decadent western red cedar--western hemlock stands of the Interior Wet Belt but the Government has made the practice compulsory by making Section 116 of the "Forest Act" applicable to the whole of the Province. However, the Forest Service is only applying the Section in the Interior slowly, as a matter of policy. Some foresters do question the practice in the Interior, since the Interior soils are susceptible to damage under some circumstances. Thus, in the development of slash-burning, the overriding factor has been and is, fire protection with only nominal attention being given to other aspects of forestry. The very great importance attached to forest fire prevention and control in order to reduce the grave losses which have been and are being incurred, is the reason.

Although the "Forest Act" of 1912 provided that operators of logging camps could be required to construct fire-lines, free from combustible material, round their logged areas and to cut down dead trees and stumps within them, there was no obligation for the logger to burn his slash.¹⁶ In 1912, more than 60,000 acres of the more hazardous areas of slash were examined by Fire Wardens of the Fire Branch and efforts were made, without much success, to persuade loggers to burn their slash. The estimated cost, at that time, was 15 to 50 cents per acre. In the absence of compulsory powers, the Forest Branch continued its persuasive approach but reported in 1916:⁴¹

"While the majority of the logging operators on the Coast are convinced of the value of the safety measure of burning over the logging slash annually, very few of them have adopted any systematic plans and the work is too often neglected. In 1916 the area burned was the smallest for several years and there are now many tracts which need attention."

In 1921, the policy of encouraging land clearing by burning before and after the peak fire hazard period resulted in the broadcast burning of 74,696 acres. The burning was carried out under permits issued by the Forest Branch and 59 of the fires, less than one-half of one percent of those started, escaped control.²⁴

Two years later, in 1923, 48,431 acres were burned over under 11,554 permits. Three-quarters of one percent of these escaped control. Of the total acreage, it is interesting to record that only 7,786 acres were to remain in use for the growing of forest. Thirty-five thousand twenty-eight acres were to become agricultural land, 4,619 acres were being cleared for railway rights-of-way and 998 acres for road rights-of-way.³⁶ In 1928, the acreage of slash burned under Forest Service supervision was still further reduced, to 27,451 acres.

But, in 1938, there occurred one of the worst fire seasons on record. There were 2,412 fires with damage estimated at 2,231,000 dollars and the cost of fighting fires at about 500,000 dollars. As is commonly the case after a severe fire year the feeling arose that the efforts being made were inadequate to meet the threat and opinion hardened. At the time, logging operations in the Lower Coastal Region were creating more than 40,000 acres of slash annually. On 1st January 1938, Section 113A of the "Forest Act" had become effective, making it obligatory for logging operators in the Vancouver Forest District to dispose of slash and of dead standing trees which were considered to be hazardous. The policy of persuasion had failed to achieve its purpose.

There was, of course, the recurring problem, almost inherent in the operations, of intentional slash burns escaping from control. In 1945, for example, 386 logging operators burned 46,469 acres of slash and 206 acres of forest cover were burned by escaping fire. The net damage to forest cover was \$1,577.02 and the net damage to property and cut products on the areas of operation was \$22,046.25. Of these amounts, the Forest Service noted that damage amounting to \$19,601.00 occurred on one operation where burning was conducted in areas of slash adjacent to active logging operations. All told, from 1934 to 1945, both years inclusive, 398,559 acres of slash burning was carried out in the Vancouver Forest District and an additional 79,284 acres were accidentally burned. From this it can be seen that the phase "controlled burn" does not always convey an accurate impression of slash disposal operations, since the acreage burned by escape fires was about one-fifth of the acreage burned intentionally. At this point it is pertinent to discuss the financing of forest fire protection.

The Forest Protection Fund was first established in the "Forest Act" of 1912 and it has been mentioned how, contrary to the usual principles of public accounting, it was a fund which was independent of other Government funds. In the initial years, those timber owners who were occupying Crown lands contributed one cent per acre per year for the land that they occupied and the

Government matched these contributions dollar for dollar. The revenues were able to meet all demands for the first two years of the fund but the heavy fire year of 1914 resulted in an advance of \$143,000.00 being made by the Provincial Treasury.⁴¹ The advance was repaid to the Treasury by 31st March 1917, after two quiet fire years. Part of the problem facing the fund was the number of timber licences (which could be reinstated under the "Forest Act Relief Act") in arrears. In 1916, there were 288 timber licences in arrears for four years; 2,106 in arrears

for three years; 2,445 in arrears for 2 years and 1,049 in arrears for less than one year. At the time, it was considered, conservatively, that 50% of these licences would be reinstated upon expiration of the "Relief Act" and that the licencees would pay \$60,000.00 to the fund at that time. The corresponding Government contribution would increase the fund by another \$60,000.00. But Forest fires do not generally cooperate in forward planning. A series of severe fire years caused the fund to fall into deficit, as in 1922, when a heavy drain occurred. A special levy was imposed under Section 26 of the "Forest Act", amounting to $3\frac{1}{2}\%$ per acre on occupied Crown timberland, and this, together with a Government contribution of \$338,100 liquidated the accumulated deficit. However, other levies followed in 1925, 1926 and 1929.³⁰ Thereafter, the fund stayed in a credit position but it was suspended in 1932 for reasons of economy. At the time, the Chief Forester wrote that forest protection expenditures in British Columbia, over the previous decade, had amounted to 0.16% of the value of British Columbia's forest capital assets.²⁹ The Dominion Bureau of Natural Resources had placed a value of 494 million dollars on the forest asset, excluding those lands which had been alienated from Crown ownership.

The suspension of the Forest Protection Fund was lifted in 1934,³⁰ a year in which the $2\frac{1}{2}\%$ per acre tax raised \$300,000.00, an amount that was equalled by a Government contribution. But the future of the fund still appeared to be uncertain. It has been recorded that considerable amounts of timber lands had been alienated as timber licences and that some of these licences reverted into Crown ownership after logging, accidental destruction by fire, through the failure of the licencees to pay the annual carrying charges or through their dissatisfaction with their investment in licences. The Forest Protection Tax levied on these lands was thus a declining source of income. Thus, out of 14,202 licences which were in good standing in 1913, only 3,117 were in this position in 1934. There was some increase in the acreage of other lands on which forest protection tax was levied. Thus, in 1931, there were 1,748,591 acres of these lands and, in 1934, 2,364,148 acres. This increase was the result of the return, by Canada, of the lands in the Railway Belt to provincial jurisdiction in 1930.

The Forest Branch also reported in 1934³⁰ that the average annual income of the Protection Fund for the ten years from 1922 to 1931, to the nearest thousand dollars, was:

From tax	\$260,000.00
From Government	<u>475,000.00</u>
Total	\$735,000.00

When the Protection Fund was restarted in 1934, about \$400,000.00 was put into it. It has been mentioned that, at this level, Forest Service fire protection activities were severely restricted. Only about one-half of the established fire lookouts could be opened and the summer staff numbered only 154, as against 259 in 1931. The Chief Forester stated:

"For adequate protection (the fund's) present proportions must be increased. How the money is to be raised, and from what sources and in what proportions, are questions of immediately pressing importance."

The Forest Service had been heavily criticised in 1934 for the policy of extreme economy in firefighting. Fieldmen were required to attack small fires

at once but action against larger fires, involving heavy expenses, was considered carefully before it was taken. Most of them were only fought at strategic points on their perimeter to protect specific values. Consequently, losses were severe and out of proportion to the degree of fire hazard which was experienced. A considerable proportion of the protection funds which were expended annually at this period were directed towards the protection of private property and the Chief Forester questioned these expenditures from a fund which was partially supported by timber owners. A complicating factor at this time of economic depression was the widespread feeling that fires started by incendiaries were a major factor in the forest protection problem. The payment of wages for fire-fighting was being questioned on the grounds that it accomplished little more than to incite additional incendiarism. The Chief Forester disclaimed the importance of incendiarism, quoting a figure of 7% of fires started for the ten year period ending in 1934. In 1932, 10% of fires (ie. 127 fires) were deliberately started, in 1933 there were 6% (65 fires) and in 1934, 4% (65 fires). In the climate of the times, these incidences may have been of limited importance but they would be regarded as very serious at the present day.

In the foregoing description of the Forest Protection Fund from 1913 to 1945 it should be remembered that other agencies, particularly the forest industry, in addition to their tax contribution to the fund, made direct expenditures of their own on forest fire protection. In 1934, it was estimated that the costs of forest protection to these non-governmental agencies for that year, excluding the costs of burning slash and felling snags, was \$133,078.00.³⁰

The position of the Forest Protection Fund did not actually improve in a material way until the Second World War. In 1939, the forest protection tax was raised to six cents per acre but, because of diminishing taxable acreages, the revenue was only \$224,303.00. Sloan has illustrated the trend:⁴⁰

FOREST PROTECTION TAX COLLECTIONS FOR BRITISH COLUMBIA

<u>Year</u>	<u>Rate of Tax per Acre</u>	<u>Amount collected \$</u>
1912	1 cent	105,259
1920	2 cents	189,817
1929	2½ cents	151,632
1931	4 cents	194,450
1939	6 cents	224,303
1943		
-44	6 cents	235,795

Although the tax had been increased six times, collections had only, approximately doubled.

As soon as the Forest Branch was formed in 1912, it began to conduct publicity against forest fires and to introduce regulations. These latter governed the use of spark arresters on donkey engines; provided that logging operators would provide pumps and hose, tools and equipment at their camps and to their men; directed the removal of slash in the vicinity of camps, mines, sawmills and portable and stationary engines; required the equipping of all mills and steam plants with spark arresters on their smoke stacks, chimneys and waste-burners and prohibited the burning of wood waste without proper safeguards. In general terms, the regulations were inadequately enforced in 1912¹⁶ but they later were better

observed as a result of Forest Branch inspections. In 1913, for example, 800 logging operations, 400 sawmills and 1,800 miles of active railway construction were inspected.¹⁷ In 1918, the Branch inspected 1,429 logging operations, although all of these inspections were not exclusively for fire protection purposes.²¹ A sense of urgency prevailed which showed itself, for example, in 1919 when mill-owners who had not provided adequate safeguards at their mills were told that they would not be allowed to operate during the fire season unless the deficiencies were corrected.²² In 1923, an Order-in-Council made the use of spark-arresters on donkey engines and locomotives compulsory.

It was necessary to introduce many regulations of this kind which, although mundane, formed the basis of a series of protective measures which are continued at the present day. Public education on the need to prevent forest fires was obviously important. In 1924, for example, human beings were held to be responsible for 85.9% of the number of fires which occurred in the Province. The education programme was imaginative and pursued with vigour. Fire-law posters (called "Legal posters") and signs, newspaper advertising and a variety of specially designed posters, campers' guides, leaflets and road signs were employed. The Governor General of Canada proclaimed "Save the Forest Week" from April 27th to May 3rd, 1924.³⁷ Lectures illustrated by motion pictures, lectures to school children and Boy Scout rallies, addresses to Service Clubs and similar organisations, broadcasts by the Department of Lands radio station at Vancouver, the dropping of leaflets from the air onto various settlements and logging camps on the Coast and an essay competition for school children on the subject of "Forest fires, their effect and how to prevent them," were all part of the educational programme. In addition, the Forest Branch continued to establish campsites at various places, not only as a convenience to campers but, also, to concentrate the risk of campers starting fires at specific points.³⁷

In 1925, three special law enforcement offices were assigned temporarily to the Forest Branch protection staff to assist in fire prosecution activities, including the gathering of evidence, preparation of cases and court prosecutions.²⁶ The apprehension of culprits improved and the number of convictions for fire law violations in 1925 was three times greater than in 1924.

By 1928, "Save the Forest Week" had become "Canadian Forest Week," a period of intensive publicity. The Forest Branch programme was carried out in cooperation with the Dominion Forest Service, the Canadian Forestry Association and Provincial and local citizens' committees. The objective of the week was still to prevent forest fires. The Forest Branch and the Canadian Forestry Association produced a film for use by touring lecture parties and an exhibit by the Association at Vancouver attracted much attention.²⁷ The publicity programme was maintained, with variations up to 1945, the end of the period under discussion. Whilst this educational effort had a desirable effect, the policy of closing forest areas to travel during periods of high fire hazard, particularly where the forest was valuable or the risk of fire was great, was continued.

Fundamental studies were made into the occurrence of weather favourable to forest fires, its intensity and the risk of fire which it created, commencing in the 1938 fire season, but the work had to be halted during 1941 - 44 due to

personnel shortages. In 1945, an examination of the earlier studies was started and it was recognised that temperature inversions had a marked effect on the fire hazard. During a period of temperature inversion, whilst very dry air lay over the region, characteristically high temperatures occurred during the day time, with extreme surface cooling at night when cold air settled to the valley bottoms, leaving a strata of warmer air along the hillsides and ridges. As a consequence, the relative humidity in the hillside zone remained consistently low at night whilst that in the valley made complete recovery to the saturation point. In 1945, a series of accurate measurements supported these conclusions but not in a conclusive way because of a lack of personnel and equipment to make detailed readings.

As has been pointed out, forest fire protection was a major policy consideration in the Province ranking with the policy of encouraging the growth of a forest industry. Its importance was recognised in the Report of the Committee on Forest Fire Protection, Second British Empire Forest Conference in 1923.³⁷ The Conference was held in Canada and the Protection Committee was charged to

"make suggestions for better forest fire protection in the British Empire, with special reference to the Canadian forest fire problem."

The Chief Forester of British Columbia, P.Z. Caverhill, was a member of the Committee. In ^{the} view of the Committee, the damage caused by forest fires in Canada militated against the practice of forestry to such an extent that no proper forest management could be instituted until satisfactory methods of fire protection had been devised and inaugurated. A solution to the fire protection problem was believed to be the most fundamental requirement of Canadian forestry.

From the point of view of the professional forester, forest fire protection was simply insurance against loss, through fire, of the capital values of the soil and timber. The need to keep expenditures at a minimum whilst achieving adequate protection pointed to the necessity of dedicating by law definite areas of reserved forests (a policy which, as mentioned previously, British Columbia was following). Neither the population of Canada (in 1923) nor the next generation could hope to support the expenditures which would be needed to provide adequate protection for the entire forest area and the Committee suggested that a wise protection policy should concentrate effort on areas where soil, growth rates and market conditions provided the best opportunities for forest management. The other forest areas should be left with only a modicum of protection until the valuable areas had been fully organised. The present and future capital values of the forest and forest land would, in the long run, determine the proper level of expenditures to provide insurance against loss.

The Committee recognised that, in Canada, the duties of protecting the community and private property in forest regions devolved upon the forest authority, because of a lack of community organisation, but held that expenditures for these purposes should not be considered as a part of forest management expenditures. Adequate financing for forest management has always been a problem in Canada and the Committee did not wish expenditures on protection of persons and property to be misrepresented as forest management expenditures, giving the impression that more was being spent on management than was actually the case.

Where people were settling in forest regions, the Committee believed that they should be directed to settle on a community basis, rather than have indiscriminate location with a consequent increase in the risk of fire. This kind of direction did not occur but, indirectly, the creation of forest reserves, in which land was not generally sold for settlement, had the effect of concentrating population outside of them.

The Committee stressed that the most important factor in securing adequate forest fire protection was the prevention of fire outbreaks. Prevention involved education of the young and their teachers and the disposal of slash in logging operations and Government road construction projects, even at extra cost. Discussing slash disposal, the Committee reported:

"As regards British Columbia, in the spruce-lodgepole pine type, which covers the northern interior and the central upper slopes of the mountains, slash disposal offers no essential differences from Eastern Canada. In the yellow-pine (P. ponderosa) stands of the Dry Belt, the accumulation of slash is not heavy, and the disposal thereof is not of primary importance from the standpoint of fire-protection. Solution of the bark-beetle problem, however, involves slash disposal. We are of the opinion that this can be done successfully only by piling and burning under proper supervision.

"In the coastal forests of British Columbia the accumulation of debris after logging is so great that broadcast burning affords the only hope of securing slash-disposal. The hazard can be materially reduced only by a hot burn. This involves intensive control. The efforts of such burning on the soil must, however, be seriously considered, particularly on thin, peaty soils."

The Committee arrived at the general conclusion that forest fires could be adequately controlled provided that full public support and Government legislative and financial support were given. There are different opinions as to what "adequate control" is but there can be few people who are aware of the damage caused by forest fires at the present day in British Columbia who can be sufficiently complacent to conclude that a position of "adequate control" has been reached. Marked improvements in forest fire control have occurred but although expenditures have soared, a high rate of damage still occurs.

The role of the Canadian Government in the field of forest entomology and pathology is discussed in a later chapter. The British Columbia Forest Service also worked in the field during the period now under review, from 1913 to 1945. The initial activity of the Forest Branch, following its formation in 1912, concentrated on forest fire protection, the provision of raw material to stimulate industrial growth, the reconnaissance inventory, classification and reservation of forests and the development of markets for manufactured products. These activities have been described. The Branch was not unaware of the many other requirements of successful management but it put these aside, in the first instance, to try to deal with the obvious essentials.

It was not until 1920 that the Branch began to report on the problems of epidemics of forest insects.²³ The problems of these epidemics was, and is, severe in the overmature and mature stands. However, in 1914 and for a considerable period thereafter, no true idea of timber losses from insect losses existed. In the first place, insect activity is far less spectacular than forest fire and, consequently, public reaction to it is usually less strong. The death

of a tree from insect attack tends to be regarded as a more natural end than death from fire, even though such an assumption may be erroneous. Secondly, the methods of combating insect epidemics which were known in the 1914 period required a great deal of manpower to achieve very limited results. At the time aerial spraying techniques, effective insecticides and natural control methods were either virtually unknown or not well understood. The first reported control operation dealt with a pine bark beetle (Dendroctonus brevicomis Lec. and D. monticola Hopk.) infestation of western yellow pine in the vicinity of Penticton and Merritt, two towns located in the Dry Belt of the Southern Interior. From 1920 up to 1930, the Forest Branch undertook some local control measures and it is of interest to describe these, to demonstrate their nature.

In 1920, the Forest Branch, working cooperatively with the Dominion Division of Entomology started an active campaign for control of the 'Pine Bark beetle by burning slash and slabs resulting from logging and sawmilling. In areas where commercial logging could not be carried out, 3,000 affected trees were felled, the bark removed and the slash burned.²³ In 1921 and 1922, between 7,000 and 8,000 additional trees were felled, and the slash^{24,25} peeled, and burned. Work continued in 1923 and was then intensified in 1924 when an average of more than 90 men, working in the vicinity of Merritt felled and treated 13,002 trees at a cost of \$5.00 per acre. In 1923, the Branch had introduced regulations requiring logging operators to carry out control measures in the area but received vigorous protests from the industry as a result. The protests argued that the control work was ineffective and that the spread of the infestation had not been influenced by logging operations.³⁷ They led to the appointment of a committee to investigate and report on the results of the past five years' control work and to ascertain what would be an equitable basis for the sharing of costs between Government and industry. The three-man committee represented the Mountain Lumbermen's Association, the Timber Industries Council and the Provincial Government. Following a public hearing at Merritt and a visit to the epidemic area, the committee found:

"That it is possible that natural conditions in the Nicola Valley were ripe for an epidemic stage of the pine bark beetle, irrespective of whether the Princeton outbreak was carried into the Nicola Valley or not. That the committee is inclined to the belief that the Princeton outbreak died from its own severity and from the other parasites that multiply after the pine bark beetle. Direct control work is necessary and has apparently been effective. That the piling and burning of slash due to logging operations to the satisfaction of the Forestry Department officials is necessary, except perhaps in the area known as 'Midday Valley'."

In 1925, with the encouragement provided by the Committee report, more than 35,000 trees were cut down, barked and burned at an average cost of \$1.63 per tree and new spots of infestation were noted.²⁶ In 1926, 3,358 ponderosa pine and lodgepole pine trees were cut.⁴⁹ A field examination of the area in 1929 indicated the need for more clearing to prevent the re-invasion by the bark beetles of the only considerable area of ponderosa pine in the Province. Work began again in 1930, when 3,161 trees were treated at a cost of \$4,878.00.

But the entire project had been carried out with a partial misunderstanding of the habits of the bark beetles and a significant discovery was now

made. The previous control work had concentrated on ponderosa pine, since it was more valuable than lodgepole pine and since most entomologists believed that bark beetles emerging from lodgepole pine did not attack ponderosa pine. Experiments by Hopping, of the Entomological Branch of the Dominion Department of Agriculture proved, however, that D. monticola would, on emerging from one species of pine, enter either of them. A fresh epidemic was now under way and, with widespread infestation present in the lodgepole pine, the control work was abandoned and the infestation was allowed to take its course.⁴⁷ The failure (or partial failure) of this attempt to control an insect epidemic of considerable size and significance signalled the end of almost all such attempts. The Forest Branch Annual Reports made no further reference to entomological problems until 1940.

A similar infestation of ponderosa pine had been reported in the Princeton area. It started about 1912 and resulted in the loss of 130 million board feet of ponderosa pine in the seven years before it died out, immediately prior to the Merritt outbreak. The report of the Dominion Entomologist for the year ending on March 31st, 1915 gives some idea of the overall situation in the ponderosa pine region, four years before any control work was undertaken:³⁷

"The bark beetle infestation in yellow pine in the Okanagan District is more extensive than at this time last year. . . . The infested region surrounds Okanagan Lake and extends as far west as Princeton and Nicola. The bark beetles causing this outbreak, Dendroctonus monticola and Dendroctonus brevicornis are not known to be causing serious damage east of the divide between Okanagan Lake and the Arrow Lakes; but their appearance in any body of yellow (ponderosa) pine, black (lodgepole) pine or western white pine is to be expected sooner or later wherever these trees occur in large stands in British Columbia In the districts which have been infested longest the destruction is enormous."

The regulations introduced by the Forest Branch in 1923, to govern logging in the ponderosa pine region are of interest as the forerunners of modern regulations. The Forest Branch had to be notified in writing of an intention to log on a timber licence and its forest officers designated the infested trees that had to be cut during the course of logging. If the logger decided that a designated tree would not produce merchantable lumber then the tree, including its limbs and the bark on the stump, had to be burned so as to consume the bark and outer layers of wood. Otherwise, in the case of a merchantable tree, the logs had to be immersed in water or sawn into lumber and, in the latter case, the bark had to be burned or removed from the woods immediately. All of the logs which were cut after April 1st in any year had to be removed and milled or floated before April 1st of the succeeding year unless a forest officer declared them to be free from infestation. This particular regulation is difficult to understand since it permitted the logs to stay in the woods during the beetle flight and breeding period and would permit population increases. Any slash resulting from logging had to be piled virtually at once and burned by the logger at his own expense, when instructed to do so by the District Forester. Trees had to be cut to as low a diameter as was practicable and stumps were not to be any higher than the diameter of the tree at the point at which it was cut with a maximum height of eighteen inches, apart from unusual cases. The bark

on infested stumps had to be removed and burned.

There were other attempts at insect control, on a smaller scale. In 1921,²⁴ direct control work was conducted on Douglas fir and western white pine around Adams Lake, in the Interior Wet Belt, when 493 trees were felled and debarked by the Forest Branch. Several epidemic areas found in lodgepole pine were not treated since the pine was judged to be non-commercial. During 1922,²⁵ work continued at Adams Lake and also at Rock Creek, when 415 trees were treated. In addition, two timber lessees on Pike Mountain carried out control measures under Forest Branch supervision. Work in all of these areas ended in 1923.³⁶

An epidemic of Mountain Pine beetle (Dendroctonus monticola) which was attacking lodgepole pine near the railway stop of Lorna, east of Kelowna, had first been observed in 1920. In 1924, control crews cut 5,290 trees at a cost of \$1.08 per tree.³⁷ The epidemic spread rapidly, however, and an additional 5,564 trees were cut in 1925²⁶ and almost 10,000 more in 1926.⁴⁹

An infestation of the Douglas fir beetle (Dendroctonus pseudotsugae) was discovered in the Coastal region in 1924, attacking Douglas fir from the Sechelt peninsula to Vancouver Bay. The attack was patchy and widespread. Up to the time of this discovery, forest entomologists had not considered the beetle to be a threat to Douglas fir and Hopping, the Dominion Entomologist observed:

"The present outbreak is therefore not only something of a surprise but seems to be an epidemic which may equal our epidemic in yellow pine."³⁷

The beetle is, in point of fact, a potential threat to Douglas fir in any part of the Province but this particular infestation subsided in 1925.²⁶

Also in 1924, the Mountain pine beetle was discovered to be attacking 11,000 western white pine trees in the Nimpkish River Valley³⁷ but this attack, also, seemed to have decreased in its intensity by the following year.²⁶

An infestation of spruce budworm (Cacoccia fumiferana Clem.) and an unidentified species of tipmoth had been observed over a large area of spruce and alpine fir stands east of Quesnel, in the Central Interior, about 1913. It died down and then flared up again in 1923. Almost all of the alpine fir were affected but only a small proportion were killed and the spruce was almost unaffected.³⁷ The infestation was replaced in 1925 by immense numbers of aphids feeding on the shoots of young trees. However, no serious damage resulted.²⁶

There are no reports of the continuation of insect control measures after 1930, until recent years. The Dominion Entomological Division was actively engaged in those operations which have been mentioned. The limited success of the operations, the lack of adequate finances, manpower and suitable techniques to tackle the problems on a large enough scale to have real effect caused the abandonment of operations for a period of years.

Quite apart from insect problems, pathological diseases also received some attention from the Forest Branch. Again, the Dominion of Canada was conducting research in the field and its role is discussed in a later chapter. There were, of course, a very great variety of diseases in various stages of development in the virgin forest, particularly in those areas where the forest trees were old and entering into a decadent condition. There was also the danger of disease being introduced into the Province. In 1921, for example, white pine

blister rust (Cronartium ribicola Fischer) was discovered in the Province and was found on an imported eastern white pine in the neighbourhood of Vancouver. The Department of Agriculture immediately established a quarantine against white pine seedlings entering the Interior from the Coast. The disease spends a part of its life cycle on plants of the gooseberry and currant families (Ribes species) and these plants were also quarantined. However, the disease was already present. In 1922, a survey showed that it was present on both white pine trees and currant bushes throughout the range of white pine in the coastal region, affecting both the western white pine (Pinus monticola Dougl.) and the imported eastern white pine (P. strobus L.). In the Interior, the rust was found in spots, notably near Lumby, Malakwa, Solsqua, Sicamous, Salmon Arm, Tappen, Notch Hill, Mara, Grindrod and Enderby, but the infections were not widespread.²⁵ Two possible courses of action to control the disease were suggested by the Chief Forester in 1924, involving the eradication of all Ribes, both wild and cultivated, in and near valuable white pine stands, or, alternatively, the eradication of cultivated Ribes.³⁷ Operations of this kind are costly in terms of finance and manpower and no action was taken. The disease continues to pose a serious threat to the white pine. Timber

We now leave the problems of pathology and it is appropriate to mention that a system of timber marks was introduced in 1913 that continues in use to the present day. It is obligatory to stamp all logs, but not cordwood, with the appropriate mark designated by the Government. The system of marks shows the class of land (or individual cutting permit or timber sale numbers) from which the timber is cut. On private lands, leases and licences the rate of royalty which is due to the Government and whether or not the timber may be exported is readily ascertained.¹⁸

The need for forest research in British Columbia was brought to the fore soon after the creation of the Forest Branch in 1912. The Chief Forester, H.R. MacMillan, pointed out in 1914¹⁸ that progress in the management of the forests depended upon a better knowledge of the forest. As a part of the information which it was necessary to acquire he mentioned the conditions affecting the reproduction of various important commercial species, so that brush disposal and cutting regulations to favour these species could be developed as far as commercially possible; the rates of growth of the various species in various types of soil and the volume in board feet of different sizes of trees in different regions. ← Forest Branch

The first attempts at studying these problems, prior to 1934, took the form of spasmodic investigations by the various Forest District headquarters but the pressures of routine duties on, and a lack of direction to, these headquarters mitigated against arriving at any very tangible results.³⁰ In 1920, a university trained forester was attached to the Victoria headquarters of the Forest Branch and he made some growth studies. Investigations and experimental work have continued since that date. In 1927, it was decided that the size of the staff which was being employed and the amount of work on hand warranted the organisation of a small research division of the Branch. Prior to 1934, two forest experimental stations were established, one at Aleza Lake in the spruce-alpine fir forest of the north-central Interior and one at Cowichan Lake on Vancouver Island. A forest tree nursery (Green Timbers) was established near New Westminster on the Lower

Mainland. Four other areas were reserved for experimental and demonstration purposes at Green Timbers, Campbell River, East Thurlow Island and on Discovery Passage.

Progress in research was not without interruption. During the depression years, from 1931 to 1937, the work was reduced to a maintenance basis. The retrenchment was not welcomed by the Chief Forester who posed another series of current problems that needed to be answered. Where, he asked, were the best growing areas and why were they superior to adjacent lands? Why did some logged and burned areas produce fine stands of young growth almost at once while others developed into "barrens"? Could denuded areas be planted with profit or would planting prove to be a costly experiment? How fast did the Provincial forests grow and how much could be cut (annually) without deflating the capital stock? How much would adequate forest protection cost and how much could the Province afford to spend on protection and forest management? These problems and others could not be dealt with in an adequate way during the period of financial retrenchment and the position was complicated by the resignation of a number of research foresters.³⁹ A second reduction of Forest Branch research activity occurred during the 1939 - 45 War because of staff shortages.

The Forest Branch also hastened to prepare volume tables. These were needed by Forest Reconnaissance or Survey for the determination of the volumes of standing timber in a forest. The volume tables were usually based on the measurement of only a small number of trees, since not too much time could be spent on their preparation if the Survey needs were to be met. As an example of these tables, the Forest Branch Annual Report for 1914¹⁸ contained tables for western red cedar, western hemlock and Douglas fir, growing on the Lower Coast, which showed merchantable volumes in board feet without any allowances for defect in the trees or losses from breakage during felling. These particular tables were the first of a considerable number of volume and yield tables to be published for the various species and regions of the Province. As an example of the yield tables, two were published in 1920 for "River-bottom Sitka spruce" and "Side-hill type, Balsam and Hemlock", showing the average number of trees per acre, diameter at breast height and growth/volume in board feet per acre for age classes at ten year intervals from fifty years of age and upwards.²³

In conjunction with the preparation of these tables, the industrial supply potential of forest areas was occasionally studied. As an instance, studies were made in the Kitimat Valley in 1921 to find out if the annual tree growth of which the valley was capable would supply, continuously, the raw material for a pulp mill and, if so, for what size of mill. The work of preparing volume and yield tables continued throughout the period from 1913 to 1945. Most of these tables are no longer in use by forest management but some of the basic data from which they were derived is still used in the forest inventory.

The important question of how to ensure that logged and burned areas were restocked was another subject receiving much of the research effort from 1913 to 1945. In 1914, the Chief Forester had stated the problem in the following terms:¹⁸

"The greater part of the 75,000 acres logged over in British Columbia each year is land whose only possible crop is timber. The continued prosperity of the Province depends upon the eventual adoption of systems of logging or slash-disposal that will encourage on such lands the natural reproduction of valuable tree species. To do this we must know what conditions affect regeneration."

Logging systems on the Lower Coast received attention at an early date. In 1921, for instance, the Forest Branch started a programme of several years' duration, which investigated regeneration, growth and yield and the effects of thinning. The ultimate aim was to introduce a workable policy for silviculture to apply to logging operations on Crown Lands.²⁴ It was considered that the policy must include certain principles. In the first place, it must ensure an adequate timber production per acre to make the logging an economic operation. Also, the particular silvicultural system of felling which should be employed must not be so costly as to make logging unprofitable. Finally, the policy should, as far as possible, encourage the regeneration of the most valuable species.

The initial studies which were made under this programme investigated the dissemination of Douglas fir seed in the Lower Coastal Region to find out how far seed would fly from a tree and in what densities per acre.²⁴ Later, the study was expanded to include other tree species. It was reported that a Douglas fir, 175 feet in height would spread seed on level ground to a maximum distance of 325 feet against the prevailing wind, 525 feet with the prevailing wind and 400 feet to the right and left of the prevailing wind, giving an oval area covered by the seed of approximately 13 acres. The effective radius of seed distribution, being the distance within which sufficient numbers of seed reached the ground to provide desirable density of new, young trees, was considered to be about 300 feet.

In 1923, the Chief Forester made a statement on the possibilities of natural regenerations in the Coastal area:³⁶

"Most of the virgin timber is logged by powerful equipment which leaves the area in what appears to be a devastated condition. The crop of seedlings may require years to establish and the height growth at first is very slow on account of most of the energy (of the young trees) being expended in the development of the root system. Many areas which, on casual observation, appear barren will be found on careful examination to be well-stocked. These various factors have resulted in the public delusion that our forest lands are left in such a condition after logging that another crop by natural regeneration is impossible. The data gathered during the past summer indicates that we can get a future crop from natural regeneration even where the present methods of logging are used. In exceptional sites some changes may be necessary but, generally speaking, if fire is kept out of the Douglas fir mixtures the cut-over areas will restock rapidly after the virgin stand has been removed."

Additional work, conducted in 1924 concentrated on the counting of seedlings in areas which had been logged by the contemporary high-lead systems. The results appeared to confirm the opinion of the Chief Forester, as follows:³⁷

SEEDLINGS PER ACRE COUNTED ON LANDS PREVIOUSLY LOGGED,
BURNED AND UNBURNED, BY CONTEMPORARY HIGH LEAD SYSTEMS
IN THE LOWER COAST REGION OF BRITISH COLUMBIA (1924)^(a)

<u>Seedlings per acre</u>	<u>Unburned %</u>	<u>Logged and Burned once %^(b)</u>	<u>Burned twice %^(b)</u>
More than 1,500	57	30	1
1,001 to 1,500	13	10	6
501 to 1,000	17	18	25
Less than 500	<u>13</u>	<u>42</u>	<u>68</u>
	<u>100</u>	<u>100</u>	<u>100</u>

Notes: (a) Based on 176 temporary sample plots
(b) Accidental burning of the area following logging

The Forest Branch wrote of these results:

"The average number of seedlings per acre on the unburned area was 2,415 for all species; on areas burned once 1,134 of all species in the Douglas fir type and 580 in the cedar and hemlock types. When we consider that planting 8 x 8 feet would require 700 trees per acre, the indications are that we will have ample reproduction on most of the areas if the fire problem is solved. These seedlings . . . are ample to ensure a new forest at the cost of protection, whereas to obtain equal results through planting which costs \$15.00 to \$20.00 per acre, or an outlay of nearly \$1,000,000.00 would be required to replace forests on the area cut annually.

"Other studies indicate that seed is disseminated long distances and that forest lands when cut over will eventually come back to forests even where the seed stored in the duff (raw humus layer) may be destroyed by successive fires . . .

"Unless destroyed, rapid regeneration, however, can usually be expected from seed left on the ground by the previous stand. On this account it is desirable to adopt for each year, the method of slash-disposal which destroys least of this seed and which, at this time, is consistent with the requirements of protection and general economy."

But, as we have seen earlier, the Forest Branch had been endeavouring from 1913 onwards, to persuade logging operators to broadcast burn their slash as a fire-protection measure without regard to destruction of seed in the process. In 1938, the practice of slash-burning was made obligatory in areas of the Lower Coast, under Section 113A of the "Forest Act".

Other aspects of natural reforestation studies which were undertaken in 1924 included the effects of burning slash at different seasons of the year; the rates of establishment of forest regeneration on burned and unburned areas; the effect of leaving seed-trees following logging on regeneration and the conditions under which they would remain firm against wind. Also, the effects of the density of regeneration upon its own, subsequent, rate of growth and mortality were studied.

There was an evident disparity of opinion between those concerned primarily with forest fire protection and those desiring to obtain natural regeneration. In 1925, the Forest Branch Annual Report²⁶ again reflected the problem when it was observed that the fire hazard was undoubtedly greater on unburned, cut-over lands than in the virgin forests. The ultimate means of reducing the hazard created by logging would be through the establishment of a new forest cover on the clearcut areas. The broadcast burning of slash in the Douglas fir type, except around spar trees and where debris covered the ground too completely for seedlings to establish, delayed the formation of a new forest cover. The

tendency was, in 1925, for slash-burning to be concentrated where the hazard occurred, such as along railways and common routes of travel. The subdivision of cut-over areas by cleared fire lines, using roads and railways for the purpose wherever possible, would assist in keeping the accidental fires within the smallest limits. The studies of regeneration on the Lower Coast had indicated that the rate of seeding of a logged area depended on the distance from seed trees and the abundance of seed crops. As little slash-burning should be done as was consistent with fire protection requirements but where burning was carried out, it should be done as soon after logging as conditions permitted, whether spring or fall. The greater the intensity of heat that was developed by the fire, the better, so long as the burned areas were within seeding distance of the marginal timber. It is of interest to note that there was little or no reference at this period to the problem of invasion of logged areas by shrubs and brush to the exclusion of commercial tree species, a phenomenon which has created serious reforestation difficulties on the Coastal sites.

The natural regeneration studies continued on the Lower Coast. During 1929, for example, studies were being conducted at locations near Ladysmith, Merville and Lois Lake into natural seeding from stands of timber adjacent to logged areas. Other studies at Lois Lake, Jordan River, Reid Bay and Nanton Lake dealt with rates of natural restocking and seedling mortality from various causes. Another study dealt with the survival of seed trees after logging and their effect on natural regeneration.²⁸

After the depression, the tempo of these studies revived again about 1940. Studies in that year investigated the factors which surrounded and influenced seed production, seed dissemination, the survival of disseminated seed, germination and survival of natural seedlings. It was found that the artificial sowing of seed ("direct seeding") in spots required the prior eradication of mosses growing on the site. Experiments in the laboratory endeavoured to determine the basic light, moisture and heat requirements for the germination of Douglas fir seed and it was shown that, although temperature was of critical importance to the germination of dry, stored seed it was relatively unimportant in the case of stratified seed.* In addition, a study of the physiology of seed production in Douglas fir was initiated and some possibility of being able to predict the size of cone crops in the previous autumn, when the fruiting bud was formed, appeared. One of the obvious advantages of being able to predict the size of a cone crop lie in/^{planning} with confidence for seed collection operations.

By the year 1941, the Forest Branch was turning its attention to the influence of the logging systems, which were currently in use, upon natural regeneration.³⁴ A cooperative government-industry experiment at the Ash River operation of the Alberni Pacific Lumber Company at Alberni, Vancouver Island investigated the merits of "patch logging". Up to this time, logging in the Coastal Region had tended to result in very large clearcut areas, frequently more than a thousand acres in extent. The patch-logging system used the same high-lead method of logging but the high-lead settings, instead of being contiguous, were

* ie. spring-sown, untreated seed would germinate under certain temperature conditions but naturally sown seed, overwintered in the ground or stratified, artificially sown seed did not need these temperature conditions.

separated by areas of forest which were temporarily left uncut and were planned for removal after the natural regeneration of the clearcut patch. Basically, the reduction of the size of the clearcut area was designed to permit a greater density of seed to fall on the area from the surrounding forest. By 1943, it was expected that 49% of the logged patches would reforest naturally as against an average of 25% on areas logged without paying any particular attention to natural reforestation.

The problems of forest management in the Northern Interior were recognised as being very different from those of the coastal Douglas fir region at least as early as 1925.²⁶ The timber stands of the Northern Interior are composed largely of spruce (Picea glauca (Moench Voss and its variety albertiana (S. Brown) Sarg.), alpine fir (Abies lasiocarpa (Hook.) Nutt.) and lodgepole pine (Pinus contorta Dougl. var. latifolia Engelm.) The latter species, apart from being an associated species in the spruce-alpine fir mixtures, occurs in relatively pure stands over large areas where fire has destroyed the former climax spruce stands. The Forest Branch considered it probable that the pulp industry would be of great importance in the region in the future, an opinion which has so far proved to be substantially correct. Most of the standing timber present in 1925 had, as its merchantable timber volume content about 85% of spruce and 15% of alpine fir but it was clear that the logging methods used at the time would considerably alter these proportions so that the alpine fir, inferior in size and commercial value, would form the greater proportion of the volume of the resulting forest. The method in general use was a primitive form of the selection system, commonly referred to in British Columbia as "high-grading." The removal of larger-sized, sound trees usually larger than a specified diameter resulted in heavy cutting of the larger spruce and lighter cutting in the alpine fir. Also, alpine fir will usually regenerate itself, naturally, more prolifically than spruce on an undisturbed raw humus layer of a depth commonly found in the Northern Interior. The problem was, as the Forest Branch saw it in 1925, to develop a method of logging that would produce a valuable second-growth forest and, at the same time, be economic. In the pure lodgepole pine forest cover type the problem was to cut the stand so as to produce the best forest in the future, including a determination of whether it would be preferable to reforest the site with lodgepole pine or to replace it with another species, preferably spruce. In connection with the latter idea, there has been a thread of opinion running through forestry thought in British Columbia which has visualised the eradication of "weed" species and their replacement by more valuable species. These opinions have usually been based almost entirely upon economic factors with little consideration of the biological factors involved. Quite apart from the obvious biological dangers of pursuing such a course on many sites, amounting in some instances to impracticality, the species concerned are now being used to an extent that removes them from the category of "weed" species. ¶ To return to the question of Northern Interior logging, it was felt that investigation into its problems would not necessarily imply the adoption of artificial reforestation measures. To the contrary, it was hoped that the cheaper method of obtaining natural regeneration would prove to be adequate. Research work into these problems

had started in 1924 at the Aleza Lake research station near Prince George but, in 1935, the problems remained and continued to present major obstacles to forest management in the Northern Interior.⁴²

In the Southern Interior, a special attempt was being made, in 1929, to secure satisfactory natural regeneration near Myra, about 7 miles west of Kelowna in the Okanagan Valley, in a valuable stand of Engelmann spruce, alpine fir and lodgepole pine.²⁸ The first logging of a timber sale there was completed during the winter of 1928 - 29 and, in the following summer, a careful study was made of conditions in the logged area.*

In the Interior as a whole, it had been customary to log spruce-alpine fir forests, usually containing some lodgepole pine by what has previously been described as primitive selection cutting or "high-grading". Confusingly enough, the system has been frequently referred to as a clear-cutting system but the term did not, in fact, imply a reasonably complete utilisation of the timber. For example, the standard of utilisation in the Interior in 1940 was based on a diameter limit, usually 13 inches at breast height and the term "clear-cutting" implied the compulsory cutting of all trees of greater diameter than 13 inches, with optional cutting in the remainder. Since optional cutting was only carried out infrequently a considerable number of live trees smaller than the diameter limit, as well as standing, dead trees, usually remained standing with varying degrees of damage inflicted upon them, after logging. This form of logging is more properly described as primitive selection cutting. Whatever name is applied to it, however, the system was considered to have resulted in unsatisfactory natural regeneration and logging slash conditions. In an endeavour to find a more appropriate system, a logging study was begun in the Okanagan Provincial Forest at Lambly (Bear) Creek, in which the Forest Branch and a logging contractor (O. and R. Sandberg, contracting to S.M. Simpson Limited) cooperated. The Government forester in charge was H.J. Hodgins. The project involved a series of experimental plots from which various percentages of the standing volume in the overmature forest were removed by a selection system of logging. The initial results indicated that the lighter selection cuts would be preferable to the heaviest, although natural regeneration was inadequate in all cases. It should be mentioned, however, that, by 1951, the situation had changed and the area subjected to the heaviest cutting was restocking more satisfactorily than the others. However, for a period it did become silvicultural policy to practice diameter-limit cutting or the marking of selected trees for cutting to leave a residual stand of future economic worth. For a variety of reasons, this system is highly unsatisfactory for virgin spruce forest. The residual stand was usually unstable against wind and some of it frequently died from sunscald, caused by exposure to hot sunlight after a lifetime in which the tree bark was shaded. In many cases the forest was simply degraded since the residual stems were actually individuals as old as the larger ones and had been suppressed in their shade. When the larger trees were removed, the remaining ones did not, in many cases, respond to their new-found freedom by increasing their growth rate. Damage to the residual trees by falling trees and

*This particular area was the subject of a later report by Stettler in 1958⁴⁶

logging machinery was frequently heavy. The current practice in Interior spruce-alpine fir and lodgepole pine forests is to clearcut in various forms on a basis of closer utilisation than was practiced in 1940 and, in some instances, with additional prescriptions of management designed to secure natural regeneration. These changes are discussed in greater detail, later in this history.

In 1930, a survey was made in the Upper Fraser River area of the Central Interior to study the occurrence of natural regeneration in areas burned over by uncontrolled forest fires.⁴⁷ Aspen (Populus tremuloides Michx.) and birch (Betula species) were found to be associated with the coniferous species in all cases. This situation might have been expected when the pioneer characteristics of these trees are considered. In all, 75% of the burned areas were found to be understocked, apparently due to a lack of germination on the poor seedbeds resulting from hot fires.

Although thinning practice has never been employed to any significant extent in British Columbia, there has been a continuing interest in it, particularly from a research point of view. The first organised attempts at thinning research started in 1929, when the Cowichan Lake experimental station was organised and a nineteen year old stand of Douglas fir was thinned. Initially, a heavy thinning from below and a heavy thinning from above were made.²⁸ Experiments in tree pruning designed to improve wood quality were also conducted there.⁴⁷ By the year 1945, studies of both thinning and pruning had expanded, although the stage of reaching definite conclusions or the practical application of the operation had not been reached.

Some interest also developed during the period of research from 1913 to 1945 in ^{research into} the possibilities of growing exotic species in British Columbia. The use of exotics for commercial purposes is very limited at the present time and has always been so. Amongst those which were planted on an experimental scale during the period which we are discussing were Big Tree (Sequoia wellingtonia Seemann) at Lois Lake.²⁸ Another plantation contained more than 2,000 trees of 13 species in 8 genera, including 1 European, 2 Oriental and 6 American conifers and 4 American hardwoods. The planting was done at Alouette Lake and it was later reported that the native hardwoods, at their best, showed better rates of growth than the introduced ones.³⁵ Also, three species of larch (Larix dahurica, Elwes & Henry; L. occidentalis Nutt. and L. leptolepis (Siebold & Zuccarina) Murray) showed some very rapid rates of growth. Of the pines, Scots pine (Pinus sylvestris Linn) grew well, followed by Red pine (P. resinosa, Aiton). The Big Tree was growing quite well. As might be expected, however, with the good growth rates exhibited by mature species in the coastal region and the knowledge that they are adapted to their environment, the use of exotics, although it has slowly increased, has been on a very minor scale up to the present day.

Soil studies have occupied a more important place in forest research although it was well recognised that in a territory as large as British Columbia there remains a very large field of knowledge to be developed. Possibly the first organised attempt to study forest soils was made in 1925, when special studies and the classification of soil types on unalienated land were carried out by the Forest Branch at Stewart Lake and on sections of the Yahk Forest Reserve.²⁶ In

1940,³⁵ the Forest Service Research Division conducted a site classification of a portion of the Cowichan Lake Research Forest, employing five site classes in an evenaged stand of Douglas fir, coupled with an investigation of methods which would be suitable for measuring soil moisture and determining soil fertility. The latter study and others were continued, one of the objectives being to define a method of site classification suitable for the south coastal region. The approach which had been adopted by 1945 was ecological, employing ground flora indicators to determine the soil type. By 1944,⁴⁵ a regular sequence of plant indicators had been defined and were related to changes in environmental conditions ranging from excessively moist to excessively dry. A general outline of the progression, listing plant indicators on eleven sites, was published in 1944 and studies were continued to refine the classification.

The foregoing description of the research activity which occurred from 1913 to 1945 is neither comprehensive nor detailed. Obviously, the Forest Service Research Branch was dealing with a wide range of problems and, with its meagre financial and staff capabilities, it could do little more than "skim the surface."

The work of the Committee on Forest Fire Protection, meeting at the Second British Empire Forestry Conference in 1923 has been described. Another committee, dealing with Silviculture in Canada met at the same Conference and, after arriving at an understanding of the term "silviculture", it stressed that silviculture and forest protection go hand in hand.

"Without adequate protection, it is a waste of time to practice silviculture on a given area. On the other hand, correct silvicultural methods facilitate protection against such enemies."

A form of silviculture, consisting of the imposition of a diameter limit on the trees which could be cut by licence holders, had been practiced in Canada for several decades but the Committee felt itself to be justified in stating that the practice had not produced the results which were anticipated. It had led, for example, to the depletion of the more valuable species and a predominance of inferior species. In other words, the development of silviculture in Canada had not kept pace with the requirements of continuous forest production. In many areas it still has not.

The conditions which must precede the practice of good silviculture were established, the Committee believed, by certain steps dependent on forest policy, as follows:

1. The classification of forest areas into those which are to remain forest and those which are suitable for other purposes.
2. The dedication to forestry of those parts which are to remain forest.
3. The demarcation of the dedicated parts so that they are definite and tangible areas known to all men.
4. The regulation of the demarcated forests under definite plans of management.

After discussing the application of general principles to Canada, the Committee turned its attention to cooperation between the State and Timber limit holders, making the following observation:

"As we see the position in Canada, it will be economically impossible, even if otherwise desirable, to embrace within a system of regulated

State forests the whole of the area which should be dedicated to forestry. There are, however, large tracts of forests on which it appears absolutely necessary that better methods of silviculture should be practiced. How is the end to be achieved? We suggest that it can be brought about only by cooperation between the two parties interested in the timber—viz. the State and the lessees or licence holders. At the same time there exists undoubtedly a large gap between the demands of rational silviculture and those of the lumbering interest. If it is not bridged the production of timber must decline in due course and with this diminished out-turn very important industries will pass in decay . . . "

The Committee discussed the "Silvicultural Constitution of the Canadian Forests and the Possibilities of Successful Management" and their comments on the various regions in Western Canada (British Columbia and the Alberta foothills) are of interest if only to demonstrate that the knowledge of appropriate silvicultural treatment of the forests, at the time, was sketchy. Of the spruce-alpine fir forests, it was noted that they were of a different species composition from the eastern Canadian spruce-fir forests but, in spite of this, they would apparently need the same silvicultural treatment. The Committee's report, however, did not make specific proposals for the silvicultural treatment of the eastern forests. So far as the very extensive lodgepole pine forests of Western Canada were concerned, their intensive exploitation had begun and it was felt that

"the facility with which this pine reproduces and the rapidity with which it attains merchantable size make its silvicultural treatment fairly easy. These forests present an immediate opportunity for profitable silvicultural management."

In British Columbia, however, large scale exploitation of the pure lodgepole pine forests did not begin until about 1960. The ponderosa pine received attention:

"The yellow (ponderosa) pine of the Interior Region is the only tree of commercial importance in the Dry Belt, where the rainfall is limited to 10 or 15 inches a year. The forest of this type is being rapidly exploited and, at the present rate of cutting, it is estimated that the supply will be exhausted within 20 years and this period is being materially shortened by such causes as the ravages of bark beetles (as described previously in this history). The method of clear-cutting now employed is not conducive to the successful natural regeneration and we believe from experience with a similar tree abroad that an adequate regeneration could be secured by leaving a proper number of seed-trees."

Depletion of the pine, mainly by logging, did occur, although it took some years longer than predicted. The pine is still being logged in relatively small amounts but in the Okanagan Valley, for example, it is extremely difficult to find even a small area of undisturbed, virgin ponderosa pine forest. Whilst, in some cases, a proper number of seed-trees will secure natural regeneration, Douglas fir regeneration has frequently occupied the pine areas after logging. It is now becoming increasingly well understood that these forests should be managed by lightselection cutting, since a pre-requisite of ponderosa pine natural regeneration is the presence of shade on the ground surface. Reforestation by planting is regarded as expensive since unless special precautions are taken, the pine seedlings are too frequently killed by drought and high, ground-surface temperatures.

In their references to the Coastal forests, the Committee described problems which were better known:

"The coastal forests, consisting of Douglas fir, cedar and hemlock are being chiefly exploited at present under the high-lead type of logging, which results in the practically complete destruction of the small trees and leaves on the ground an enormous amount of debris which, though it gives a certain amount of beneficial shade and shelter to the seedlings, on the whole is detrimental to the re-establishment of the forest by natural processes. This is due partly to the fact that in places it covers the ground too completely, but chiefly to the fact that it remains inflammable for many years and constitutes a dangerous fire risk in the application of any method of regeneration. It appears quite evident that, so long as repeated fires are probable, little dependence can be placed upon seed stored in the soil and, therefore, the logging methods should make provision for other methods of regeneration, such as the leaving of individual seedtrees or logging in compartments small enough to permit seeding from adjacent stands. We have seen many illustrations of magnificent regeneration of Douglas fir on burned, logged-over areas where seed-trees are left.

"We may say in connection with the debris that we have been greatly impressed by the waste in logging operations in this Region and others we have visited. We realise that this is largely the result of economic conditions, but still it represents an enormous loss in the timber supply, and in the interests of the Empire, as well as Canada, it should be reduced to a minimum."

Because close utilisation and the elimination of large quantities of waste progressed only very slowly and is only just, at the present day, approaching realisation, it became the standard practice to burn the slash to reduce the fire hazard which it presented. Although logging areas have become smaller, they are still large from a silvicultural point of view and natural regeneration has not been so successful as was originally hoped. This has increased the reliance upon planting. It is to be hoped that close utilisation of the forest and the accompanying reduction of waste will greatly reduce the need for slash-burning and improve the chances of obtaining natural regeneration, at least on the lower quality sites.

The Reforestation Division of the Forest Service has played an increasingly important role in forestry, a trend which does not show any signs of slackening. The first forest planting reported in British Columbia was in 1925 when

"A total of 7,500 alder, black cottonwood, ash, Manitoba maple and caragana were planted in April as an experimental firebreak."

The survival of the planting was good and, in the next year, the fire-break was completed by the planting of another 6,000 alder. The source of the planting stock is now unknown but the fire-break is believed to be in the Oyster River District on Vancouver Island.

The Forest Service Research Division, soon after its formation, leased some property from the Municipality of Saanich and, in 1927, a small, temporary forest nursery was laid out on Shelbourne Street just outside Victoria. Experimental work was carried out on this site until 1933 and techniques for growing nursery stock were developed. The need for a permanent, production-scale nursery resulted in the establishment of Green Timbers on 655 acres of clearcut Dominion Land in Timber Berth 'R', about five miles southeast of New Westminster. The area was gazetted as "Green Timbers Forest" and development was commenced in 1930 when a few trial beds were sown, 80,000 seedlings were transplanted from the Shelbourne nursery and a plantation of 50,800 Douglas Fir and Sitka spruce was established on 55 acres at the Station.

In 1931, a reconnaissance survey was carried out on logged land near Campbell River (Vancouver Island) and on West Thurlow Island. In the next year 545 acres of West Thurlow Island were planted. During 1935, an area of 15,000 acres within the Sayward Forest was selected for a concentrated reforestation effort, although by that year only 200 acres had been planted in the Campbell River area, including 40 acres planted in cooperation with the Elk River Timber Company. The Young Men's Forestry Training Programme started in 1935 with an enrolment of 500 men and it proved to be of great assistance in the early forest nursery and planting developments. The nursery capacity continued to be increased and, by 1937, adequate land had been prepared at Green Timbers Nursery to provide for a potential production of 3 million trees annually.

The Minister of Lands and Forests announced a Government policy, in 1938, to plant 10,000 acres of logged land each year. The announcement followed a very bad fire year in which 202,000 acres of the Vancouver Forest District were burned accidentally, including 75,000 acres near Campbell River and the period, as we have seen, was one of great public concern over the destruction of forests by fire. This was also the year in which Sections 113 A and 113B of the Forest Act were passed, imposing on the logger compulsory slash disposal and snag falling. In order to meet the expanded reforestation programme, the Forest Branch leased Indian Reserve land near Campbell River for a second nursery to produce 4 million trees annually and development work by Forestry Development crews started at once. It is clear that the 1938 fire year, probably more than anything else, ended the current controversy as to whether slash-burning should be compulsory or not. The best information at the time was that broadcast burning was generally detrimental to natural regeneration but the staggering losses from fire caused the Government to take all measures to improve forest protection and to virtually ignore the desirability of obtaining natural regeneration. This, in turn, placed an increased reliance on tree planting to reforest logged areas and this, along with the definite need to plant to reforest areas burned by natural fires led to the announcement of the plans for the increased scale of planting.

With the outbreak of war in 1939, the Research Division and the Survey Division of the Forest Service were merged into an Economics Division and in that year a record was made when more than one million trees were planted on 1,118 acres.

The first seedbeds were sown at the Campbell River nursery in 1940 and the first seedlings from there were planted in the autumn of 1941. As mentioned previously, the labour problem during the War was ameliorated by the Alternative Service Workers (conscientious objectors) who did a great deal of the nursery and planting labour. Surveys of land that had not restocked with trees in a satisfactory way following logging operations in the Cowichan Lake area of Vancouver Island disclosed that there were some 98,000 acres needing reforestation. Consequently, in 1943 the Forest Service purchased 23.5 acres of land at Duncan for a nursery to provide stock for this planting programme. Along with continued land development at the Green Timbers and Campbell River nurseries, this acquisition was calculated to bring seedling production to a possible 20 million trees per year.

In 1944, the Honourable Gordon McG. Sloan was appointed to investigate the forest resources of the Province. His report estimated that, of approximately one million acres which were not satisfactorily restocked to forest, following fire and logging, about 40% was plantable and that it should be planted within twenty-five years. His suggestion of compulsory reforestation of these lands, where they were alienated in berths, leases and licences later led to the introduction of Section 152 of the "Forest Act", under which the Forest Service can, if it decides, enter onto alienated lands and plant them at the owner's expense. Sloan, surprisingly, did not consider that there was any urgency to plant denuded areas in the Interior on the grounds that the growth increment was exceeding the depletion of timber and fire protection was improving.

From the formation of the Forest Branch, the administration of grazing land has been one of its functions. Although the activity is agricultural, the location of the bulk of the grazing areas in the Province make the administration by the Forest Branch a logical allocation. The Forest Branch, in 1912¹⁶ estimated conservatively that there were, in the Interior and mainly in the Dry Belt, 3 million acres of mountain meadow and parkland and at least 10 million acres of first class, timbered, grazing land, all of which was capable of furnishing summer grazing for upwards of one million head of cattle or five million head of sheep. In 1913, this range was supporting not more than 50,000 head of cattle and horses. Ideas were now put forward for grazing regulations.¹⁷ It was recommended that areas in which grazing would be allowed should be selected by the Minister of Lands and that these areas should be divided into districts. The Minister should decide on what kind of stock could be grazed in each district and he should be able to exclude stock from specified areas for any period he chose, for the protection of water supplies, game, forest reproduction or for agricultural reasons. It was recommended, also, that permits would have to be secured from the Government before a grazier could move his stock onto public forest land, although animals used by prospectors, campers and travellers or which were necessary for the care of animals which were already permitted to graze should be exempted from needing a permit. Another exemption allowed a settler who was regarded as a bona-fide or genuine settler to graze up to 10 head of cattle or horses and 50 head of sheep or goats without a permit. It was suggested that a priority of allotment of permits should be established so that they would be given first to "small nearby owners" and nearby owners of improved ranches, whose stock regularly grazed on public forest land and who were dependent on this grazing. The next priority would go to larger nearby owners, whilst owners of transient stock would receive consideration last. Evidently, large ranches were viewed with some disfavour in spite of their stronger economic position and, capability for better range management but no doubt the bias for the small owner also possessed a strong political appeal. The minimum annual fee for grazing under permit should be ten cents per head for cattle and horses and one cent per head for sheep and goats. Those who received permits would be responsible for repairing damage to roads, trails or fences which they caused. They would also be required to extinguish camp fires which they started and to assist in extinguishing any forest fires occurring in the grazing district.

These modest proposals did not meet with immediate favour and it was not until 1919 that the "Grazing Act" and regulations came into effect and attempts at effective control of grazing could be made. The problem of overgrazing was already apparent on the more accessible ranges and this, coupled with damage caused by grasshoppers, placed these ranges in a poor condition for grazing. With the introduction of the "Grazing Act", 17 Stock Associations were either organised or reorganised with the idea of placing definite areas of rangeland under their jurisdiction. In 1919, just over \$11,000.00 was paid or was due for permits issued to 43,602 cattle, 2,789 horses and 4,335 sheep and complaints about conflicts between range users were numerous.

The Range Commissioner reported in 1921 that the practice of burning and reseeding of the Crown Range, including land carrying open forest, had been investigated to determine its merits. Other experiments indicated that grasshopper control by poisoning would not be successful. However, the fencing of areas to eliminate spring and fall grazing at low altitudes had produced good grass growth in spite of the grasshoppers. The investigations revealed that, because of heavy grazing and damage by grasshoppers, the growth of forage on ranges was so sparse that the grasshoppers travelled considerable distances in their search for food and, in these conditions their normal enemies did not keep the population down, allowing rapid increases in numbers.²⁴ The disturbances of the natural ecology by uncontrolled grazing led to undesirable results.

Receipts and expenditures for grazing by the Forest Branch remained minute when compared to the scale of the grazing problems. In the three years 1920, 1921 and 1922 total receipts were \$12,315.27, of which \$5,402.76 was expended on drift fences, mudholes, trails, development of springs, grasshopper control, reseeding of grass and demonstrations of range salting.²⁵

Burning and reseeding of range continued to receive attention as a means of improving the range but conflicting results emerged. An examination of some lodgepole pine stands, in which cattle could not be grazed because of the density of the trees revealed that they had been established following the destruction of Douglas fir forest by "heavy fires of about sixty years ago". The conclusion was reached that "only the best protection (from fire) will restore it to its former valuable grazing condition." Pure stands of lodgepole pine of a generally similar nature were later the subject of suggestions by Government Game Branch Officials, at a time when the stands were of low economic value, to the effect that they should be deliberately burned again to provide browse for an increased game population. Another later suggestion was that, following logging, the lodgepole pine areas should be burned over and seeded to grass to provide grazing until such time as natural regeneration should occur. There are serious doubts that suggestions of these kinds are ecologically sound and, in any event, they have not been adopted. The Forest Service expressed some doubt³⁶ in 1923 on the value of sowing special seed grasses on the ranges, since a sowing in the dry Nicola area was a practical failure, attributed to heavy competition from native forage. It was felt that cultivated species of forage must be given a measure of protection if they were to establish themselves. Much later developments have led to the use of a "dry land mix" of grass seeds, more suited to the dry environment.

The colourful nature of the grazing industry caused the Grazing Commissioner a degree of despair over its efficiency.⁴⁹ He felt that the annual "stampede" held in each hamlet of the range country was a growing menace to the range cattle industry.

"They accomplish nothing but confusion by unsettling labour on the ranch and range during the season when all important operations are going on. "Cowboys" are inclined to devote their energies to practising up for bucking and steer-riding contests instead of the care of the cattle as they are hired to."

The grazing stock in the Province continued to increase and, in 1927, authority was granted to graze 60,000 cattle and horses and 26,000 sheep on the Crown ranges.

In 1930, the Chief Forester, in cooperation with the B.C. Beef Cattle Growers' Association and the B.C. Sheep Breeders' Association, conducted a series of open meetings in order to gain a better understanding of the stockmen's problems.⁴⁷ This was followed, in 1932, by a Departmental reorganisation (mainly for economy reasons) in which the position of Grazing Commissioner disappeared and all grazing matters were placed directly under the Chief Forester.²⁹ This change and certain changes in the grazing regulations were felt to improve the service offered to stockmen by the Forest Branch. The livestock industry had passed through its pioneer stage and was now encountering changing conditions, a situation which required greater attention to be given to the finer points of stock grazing, range management and marketing. The Forest Branch asserted that livestock could no longer be turned out, year after year, on the open range and left to rustle for itself.* The poor practices of most cattlemen had led to impoverished ranges, unsatisfactory calf crops and lack of finished product for the market.

By 1935, the numbers of livestock grazing under permit were 61,000 cattle and horses and 37,000 sheep.²⁶ This was an increase of only 10,000 sheep from 1927 and the grazing fees which were collected amounted to only \$14,527.01. The stock increased in 1936 to 77,000 cattle and horses and 46,000 sheep but grazing fees dropped to \$11,043.75.⁴⁹ The large bands of wild horses that once foraged on the open and tree-covered range had, by this time, been broken up and largely eliminated, mainly by shooting. A few, small bands remained and it was believed that they would have to be controlled, mostly by round-up.

In 1945, the total number of stock grazed under permit, mostly in the Kamloops Forest District, had risen to 109,000 cattle, 5,000 horses and 39,000 sheep and the grazing fees which were billed had increased to \$30,066.34.⁴³ The industry that had developed grazed its cattle and sheep on the low ranges in spring and autumn and on the higher ranges in summer. Many of these ranges were forest-covered, lying within the Provincial Forest Reserves. During the winter, the stock was fed with hay at the home ranch on the valley floor and the industry was seriously affected in those years when the hay crop was poor and the winter was long and cold. The grasshopper population and poor range management continued to downgrade the range quality, particularly on the low-level ranges.

*The practice is, however, quite common at the present day.

Livestock losses were incurred by graziers from poisonous weeds and attacks by predatory animals, particularly grizzly bears and wolves. Horse disposal programmes continued in an attempt to eliminate wild horses.

The industrial associations of the ranchers were the B.C. Beef Cattle Growers' Association, primarily interested in the betterment of the industry and improvement of cattle quality and its affiliated B.C. Livestock Producers' Cooperative Association, primarily concerned with orderly cattle marketing. The B.C. Sheep Breeders' Association was the organisation of the sheep graziers. *Relief Projects*

After this brief review of grazing, it is convenient to turn to the National Forestry Programme, Relief Forest Development Projects and Alternative Service Workers, all of which have been mentioned. The National Forestry Programme, also known as the Young Men's Forestry Training Plan was started in 1935, during the Depression Years, to assist unemployed young men by providing them with useful forest work designed to give a return to the Province in keeping with the expenditure of money involved. The project was financed through, and the men selected by, the Provincial Department of Labour, after which the men came under the Forest Branch for administration. They were paid a subsistence allowance and given training, including lectures. Initially, about 500 men were enrolled and employed as assistants to Forest Rangers in forest development, trail and telephone construction, repair and maintenance.⁴² During 1936, about 25% of the 500 men secured other employment in various industries.

Up to this point, the programme and its financing had been entirely Provincial but, in 1937, it came under the Dominion-Provincial Youth Training Projects Agreement,³¹ the cost between shared equally by the two Governments. The selection of enrollees was now carried out by a Board consisting of a Dominion Government representative and a representative each from the B.C. Department of Labour and the B.C. Forest Branch. By the end of 1939, a total of 3,100 men had taken the practical training.³² In 1940, only 186 men were enrolled and the programme was terminated.

Enrolment under the plan was restricted to single men, not otherwise employed, who had resided in the Province for five years or more and who were 17 or 18 years of age. Physically fit army rejects were, however, accepted up to 27 years of age. The pay was \$45.00 per month if living at home or \$55.00 when away from home. The enrollees paid their own board and lodging and received travelling expenses.³⁵

The Relief Forest Development Projects were independent of the National Forestry Programme and were undertaken to provide work for single, homeless men, many of them transients, who were registered for Relief. In 1936 - 37, the first year for the Projects, approximately 1,400 men were provided with accommodation in twenty-one camps on the Lower Mainland and Vancouver Island³⁹ and this number was approximately doubled in 1937 - 38.³¹ In 1938 - 39, a maximum of 1,313 relief workers were enrolled at one time during the winter, the actual total of men passing through the camps being 4,441. They accomplished 221,104 man-days of work of which 52.2% was spent on park development, 31.8% on forest protection and 16% on forest experiment stations and planting. The development of the new forest nursery at Campbell River was started and improvement work was continued

at the Green Timbers Forest Experiment Station and the University of British Columbia Demonstration Forest. Forest protection work mostly consisted of opening two abandoned logging railroad grades for access by mobile protection equipment, and snag felling. At this point (1939) the programme terminated.³²

In 1942, to aid provincial fire protection during the period of manpower shortage in wartime, the Dominion Government agreed to provide the province with Alternative Service Workers (conscientious objectors). Under the terms of the agreement, the provincial Forest Protection Fund served as a drawing account for immediate financing of the plan, the Fund being reimbursed by payments from the Dominion Government based upon an allowance at a fixed rate per man-day. Whilst, in the early stages of the programme, the initial capital cost which was incurred in providing housing and equipment exceeded the credits established through the per diem allowance, monthly expenditures decreased by the end of the first year to a cost less than the total established monthly credits and the Forest Protection Fund had been totally reimbursed. In all, 740 men reported for duty at 18 camps.²⁹ They fought 145 fires, felled 249,400 snags over 24,500 acres of logged land, cleared and built 16 miles of new road, converted 57 miles of old logging railroad grade to truck trails, improved 44 miles of existing road and maintained 64 miles of road by installing 21 miles of ditches, 134 culverts and 8 small bridges. Also, they cut 10 miles of new trail and improved another 12 miles, constructed 28 miles of telephone line and planted 425,000 tree seedlings on 660 acres of land. The programme continued into 1943 with a reduced average strength of 450 men and the same types of work were performed with a total operating cost for the calendar year of \$336,300.00. At this point the scheme was terminated. PAGES

It is appropriate to mention the Provincial Parks of the Province. By the year 1939, British Columbia had reserved some 41 areas for parks which were scattered throughout the Province and aggregated more than 6,370,000 acres. It was not planned, at the time, to actually develop all of these parks for use by effecting extensive improvements but, rather, to reserve them whilst the land was still in public ownership and pressure for other uses was small.³² Chief Justice Sloan was to remark in his 1945 Report⁴⁰ that probably a more accurate description than "parks" would be "park areas", since with few exceptions the areas were "of the forest primeval without roads, trails or other organised park developments."

During the period up to 1945 parks were created in three ways. The Lieutenant-Governor in Council could create one under the "Forest Act" or, alternatively, under Section 94 of the "Land Act" or, lastly, Special Acts of the Legislature were employed. The majority of the areas were formed under the "Forest Act" and they fell into three categories, designated A, B, or C, according to the degree of protection from alienation to other uses which was afforded to them. Lands included in Class A and C parks ^{were} reserved from pre-emption, sale, lease or licence under the "Land Act" and certain restrictions ^{were} also imposed on the holders of mineral claims located in those areas, such as a requirement to dispose of mine tailings without detriment to the aesthetic values. The Crown timber on any Class A park was reserved from cutting or sale except where the Deputy Minister believed that cutting and incidental sale were necessary and advantageous

in developing or improving the park or for protecting and preserving the major forest values of the park for the enjoyment of the public. In other words, no timber could be sold from Class A parks for the primary objective of deriving revenue from it. Crown timber on areas within Class B parks could be sold except where, in the opinion of the Deputy Minister of Forests, the sale would be detrimental to the recreational value of the area. Class C parks were usually very small areas for purposes such as playgrounds. Whilst there was provision, as described, for the sale of timber from parks, only relatively small volumes have actually been cut in them.

During 1941, the important Earnest C. Manning (171,500 acres) and Hamber (2,432,000 acres) Class A parks were created.³⁴ In 1942 two men were appointed as Park Rangers becoming the first men to work full time in the field on the administration of development of specific parks. In this instance, they were allocated to Wells Gray and Mount Seymour parks.³³ It has been stressed that the emphasis has been on the reservation of the park areas rather than their development. This, and the low population of the Province may account for the low usage of the parks during these years. In 1943, for example, when 9,013,690 acres of park areas existed, the estimated number of visitors was only 27,167.⁵⁰ The use of some parks is quite heavy nowadays. In 1945, the following parks were in existence:⁴⁰

NUMBER AND ACREAGES OF PROVINCIAL PARKS BY
CLASSIFICATION, IN 1945

<u>Classification</u>	<u>No. of Parks</u>	<u>Acres</u>
Class 'A'	16	2,720,771
Class 'B'	3	4,622,246
Class 'C'	28	4,113
Special	3	1,666,560
Section 94, "Land Act"	2	1,809,440
Totals:	52	10,823,130
		(16,901 square miles)

The period which we are discussing drew to its close with forestry as the main industry of the Province. The Economic Council of British Columbia in 1937 had given the average annual value of production in the primary industries as being:⁵¹

<u>Industry</u>	<u>Millions of Dollars</u>
Fisheries	17.7
Agriculture	47.0
Mining	48.6
Forests	63.3

The policy of encouraging industry was showing results. But the forests were still being exploited or possibly plundered and burned without adequate forestry practices to ensure the regeneration of logged areas. The state of silviculture was relatively crude. The understaffed Forest Service, although developing, had obvious difficulties in its efforts to cope with the problems of the vast territory which it was administering. Industry itself was doing very little forestry, other than to assist in fire protection and its orientation was almost purely toward the logging phase of forestry. The disrupting years of

the Depression had given way to the accelerated timber use of the War years but, with critical manpower shortages, attention to forestry was not improved. It is hardly surprising that, by 1945, a number of serious problems, relating to the forest resources, had arisen and were not considered to be under control to a satisfactory extent. It was desirable, in the public interest to inquire into all phases and aspects of the forest resources, the pertinent legislation and administrative policy. As a result of this desire, the Lieutenant-Governor in Council appointed a sole Royal Commissioner, the Honourable Mr. Justice Gordon McGregor Sloan, Puisne Justice of the Court of Appeal for British Columbia and, later, Chief Justice of the Province, under Section 3 of the "Public Inquiries Act". It was the beginning of a new era in British Columbia forestry in which increasing efforts were to be made to bring about a period of more orderly progress. Sloan was to conduct a second inquiry in 1956 and died shortly after its completion.

The progress which was made during the period from 1912 to 1945 involved much pioneering effort by hard-working and dedicated men. Whilst detailed reference to individuals is avoided in this history, it is perhaps fitting to end this account of the period with an excerpt from the "Prince George Citizen" of 19th December, 1929, which illustrates quite graphically the pioneering nature of much of the earlier work.

The article describes the Pacific Great Eastern Railway Resources survey, conducted jointly by the Province of British Columbia, the Canadian Pacific Railway and the Canadian National Railway. The Province had already invested \$60,000.00 in the P.G.E. Railway and was trying to attract a railway company to complete the Railway with a land subsidy of four blocks of land totalling 16,075,000 acres.

"There was a double purpose in the making of the survey. The government was desirous of impressing the managements of the transcontinental railways as to the value of the natural resources of this large section of British Columbia as prospective bidders for the acquisition of the completed portion of the P.G.E. and the immense land subsidy, subject to the conditions attaching thereto. The government was also desirous of being in a position to defend any grant it might make of the subsidy lands by being in a position to show it had a fairly accurate knowledge of the lands it proposed to convey.

"The survey was the first attempt at securing first-hand knowledge of the agricultural, mining and timber resources of a district of empire proportions, and the work of ^{examining} it was carried forward by land and air forces. The major attention was given to the larger block of land in the Peace River drainage basin. The greater number engaged in the field work of the survey travelled through the areas by the waterways as it possesses few trails and no roads. The work performed by the airmen, however, was the more novel and interesting. During the summer, working from fixed land points, they succeeded in securing photograph maps of hundreds of miles of terrain which was before completely unknown, and thereby furnished excellent information as to timber stands of great extent.

The information gathered by the land and air forces is now being collected by the office staff of the survey, and the report is expected to be ready

for submission to the members of the legislature before the close of the approaching session, at which some definite action with respect to the P.G.E. is expected to be taken.

"During the progress of the very comprehensive natural resources survey, its headquarters were based at Prince George. At the head of it was Major C.R. Crysedale, formerly chief engineer of the Alberta system of railways, who brought to his task a genius for organisation, in the co-ordination of the several branches so that they functioned^{as} a smooth-running machine. Norman C. Stewart discharged the duties of surveys engineer, and J.M. Stewart those of office engineer. W.G.H. Firth was chief draughtsman for the headquarters staff and J.A. Sharp chief clerk. These with a staff of fourteen draughtsmen in Prince George, and forty-six in Victoria, made up the office staff.

"The land survey parties were in charge of members of the B.C.L.S. of outstanding ability in the persons of H. Idsardi, H.A. Cornwall, W.A. Moffatt, L.S. Cokely, H. Pattinson, F.C. Swannell, J.F. Templeton, John Davidson, M.H. Ramsey, G.M. Downton, G.S. Boulton and C.L. Roberts.

"The forestry parties were in charge of H.C. Kinghorn as forestry engineer, F.M. Knapp, assistant forestry engineer, and G.H. McLean, D.P. Bird, C.D. Schultz and W.H. Ryan in the capacity of timber cruisers. With them there was a considerable force of compassmen, packers and boatmen.

"The geological parties had an impressive personnel. They included Prof. R.W. Brock, LL.D., Professor Williams and Professor Schofield, with J.E. Kania, R.M. Logie, C. Riley and J.B. Bacock as field geologists.

"The air photography on the survey was divided between members of the R.C.A.F. and the Western Canada Airways service. Of the former Flight Lieut. A.L. Morfee was in charge with Flying Officer L.H. Weeden, Sergeant Warner, Sergeant Attwood, and Corp. M. Squire. The Western Canada Airways had but one plane engaged in the air photography. This was in charge of P. Calder, pilot, with F. Little as photographer.

"The transportation arrangements for the survey were in the capable hands of Jack Adams, with the title of superintendent. He had an efficient crew of boatmen and cache keepers under him, and kept the survey moving and its personnel fed without missing a meal."

CHAPTER EIGHTTHE ROYAL COMMISSION OF INQUIRY INTO THE FOREST
RESOURCES OF BRITISH COLUMBIA - 1945

The Honourable Mr. Justice G. McG. Sloan was given wide terms of reference for his investigation.* In fact, his scope was unlimited, even though he was specifically directed to investigate a number of subjects. He was to find out the extent, nature and value of the resources and their conservation, management and protection. Of particular significance was the direction to investigate the establishment of forest yield on a continuous production basis in perpetuity. Forestation and research, along with forestry education and instruction specifically fell within his scope. The Government desired that he should study the utilisation of the forest crop and its relationship to employment and social conditions. He was not limited to timber values alone, however, and was to investigate the use of forests and wild lands for parks, recreation, grazing, wild life, water conservation and to find how soil conservation could be effected. Forest finances and revenues, the various forest tenures and any abuses of the rights which they conveyed, the legislation and amendments to it were all on his list. It was a major task. The Commission sat for 111 days, heard 293 witnesses and recorded 11,900 pages of transcript. The forestry advisor appointed to the Commission staff was F.D. Mulholland, B.C.R.F. There is no doubt that much of Mulholland's principles and beliefs appeared in the 1945 Report, as they did in the later 1955-56 Royal Commission Report.

In his report, Sloan reviewed the economic importance of the forest industry and whilst he noted that the generally accepted percentage of forest production in dollars to total Provincial production was 40% he hazarded the general opinion that it was, in point of fact, at least one-third. The value of forest production in 1942 was \$124,720,000.00.** The primary forest industries, at the time, amounted to more than 1,600 logging operations supplying logs to 638 primary manufacturing plants—551 sawmills; 4 large plywood plants; 76 shingle mills and 7 pulp and paper mills. The secondary wood-using industries totalled 198 establishments producing a wide range of manufactured articles for the domestic and export markets. The capital invested in industry, including investment in timber in private ownership, which produced the annual value of forest production of almost \$125,000,000.00 was at least \$350,000,000.00. An average of 31,686 persons were employed by the forest industries for the twelve month period and they were paid direct wages and salaries amounting to at least \$350,000,000.00.

* As described in the previous chapter Mr. Justice Sloan was appointed sole Royal Commissioner under Section 3 of the "Public Inquiries Act."

** gross value, including loading and freight within the Province and the value contributed by the wood-using industries.

The average hourly wages were:

AVERAGE HOURLY WAGES IN THE FOREST INDUSTRIES OF BRITISH COLUMBIA - 1942

<u>Industry</u>	<u>Type</u>	<u>Cents</u>
Primary	Logging	75
Secondary	Pulp and Paper	74
Secondary	Shingle	64
Secondary	Sawmill	60
Secondary	Miscellaneous	53

The costs of production for 1942 were estimated by the industry to be more than \$114,000,000.00. The importance of the forest industry as an exporter was demonstrated by the statistics, the figures for 1942 showing exports to foreign

countries at \$73,105,466.00 and to other Canadian Provinces at \$21,806,382.00, for a total of \$94,911,848.00. In view of what has occurred later in the Province's forest history it is interesting that, in 1939, although British Columbia accounted for 60.97% of Canadian wood and wood products exports, exclusive of pulp and paper, it only exported 7.63% of the total Canadian exports of pulp and paper.

To Sloan, the foregoing facts established beyond any question that the forest industries of the Province played a tremendous and important part in both the Provincial and the National economy. He added:

"The future existence of our forest industries depends upon the intelligent management of our forest land to ensure its continued productivity. No industry that continues to deplete the source of its own raw material can hope to survive without providing for the future replacement of that material.

"The vital necessity of continued forest cover to the public welfare and the importance of the forest industries to our economic structure demands that, in the National and Provincial interest, our forests be perpetuated."

Because of the continuing work of the Forest Service, the knowledge of the forests had improved enormously over that which was available to the Royal Commission of 1910. A land classification of the Province was available, as follows:

LAND CLASSIFICATION OF BRITISH COLUMBIA, BY REGIONS,
ACCORDING TO THE 1945 COMMISSION OF INQUIRY

<u>Classification</u>	<u>Coast</u>	<u>Percent</u>	<u>Interior</u>	<u>Percent</u>	<u>Total</u>	<u>Percent</u>
Mature Forests	7,880,000	19.2	14,776,000	7.6	22,656,000	9.7
Immature Forests	1,253,000	3.0	31,062,000	16.1	32,315,000	13.8
Not Reforesting	918,000	2.2	19,134,000	10.0	20,052,000	8.6
Agricultural	495,000	1.2	4,207,000	2.1	4,702,000	2.0
Scrub	12,515,000	30.4	69,766,000	36.1	82,281,000	35.1
Barren	16,902,000	41.1	48,844,000	25.3	65,746,000	28.0
Swamp & Water	1,196,000	2.9	5,455,000	2.8	6,651,000	2.8
Totals:	<u>41,159,000</u>		<u>193,244,000</u>		<u>234,403,000</u>	

Expressing this information in a different form:

	<u>Acres</u>	<u>Percent</u>
Land capable of producing commercial timber	75,023,000	32
Land incapable of producing commercial timber (alpine, barren, scrub, swamp, water, etc.)	154,678,000	66
Agricultural Land	4,702,000	2

Of the agricultural land, 23.6% was cultivated and 76.4% was open grass-land.

From these statistics, it was clear to Sloan that the Province was a geographic unit in which the growing of perpetual forest crops was a "prime essential" if the fertility of the soil was to be used for the purpose to which it was most suited. About one-third of the land surface of the Province and 98% of all productive land was in "absolute forest sites." Although the statistics have been refined since 1945 and some figures have changed, the broad conclusions drawn by Sloan remain true. The forests are easily the renewable resource of greatest importance to British Columbia's economy, as well as providing for important social values.

In addition to considering the land classification statistics, Sloan examined the distribution of the forests, based on the following statistics:

DISTRIBUTION OF MATURE FORESTS, IMMATURE FORESTS AND DENUDED
FOREST LAND BY REGIONS OF BRITISH COLUMBIA ACCORDING TO THE
1945 COMMISSION OF INQUIRY (ACRES)

<u>Classification</u>	<u>Coast</u>	<u>Percent</u>	<u>Interior</u>	<u>Percent</u>	<u>Total</u>	<u>Percent</u>
Mature Forests	7,880,000	78.4	14,776,000	22.7	22,656,000	30.2
Immature Forests	1,253,000	12.5	31,062,000	47.8	32,315,000	43.1
Logged, logged & burned, & burned, not reforested	<u>918,000</u>	9.1	<u>19,134,000</u>	29.5	<u>20,052,000</u>	26.7
Totals:	<u>10,051,000</u>		<u>64,972,000</u>		<u>75,023,000</u>	

The Commissioner derived two striking facts from this table. The first was that, of the total productive forest sites of the Coastal Region, 78.4% was covered by mature forests and, the second, that 20,000,000 acres of productive forest land in the Province were not reforested. The denudation of forest land by fires and logging has been a cause of increasing concern since 1945.

Sloan turned next to the concept of a normal forest as the ideal condition to be achieved although he pointed out that, in European practice, 75 to 80% of normality was considered to be a satisfactory attainment. To digress briefly and without delving into the matter in depth, a normal forest is an ideally constituted forest with such volumes of trees of various ages so distributed and growing in such a way that they produce equal annual volumes of produce which can be removed continuously without detriment to future production. The concept clearly visualises an ideal state and Sloan was simply pointing out that it is not always attained, although his use of the figures "75 to 80%" is vague. As a result of the growth of trees, exploitation and unforeseen influences such as gales and large forest fires, the condition of the forest constantly changes. When a normal distribution of trees has been achieved in all or part of a forest, it can then only be preserved with difficulty. Thus, there is no absolute normality, remaining unaltered everywhere and for all time, but only a relative one which corresponds best to the circumstances for the time being. Sloan favoured the application of the concept of normality to British Columbia's forests although, since he was not a professional forester, his proposals as to how it should be applied were not always definite or clear. He believed that, on the Coast, it was necessary to remove the excess of mature and overmature forests so as to realise the potential of faster growth rates of young trees and to achieve a proper distribution of age classes. However, the annual or periodic cuts to remove the overmature or mature forests would need to be adjusted so as to avoid a hiatus in the annual volumes of logs which were produced since such a drop in production would cause the collapse of industry. When the process of conversion to the normal forest was completed, continuous production from the provincial forests on a true "sustained yield basis" could be assured by a proper system of regulated forest management but until this was accomplished the problem was not how to assure sustained yield but to ensure sustained production. Insofar as the Interior forests were concerned a more balanced division between mature and immature forest existed.*

* The 1945 Report says "mature and overmature stands", evidently an error. The tenor of Sloan's comments at this time clearly indicates a greater degree of concern for the future of the richer, more heavily exploited Coastal forests than for those of the Interior.

The 20,000,000 acres of land which Sloan believed were not reforesting has been mentioned and it was a depressing fact that it was increasing each year. On the Coast, forest was being clearcut at a rate of about 65,000 acres each year, of which approximately 50% would restock naturally with conifers, in varying degrees, over a period of years. Since 1940, the Forest Service had planted between 10,000 and 15,000 acres per year. These figures led Sloan to the conclusion that at least 20,000 acres were being added each year to the areas denuded of forest in the Coastal Region. Logging alone had not created the denuded acreage. It had resulted from logging, a combination of logging and fires or fires alone. As an example, during the decade from 1934 to 1943, 4,343,600 acres of Coastal forest and 2,926,500 acres of Interior forest were burned, destroying both mature and immature stands. The backlog and rate of forest land denudation were thus very serious and the Commissioner insisted in his report that three requisites must be carried out to correct the situation. Firstly, the productive land areas which had already been denuded and which were not restocking naturally must be replanted. Secondly, the areas to be logged in the future must be left in such a condition that their continuous productivity was assured and, thirdly, the young growth must be protected from fire.

Sloan turned to the question of what annual cut could be allowed in the Coastal Region and gave it, as his opinion, assuming a close recovery in logging, successful regeneration and reforestation and protection of young stands from fire, that the following round figures applied, based on an average rotation age of sixty years.

	<u>Millions of board feet</u>
Standing accessible mature timber	180,000
Divided by 60	3,000
Deduct annual fire and insect net losses (approximately)	17
Leaving	2,983
Add increment on growing stock, 1,253,000 acres at 350 - 400 board feet per year	<u>500</u>
Total allowable annual cut:	3,483*

The Forest Branch had reported, in 1938, the continuation of a serious lack of balance between the proportions of the standing volumes of various Coastal species and the proportions of the volumes of each species which were being utilised by the forest industry.³¹ The heavy overcutting of Douglas fir was especially significant. Chief Justice Sloan noted that the imbalance persisted as shown on the following table:

*The management forester will recognise that this is a crude sort of yield calculation containing a number of possible weaknesses. It assumed, for example, that the removal of the accessible mature timber could be spread over the 60 year rotation period without sustaining serious losses from death, decay and other pathological effects. There was no allowance for increment on the accessible mature timber. At best, the calculation was an indicator of the potential.

ANALYSIS OF VOLUMES OF TIMBER CUT BY SPECIES AND STANDING
TIMBER BY SPECIES IN THE COASTAL REGION OF BRITISH COLUMBIA
ACCORDING TO THE 1945 COMMISSION OF INQUIRY

<u>Species</u>	<u>(Board Feet)</u>		<u>Percent of Total Coast cut</u>	<u>Percent of each species to total coast volume of all species</u>
	<u>Total Cut 1937 - 44</u>	<u>Average Yearly Cut 1937 - 44</u>		
Douglas fir	11,214,723,207	1,401,840,400	49.93	24.0
Western hemlock	4,639,616,818	578,702,112	20.61	29.7
Western red cedar	4,440,492,129	555,061,516	19.72	26.2
Spruce	1,059,546,179	132,443,272	4.72	6.4
Silver fir (balsam)	932,046,513	116,505,814	4.15	11.3
White pine	171,021,597	21,377,699	0.76	0.4
Others	12,866,000	1,608,250	0.06	2.0
Totals	22,470,312,443	2,807,539,063		

In addition, Sloan gave his estimate of volumes of standing timber in the Coastal Region and thereby estimated the number of years' supply, based on his estimate of the annual cut which has been given above. His estimate of volumes of standing timber was actually based on that of F.D. Mulholland of the Forest Service. Mulholland, in giving evidence, had admitted that his Coastal estimates were too conservative and that they could be increased. Consequently, Sloan increased Mulholland's estimate by 16% for each species. From this increased estimate and other findings he estimated how long each Coastal species would last, as follows:

ESTIMATE OF PROBABLE DURATION OF SUPPLY OF THE
COMMERCIAL SPECIES IN THE COASTAL REGION OF BRITISH
COLUMBIA, ACCORDING TO THE 1945 COMMISSION OF INQUIRY

<u>Species</u>	<u>Estimated Standing Volume (Millions of Board Feet)</u>	<u>Supply in years</u>
Douglas fir	43,053	31
Hemlock	53,517	92
Western red cedar	47,041	85
Spruce	11,541	87
Silver fir (balsam)	20,393	176
White pine	755	35
Totals:	176,300	63

The results indicated a possible failure in the supply of Douglas fir and white pine since the removal of the mature timber of these species at the proportionate cutting rates existing in 1944 would not last for the sixty year rotation. The calculation again took no account of the pathological factors which might require the accelerated removal of the overmature and mature timber, nor of the immature stands which would become mature and ready for cutting before the end of the estimated periods of supply.

Chief Justice Sloan did not offer any particular solution for the imbalance of the cutting of species. He did suggest that, as the accelerated liquidation of Douglas fir proceeded, the species being undercut would have to be brought into greater use. This trend did occur later. Also, the Coastal industry, Sloan felt, might direct their attention to Interior stands of mature Douglas fir to make up the inevitable deficiency of supply to the export market. Although some Douglas fir pulp chips were delivered from the Interior to the Coast, starting in about 1960, very few logs were transported. The Coastal companies have, of course, migrated into the Interior in an extensive way, building new pulp mills there and acquiring existing industry by purchase.

Sloan's general conclusion was, as the basis for current regulation of the forest, that the annual cut on the Coast should not be permitted to exceed 35 billion board feet during the ensuing ten-year period with any necessary adjustments to be made at the end of that period.

Following this assessment of the Coastal forests, the Commissioner reviewed the position in the Interior of the Province. The Interior forests were stated to be in a much better balance than those of the Coast, in view of the proportion of mature forest acreage to immature forest acreage. However, the 19 million acres which were not reforesting called for serious consideration and future action. The implication of this remark was, clearly, that Coastal areas should be replanted first.

Mulholland had estimated, in 1937, that the Interior forests contained approximately 100,000 million board feet of merchantable timber and 1,580 million board feet of increment were being added to that figure each year. The average annual depletion was a little over 1,000 million board feet per year. From these figures, he concluded that about 500 million board feet a year had been added to the inventory since 1937, or about 4,000 million board feet. If the added increment were to be considered only for those areas which were accessible in 1937 it was reduced to 200 million board feet a year or 1,600 million since 1937. Sloan did not feel qualified to say to what extent the areas considered to be inaccessible to logging in 1937 had or would become accessible. Even on the basis of the 1937 figures for accessible, merchantable timber, however, the Commissioner stated that the overall inventory was increasing annually, since the increment added by tree growth exceeded the total overall depletion. In the past, losses from forest fires and insects had equaled or exceeded the annual cut. Better control of these losses, as well as the planting of selected acreages, would greatly increase the annual Interior increment. As in the Coastal Region, Sloan gave an estimate of how long the existing stands of mature and overmature timber would last at the current rate of cutting:

AVERAGE ANNUAL CUTS AND ESTIMATED PERIOD OF SUPPLY FROM
EXISTING STANDS IN THE INTERIOR REGION OF BRITISH COLUMBIA
ACCORDING TO THE 1945 ROYAL COMMISSION OF INQUIRY

<u>Species</u>	<u>Average Annual Cut. 1937 - 1944 Board Feet</u>	<u>Percent of Total Interior Cut</u>	<u>Mulholland's Estimate of Standing Merchantable Accessible Timber Millions of board feet</u>	<u>Number of Years' Supply</u>
Douglas fir	99,572,853	26.2	7,261	72
Western hemlock	10,133,528	2.7	2,288	225
Western red cedar	48,673,980	12.8	4,106	84
Spruce	112,072,988	29.4	11,426	101
Alpine fir (balsam)	1,907,370	0.5	2,260	1,184
Lodgepole pine	15,650,038	4.1	2,633	167
Western larch	40,251,986	10.6	1,864	46
White pine	12,126,054	3.2	580	47
Ponderosa pine	40,023,346	10.5	1,212	30
Totals:	380,412,143	100.0	33,630	89

Sloan felt that the relationship of depletion to increment gave assurance that, except for Western larch, white pine and ponderosa pine, the Interior timber supply position was much better than was that of the Coast resource.

The quantities of wood wasted in the course of a logging operation has been mentioned several times. Indeed, it has been a vital problem throughout the forest history of the Province since the exploitation of the forests began, particularly in the Coastal Region. The Commissioner came to the conclusion, on the basis of a study conducted by J.H. Jenkins and F.W. Guernsey in 1932, that 19.5% of the original stand of merchantable timber was left lying on the ground after the logging operation. The study had covered eight, representative logging operations. More information came from an experimental project known as the "Ladysmith Experiment", conducted near Ladysmith on Vancouver Island by the Comox Logging and Railway Company, the Powell River Company Limited and the British Columbia Forest Service to ascertain whether sound wood left in the forest after logging could be salvaged economically and used for the manufacture of pulp. The recovery of sawlogs from the original logging had been approximately 6,405 cubic feet per acre and the recovery in the subsequent salvage logging operation was 1,550 cubic feet per acre. Thus, the salvage was 19% of the total wood which had been utilised and 24% of the sawlog volume. There was a parallel between these figures and those of Jenkins and Guernsey and the Commissioner wrote:

"I think I may safely assume that, generally speaking, about 20% of the total wood volume of our logged areas is left in the woods as waste. Our total annual log production of 3 billion (3,000 million) feet is based on logs scaled. That means that 750 million feet of material are left in the woods each year. On the conservative basis of 300 feet per acre per year increment we are thus wasting each year a volume of wood equal to the yearly growth on 2,500,000 acres of productive forest lands. This practice is an uneconomical misuse of the forest resource and, in addition, this mass of material creates a dangerous fire hazard."

Sloan had some suggestions for reducing waste. The creation of a new log grade for salvage material on which royalty should not be reserved and for the use of which the overall stumpage would be adjusted might make it possible to conduct a salvage operation prior to or after the main logging operation. To some extent, improvements of plant processing techniques would also improve the utilisation of waste, although the operation would have to be profitable and the products able to compete in an exacting and competitive market. A reduction of waste could also be achieved by the forest administration and industry by cutting tree stumps lower, reducing the breaking and shattering of tree trunks by more careful felling techniques and cutting the tops of understorey trees at a diameter of six inches. Sloan did not apply this latter suggestion to "old-growth" trees since he felt that it was impractical "because of knots and so on." Sloan also emphasised, as the reader will be aware from previous remarks, that logging by the high-lead system resulted in the destruction of thrifty, young forest. He felt that much of the destruction was probably unavoidable and, even if scattered young trees were left standing after logging, they would probably be blown down by high winds or burned in slash fires. The Commissioner insisted, however, that the reprehensible destruction of dense, thrifty, second-growth stands by logging operations carried on for the sole purpose of recovering a few, scattered old-growth trees must stop, in the public interest.

Logging was not, of course, the only operation involving waste of wood. There was additional waste at the sawmill, even though there was a dwindling use

of sawmill burners, especially by mills which had facilities for good utilisation and mills near populated centres offering a market for sawdust, shavings and wood waste as fuel for both domestic and commercial use. From the evidence presented to him, he concluded that about 70% of the volume of logs that arrived at a sawmill was converted into lumber. This loss of volume, of about 30%, added to the 20% loss in logging, meant that about 50% of the volume of the tree finally emerged from the mill as lumber. The Commissioner was satisfied that most sawmillers were aware of the compelling need to improve the situation and that they were anxious to reduce wastage in manufacture.

From statistical material available to him, the Commissioner selected the following data for purposes of comparison of demand for lumber with the level of sawmilling activity.

COMPARISON OF SAWMILLING ACTIVITY AND THE SELLING PRICE
OF LUMBER IN SELECTED YEARS IN BRITISH COLUMBIA

<u>Year</u>	<u>Number of Active Sawmills</u>	<u>Daily Capacity Thousands of Board Feet</u>	<u>Total Lumber Production Millions of Board Feet</u>	<u>Average Selling Price of Lumber. Dollars</u>
1929	354	11,896	2,460	21.44
1932	293	7,641	934	12.01
1941	557	13,820	2,407	25.71

He concluded from this that good demand for lumber with accompanying higher price levels had been the prime factor governing the fluctuation in the number of operating sawmills. However, probably the underlying reason lay in the fact that higher lumber prices stimulated log production and increased the area of forest which was economically accessible during periods of short supply. In the Coastal Region, these logs flowed to the open log market and, in turn, to the mills which were buying their logs, rather than producing their own. However, Sloan was very doubtful that this trend would continue because areas supplying the open log market were "drying up" or were no longer available for that purpose. Thus, high lumber prices could not, in the future, attract logs to the open market from depleted areas or from areas controlled by sawmills requiring the production from their own forest areas for their own survival. The logging industry, being no longer able to expand in a westerly direction in the Coastal Region was creeping northward along the Coast, with logging activity centered about 150 miles north of Vancouver. This meant that the best stands in the valleys and on the lower slopes of the mountains were disappearing. Operators were cutting the forest from the higher altitudes where logs of lower quality and grade were being produced.

The high prices for lumber which had developed during the Second World War had led to an increase in the number of portable sawmills, especially those producing railway ties. Many of these mills had carriages of less than 16 feet in length and they did not cut the side lumber that could normally be recovered from the slabs cut off the sides of the log. Sloan recommended that portable railway tie mills should be required to conform to a standard to be set by the Forest Department before being permitted to operate. This recommendation was not acted upon by the Provincial Government, possibly because of a very marked decline in the number of portable mills which occurred during the 1950's. The decline was caused by economic pressures and rendered the suggested control of standards

unnecessary. It also appears to be likely that the Government was opposed to the licencing of portable mills as a matter of policy.

The 1945 Report observed that six pulp and paper companies were established in British Columbia with a combined capital investment in plant and equipment (in 1942) in excess of 58 million dollars and with roughly 20 million dollars worth of value in their timber holdings. Because of the need for an abundance of water for processing the pulp and for the production of power to run the mills, the larger plants were situated in areas remote from urban centres. The towns around these plants were mostly "company towns" and they had a combined population of more than 10,000 people. In 1942, there were 3,574 pulp mill employees with a capital investment of \$16,295.00 per employee, as compared with \$2,895.00 per employee for the sawmilling industry. The wages and salaries paid in 1942 amounted to \$8,824,524.00.

An important feature of the pulp industry at this period was the comparative stability of employment which it provided. It was much less susceptible to seasonal fluctuations of numbers of employees than were the sawmills and shingle mills, a condition which aided in the formation of permanent, prosperous communities. It was also important that, for each 1,000 board feet of logs which were consumed, the pulp and paper industries provided employment equivalent to 3.3 man days, as compared to 1.67 man days for the other forest industries. The same volume of logs, when processed into pulp, emerged with a value of \$58.50 added to their original value as logs, the composite figure for all other industries being about \$15.00 in added value. Clearly, the pulp industry, in economic terms, was a relatively desirable form of wood utilisation industry.

In 1943, the British Columbia export trade in pulp and paper products totalled \$23,623,498.00, whilst/^{its} Canadian sales amounted to \$6,734,507.00. The export market was, of course, valuable in assisting in the creation of foreign exchange credits. The value of the industry was also evident from the fact that, in processing 11% of the total log cut it produced about 25% of the gross value of the provincial forest industries' production for 1943. Thus, Sloan placed emphasis upon the importance of the pulp industry to the Province and, at the same time, he deprecated the effects of United States tariff restrictions upon the importation into that country of the more highly manufactured forms of pulp. He saw the basic requirement of the industry as the continuity of raw material supply on a sustained yield basis. This could be achieved by a programme of planned forest management which recognised the needs of the pulp industry.

The Commissioner now turned his attention to the questions of forest land ownership and forms of tenure in British Columbia. The position in 1937, which Sloan considered to be relatively the same as in 1945 was:

PERCENTAGES OF UNALIENATED CROWN LAND, TEMPORARILY ALIENATED
CROWN LAND AND PRIVATELY OWNED LAND IN BRITISH COLUMBIA

	<u>Crown Unalienated</u>	<u>Temporary Alienations</u>	<u>Other Owners</u>	<u>Total</u>
Percent of total provincial acreage of mature stands	75	15	10	100
Percent of mature timber stands of the Coast and Interior (acres)				
Coast	53	32	15	100
Interior	87	6	7	100
Percent of total Provincial volume of merchantable timber	57	32	11	100
Percent of volume of merchantable tim- ber of the Coast and Interior				
Coast	39	47	14	100
Interior	86	9	5	100

The figures showed the much higher amounts of temporary alienations and private ownership in the Coastal Region, as compared with the Interior. They also indicated that, on the Coast, temporary alienations carried higher volumes of merchantable timber per acre than did the unalienated Crown lands. Nevertheless, the great bulk of forest land, including that which was temporarily alienated was in Crown ownership.

Sloan analysed the temporary alienations, which covered 3,888,678 acres, more closely.

TENURES AND ACREAGES GRANTED AS AT FEBRUARY 1944

<u>Tenures</u>	<u>No. of contracts</u>	<u>Acreage</u>	<u>Percent</u>
Timber Licences	2,850	1,795,817	46.2
Timber Sales	3,721	978,862	25.2
Timber Berths	205	424,671	10.9
Pulp Leases	33	335,611	8.6
Timber Leases	152	197,939	5.1
Pulp Licences	<u>252</u>	<u>155,778</u>	<u>4.0</u>
Totals:		<u>3,888,678</u>	<u>100.0</u>

An ownership analysis of these various tenures disclosed that, in 1944, cutting rights were held by 2,877 persons or corporations. Of these owners, 58 or 2% held 51.7% of the total area of the tenures and the other 2,819 holders, or 98%, held cutting rights over 48.3% of the area.* In the Coastal Region itself, 24 out of 677 logging operators produced more than 60% of the volume of the annual cut.

From these startling facts, the Commissioner concluded that the great part of the alienated timber resources was controlled by a very few men. It followed that the success of a forest policy designed to place the forests under a system of planned management would depend, to a degree, upon the extent to which these men cooperated with the Crown. Because the Crown could impose conditions upon those holding cutting rights on Crown land and because it still retained title to 39% of the merchantable Coast stands on which terms could also be imposed at the time they were due to be logged, Sloan did not foresee any real difficulty in securing the cooperation of licencees, lessees or purchasers

* These figures excluded the unalienated timber lands held by the Esquimalt and Nanaimo Railway Company.

of Crown timber. In spite of the good chance that this kind of gentle persuasion or coercion would be effective, it was noted that the owners of Crown-granted lands, who also had the ownership of the timber on the lands, considered themselves to be in a different position, relative to Crown regulations, from those owners who only had the right to cut timber on land remaining with the Crown. From 1934 to 1943, 40% of the total volume of logs which was cut in the Province had come from this cut which, in direct forest revenue, produced a sum equal to about 4% of the total forest revenue.

Earlier in this history, we have seen that the Forest Branch had been engaged in the creation of forest reserves. By the time of the Royal Commission of 1945, there were 18,877,740 acres of these reserves in existence. The Minister of Lands, in 1924, when he was introducing legislation to provide a fund for the development and management of the reserved areas had said

"the primary object of their creation is to ensure a continuous supply of timber."

Whilst the forest administration had sold timber through the media of timber sales or other forms of tenure, into which it could write any terms that it chose to impose, the evidence before the Commission showed that no proper programme of forest management had been introduced into the reserves. Even though management plans had been prepared, the opportunity to implement them had been missed. For example, loggers had not been required to leave seed trees to provide for natural regeneration and this omission, along with destruction by fire, had resulted in an area of 678,600 acres within the reserves not being restocked in a satisfactory way. No real attempt had been made to restrict the cut on the areas which had been alienated to correspond to the sustained yield capacity of the area, although increasing attention was being given to silvicultural practices in the Interior forest reserve areas. These included experiments with the marking of selected trees for cutting.

In summary, Sloan found it to be manifest that very little, if anything, had been done between 1925 and 1945 to bring to fruition the ideal objective contained in the speech of the Minister of Lands in 1925. The fault stemmed from lack of sufficient funds in all aspects of forest administration and, particularly, in a lack of adequate staff to conduct the necessary research work.

The needs of the situation, Sloan declared, emphasised the one essential fact basic to all future forest planning:

"Forest revenue accruing to the Crown must be recognised as capital to be reinvested in our forests to ensure their continued productivity. To persist in the pursuit of any other policy is to invite a deserved disaster."

The same point had been made by the Commission of Inquiry of 1910. In neither case was the recommendation adopted by the Government and funds derived from forest liquidation continued to be diverted, in major part, to other purposes.

Sloan reviewed the history of various forms of forest tenure but found it to be impossible to give the reasons for the various statutory changes which had affected them, from time to time, over the years. He discovered, however, what he felt to be a fairly consistent philosophy underlying the evolution of tenures. Firstly, all productive forest land was to remain in Crown ownership. Secondly, the Crown was to receive a fair share of the wealth produced by the

exploitation of this natural resource. Thirdly, financial speculation in timber by private interests was to be eliminated and, fourthly, the export of round logs was to be reduced to a minimum.

To a degree, Sloan felt that these objectives had been attained. But past forest policies had not envisaged the practice of forestry by private interests as an objective. The vice-president of one of the largest logging and sawmilling companies on the Coast had said:

"Up to this time, loggers and lumbermen have been looked upon and treated as transients without any permanent interests in their forests, their own business, or the communities they built and support. This point of view has been reflected in the forest legislation of our Province. There is no provision in our forest laws to allow an operator to plan a permanent operation. Lands chiefly valuable for forests have been reserved from outright sale and such lands have been alienated only under temporary lease or licence until the merchantable timber is removed, at which time the land reverts to the Crown. The logger has been treated as a miner, with no choice but to mine his forest . . .

"We believe that sound forest management integrated with the management of logging can be compatible with good business management. We recommend that it be made possible for the forest owner or operator to bear the responsibility of managing his forest on a permanent basis . . .

"Our present form of tenure, which is largely timber licence, prohibits us from having any interest in our land after it is logged."

Sloan felt that this viewpoint was undeniably correct and that, if a measure of private forestry was to develop whereby large corporations would plant, grow, protect and conserve their own productive land areas, a form of tenure would have to be devised to meet the situation.

The increasing pre-occupation of the Provincial Government to reduce the export of unmanufactured logs to a minimum has been described. Sloan found that the Export Advisory Committee* had effectively controlled log export from lands under Provincial jurisdiction but that exports from Crown-granted lands remained high, being 91% (84,577,000 board feet) of the Provincial log exports in 1939. This was a matter of concern when it was known that the Coast open log market would, in future, be short of log supplies. The loss of manufacturing activity within the Province also affected potential employment levels, particularly since there had been an increased export of pulp species (hemlock and balsam) since 1933. In 1942, the export of logs had been restricted by the Timber Controller, acting under the authority of the Dominion Government, as a wartime measure but exports in 1941 had been heavy. The export of hemlock and balsam in the latter year had been enough to supply two "good-sized" pulp mills and was in excess of 50% of the highest pulpwood consumption in any year in the Province.

The exports from certain tenures was basically a consequence of the division of legislative powers between the Dominion and Provincial Governments under the terms of the "British North America Act." Sloan wrote:

*The Committee consisted of the Minister of Lands and Forest (Chairman), three logging operators' representatives and three log buyers' representatives. They advised the Lieutenant-Governor in Council on applications for log export from under Provincial jurisdiction.

"Matters of international trade and commerce, such as exports, are assigned exclusively to the Dominion Parliament, and this Province has no jurisdiction to enact any statutory provision forbidding the export of goods from this Province. This Province can, however, impose terms and conditions upon purchasers of Crown timber. In some instances it has, in its contract, imposed terms preventing the export of logs cut thereunder unless by consent of the Lieutenant-Governor in Council. In others, for example, Crown Grants prior to April, 1887, the Crown did not insert therein any provisions restrictive of export. In consequence, the Government of this Province, not having any contractual restrictive control over the log production from such areas, and not having the legislative power to prohibit or restrict export by statute, can not interfere with the export of logs from these areas within this classification. That control, then, lies solely within the competence of the Federal Government."

Sloan could see no good reason, if the public interest demanded it, why the extension of the principle of control, as exercised during wartime, should not continue to be exercised by the Dominion in the post-war period of transition to a planned system of forest management. The Federal Government did set up an Export Advisory Committee early in 1970 to deal with the so-called "exportable timber." The representation on the Committee and its functioning parallel those of the Provincial Committee.

We have seen that for thirty-five years the recommendations of the Royal Commission of 1910, to the effect that receipts from the sale of timber should be treated as capital (and not as current revenue) and expended for protection, conservation and reforestation of the forest resource, had been consistently ignored and disregarded by successive governments. Sloan regretted this fact. Millions upon millions of dollars had been drained from the forests into the general revenue to assist in paying for Governmental activities and services wholly unconnected with the protection and development of the primary source of the Provincial wealth. Sloan pointed out that the other Canadian provinces, not so dependent on forest wealth for continued prosperity, were spending relatively larger proportions of forestry income on forestry administration than was British Columbia. The dollar values of direct revenues and expenditures of these Provinces was:

FOREST REVENUES AND EXPENDITURES BY PROVINCES (1933 - 1943)

<u>Province</u>	<u>Revenue</u>	<u>Expenditure</u>	<u>Percent</u>
Nova Scotia	1,682,410	1,036,503	62.5
New Brunswick	8,256,853	2,273,109	28.5
Quebec	42,566,403	19,559,431	40.5
Ontario	29,297,107	20,895,020	79.5
Manitoba	2,230,926	1,767,694	80.0
Saskatchewan	3,013,852	2,269,093	93.0
Alberta	4,029,954	2,767,442	72.0
British Columbia	30,482,398	8,807,596	28.8
All:	121,968,728	59,488,874	47.8*

* For unknown reasons, the Sloan Report (p.117), in dealing with percentages of expenditure to revenue omitted the percentage figure for Quebec but gave percentages for the other seven provinces listed above. The average percentage of expenditure to revenue is given in the Report as 63.5 which is the arithmetic average of the percentages for the seven Provinces. This figure is misleading and the author has changed the figure to the percentage of total dollar expenditure to total dollar revenue for the eight provinces.

Based on his analysis, Sloan concluded:

"The public estate has suffered impairment during the last thirty-five years due to lack of provided funds for essential forest management. The public interest requires that this state of affairs should not continue into the future."

The forest administration of the Province was and is the responsibility of the Department of Lands and Forests, with the Forest Service working under the direction of the Deputy Minister of Forests. There were two broad administrative classifications within the Forest Service. These were Head Office and Field Administration, the former being divided into Operations, Management, Economics, Grazing and Records Divisions. For field administrative purposes, the Province was divided into five Forest Districts with headquarters at Vancouver, Prince Rupert, Prince George, Kamloops and Nelson. In 1965, another Forest District had been announced with headquarters at Williams Lake, but by 1st January, 1971, no action had been taken to form it. The Forest Districts were divided into Ranger Districts, each in charge of a Ranger.

Sloan stated that the Forest Service needed more money and that the Service staff of thirty-five foresters could not cope with the management of the forest areas on a sustained yield basis. The number of Rangers was also too low. In evidence before Sloan, the Deputy Minister of Forests had estimated that the permanent staff would need to be increased from 243 to 689 in order to carry out a programme of planned forest management effectively. Another facet of the problem was that salaries were too low to hold foresters* in the Service and Ranger schools were needed. Sloan believed that consideration ought to be given to increasing the number of Forest Districts with a consequent reduction in size of each administrative unit. At the time, the average productive acreage of each forest district, administered by a forester, was 12 million acres, a much larger area than was to be found in Europe and Scandinavia. However, although Sloan saw the need for a stronger administration, he was not suggesting that British Columbia forestry should be organised as intensively as in Europe.

In summary, Sloan's findings as to the state of British Columbia forestry revealed an unsatisfactory situation. The Province, because of its topography, soil conditions and climate was, he held, a geographic unit in which the growing of perpetual forest crops was a prime essential if the fertility of the soil was to be used for the purpose to which it was most suited. The forests and the dependent industries were of incalculable consequence to the economic and social development of the Province in relation to both the direct and indirect benefits flowing from them. The Coastal forests were in an unbalanced state of growth in that about 75% of the productive forest land was covered by mature and overmature forests adding little,

*The title of "Forester" as employed in British Columbia refers to a Registered Professional Forester (R.P.F.). These are persons who have graduated from a recognised university or who hold equivalent qualifications who have been registered by the Association of British Columbia Professional Foresters. The Association was not formed until 1947. In 1945, Chief Justice Sloan referred to "technical foresters" or "technically trained foresters." The use of the word "technical" with reference to foresters leads to confusion since, at the present day, persons successfully completing a two year forestry course at one of two Institutes of Technology in the Province are termed "technical graduates" or forest technicians." To avoid confusion, the author has amended Sloan's use of titles to correspond to modern usage.

if any, annual increment. The forests and the forest reserves were not being managed to ensure their continued productivity because of a lack of adequate funds and personnel. The extent of the denuded land area, an area which was increasing each year, was a matter of grave concern. The area of young growth forests was inadequate for future forest needs and it was not properly protected from destruction by fire.

In terms of volumes, the Coastal stands were estimated to contain 180,000 million board feet of timber which would be accessible for logging and this volume was being depleted by logging, fire and insect losses at an average rate of 2,792 million board feet per annum. The estimated 100,000 million board feet of accessible timber in the Interior forests was being depleted at an average rate of 1,084 million board feet annually. The Coastal depletion far exceeded the growth increment because of the large areas of forest which were not adding increment but, in the Interior, increment was exceeding depletion because of the large area of immature forests which were adding increment. As a result of these situations, Sloan concluded that a sustained yield programme was not possible on the Coast until the mature forests were replaced by young growing stock.* It was estimated that, if the Coastal forests were grown on a sixty year rotation that the annual cut which would be allowed must not exceed 35,000 million board feet during the ensuing ten years. The Douglas fir stands would be cut out in about thirty years, resulting in a higher production of hemlock and cedar affecting sawmill design and operation and requiring increased trade extension activities. Hemlock logs should be made subject to grading, achieving, at the same time, increases in the rates of royalty and hemlock for export markets would require custom dry kilns.

The reduction of logging and sawmill waste and its utilisation were economic imperatives. Sloan found, however, that standard sawmills and pulp and paper mills were, generally, of high standard and were adapting their processes to meet the exigencies of the future. Portable mills, on the other hand, should be licensed but, as we have seen, the Government did not implement this recommendation. Finally, Sloan noted that forest tenures and the carrying charges which the holder was required to pay for them required revision insofar as the existing system encouraged the liquidation of the forest and discouraged the practice of private forestry.

The Commissioner stated the objective of future forest management, a summarized version of which is:

To change from the existing system of unmanaged and unregulated liquidation of the forested areas to a planned and regulated policy of forest management, leading eventually to a programme ensuring a sustained yield from all of the productive land area. When accomplished all benefits, direct and indirect, of a sustained yield management policy would be realised provided that the multiple purpose of the forests was recognised as an aim as important as balancing cut and increment.

Sloan defined "sustained yield" as "a perpetual yield of wood of commercially usable quality from regional areas in yearly or periodic quantities of equal or increasing volume." He did not feel that the practice of silviculture was a necessary

* This was not actually so. Sloan appears to have believed that sustained yield forestry could only take effect when the forest was in a condition in which equalised annual or periodic cuts could be removed. This is a rather common misconception of sustained yield which is actually in effect when the objective of management is the achievement of equalised annual or periodic cuts. Sloan may have had in mind the rapid removal of the overmature forests to improve the increment. Such a course is compatible with sustained yield forestry provided that the objective of achieving a normal forest and equalised annual or periodic cut by a selected target date is followed.

or essential ingredient of the definition although recognising that silviculture can, and will, increase the yield from a given area. In his reference to "multiple purpose" he included watershed protection, stream flow, and run-off control, prevention of soil erosion, provision of recreational and scenic areas and wildlife conservation.

Chief Justice Sloan concluded his report with a series of recommendations on how the objective of sustained yield should be achieved. In the first place, the continuation of the supply of inadequate funds for fire protection would mean that any plans for managing the forests would be foredoomed to failure and the Commissioner assumed, therefore, that the Government would provide ample funds to the Forest Service for fire protection throughout the province. Four possible sources of financing for fire protection were enumerated: from the forest revenue; from the general provincial revenue by way of increased grants; from the Dominion Government in the form of grants and lastly, if necessary, by increasing the fire protection tax on industry. There was a need for a widely distributed system of stations reporting essential weather data daily or twice daily during periods of extreme danger, to a central office. He suggested a series of responses by the central office according to the degree of hazard which was reported and these responses would lead in the most hazardous situation to total closure of the forests. Whether or not a partial or complete closure order was issued, any logging operation at which the relative humidity dropped to a reading of thirty should cease immediately and take the men out of the woods. It should also be compulsory, Sloan felt, for an operator to maintain, in the area where the logging was being conducted, one or more hygrometers with automatic devices recording the relative humidity readings. In conjunction with these steps, Sloan added that forest roads on which the Forest Service had expended money should be private and not public highways, so as to permit the Service to debar public use when it was desirable to discourage travel in the woods. Strategically located airstrips and additional access roads were also recommended.

As we have seen, it was estimated that one million acres on the Coast and nineteen million acres in the Interior were not restocking satisfactorily and Sloan recommended that, on the coast, 400,000 acres should be replanted within the ensuing twenty-five years. He also recommended that the logger who did not wish to retain his lands for the practice of sustained yield production should be allowed to elect to pursue one of two courses. Either he should submit his cutting plan to the Forest Service for approval, or else deposit whatever sum might be deemed sufficient to plant the acreage logged if the logging methods he chose to pursue did not result in regeneration. If the cutting plan was approved by the Forest Service the logger's obligation was thereby fulfilled. When he chose to cut on an unapproved plan his deposit would be retained for at least eight years and if, at the end of that period, new growth had appeared to a degree satisfactory to the Forest Service, his deposit would be refunded. If regeneration was not satisfactorily established then the Forest Service would plant the blanks with the fund deposited. Any surplus monies ought to remain the property of the Forest Service to be expended on any areas over which the cost of planting had exceeded the sum of the deposit. In that sense, the deposit was to be regarded in the nature of a penalty and forfeited to

the Crown. In principle, Sloan felt that these provisions should apply to all forms of tenure.

Because the existing system of temporary alienations offered operators no encouragement to treat their lands as permanent tree farms/producing continuous crops, industry was forced to "cut out and get out." To correct the situation the Commissioner recommended as a first step, the creation of a form of tenure permitting the operator to retain possession in perpetuity of the land currently held under temporary forms of alienation, upon condition that he maintain the lands continuously productive and regulated the cut on a sustained yield basis. However, the existing holdings of timber of operators was not large enough to permit them, individually, to maintain an economic production of lumber, if they were compelled to cut on a sustained yield basis, at least until the end of the next sixty-year rotation. To overcome this problem, the Commissioner saw as the only practical solution, the allocation of Crown timber to supplement areas already allocated so that the combined area of private and Crown acreage should, on the second rotation, produce enough timber on a sustained yield basis to maintain production of the manufacturing unit on a profitable basis in perpetuity. This form of tenure was to be called "the private working circle." In point of fact, as will be described later, this recommendation led to the formation of "forest management licences," a name later changed to "tree farm licences."

The obstacles to the practice of private forestry were, in the main, the uncertainties of future markets, the risk of fire and existence of burdensome taxation. In the field of taxation, the Commissioner felt that owners of revertible tenures should be permitted to retain the lands, when classified as best suited for the purpose of tree farming, at a nominal annual licence of one cent per acre, plus the fire protection tax and subject to a yield tax of $12\frac{1}{2}\%$ of prevailing stumpage values payable when the final crop, or any interim cutting thereof, was harvested. The Dominion Government should also be prepared to facilitate the development by allowing the operator to charge current operations with all reasonable costs incurred during each year in the reforestation of logged-off lands under his control or management, thereby gaining a Dominion tax advantage.

In addition to the "private working circles", Sloan recommended the formation of "public working circles." These could be areas to supply the open log market on the coast or small manufacturing plants with timber on a sustained yield basis; a merger of private holdings whose owners had no plant but desired to practice sustained yield forestry; areas managed on a sustained yield basis by municipal authorities or areas designated for watershed protection or other multiple forest use. The "private working circle" was thus to be created as an appurtenancy to a manufacturing plant whereas the "public working circle" was not to be appurtenant to any particular plant.

The report dealt next with the special problems of the Interior where values other than timber production could require special study and the application of logging methods best suited to the maintenance of the working circle for its paramount economic use and value. Then too, limitations would be imposed on size and other aspects of working circles by the necessity to transport logs by road to the conversion plant and the absence of any open log market. In spite of the

fact that overall increment in the Interior exceeded the depletion, nevertheless areas near settled communities were being overcut, for example, the area contributory to Cranbrook in the West Kootenay. To solve this problem and prevent the construction of mills with a higher combined production capacity than the contributory forest area could supply, the Commissioner (on the suggestion of the Interior Lumber Manufacturers Association) recommended that all existing operations should be licenced by the Government and no new operations should be licenced until the availability of timber in the area affected was sufficient to guarantee the maintenance of that operation in perpetuity. Sloan said:

"Ghost towns in the Interior bear distressing and silent witness to the past policy of too many mills cutting out areas that would have supported in perpetuity, on a system of planned management, the potential capacity of probably half of them."

In order to broaden the areas contributory to mills supporting permanent Interior settlements, the Crown should build roads to currently inaccessible timber stands at the Crown's expense.

Recognising that the organisation of Coast and Interior working circles would take time, the Commissioner estimated that, by 1955 (at which time he suggested another Royal Commission to survey the situation), the Province should be well under way toward a planned system of forest management. One of the proposals made to him, that the Coastal Region should be treated as a single working circle, on the grounds that local overcutting could then occur, was rejected because it would result in social and economic dislocation.

Sloan was of the opinion that a semi-autonomous Forestry Commission should be created to administer the forests and the practice of forestry in British Columbia. He was strongly supported in his view by the forest industry. The major reason which he advanced was the long-range planning required to convert from forest liquidation and depletion to sustained yield management.

"This kind of planning has as its concomitant, long-range financing. The present system of annual appropriations from the general revenue, for which the Forest Service must compete with other spending departments of Government is subject to vagaries in general business activity, the exigencies of short-term financing and the uncertainty of money supply due to temporal variations in Governmental receipts available for departmental allocations. These factors coupled with recurrent periods of transitory demands for increased expenditures in social and economic fields unrelated to forestry have in the past and will in the future, under the present system, retard if not frustrate any long-term policy of forest management."

In connection with Sloan's proposals it is interesting that the constitutional limitations placed on British Columbia required that all public monies from revenue must be paid into the Consolidated Revenue Fund to be appropriated for the public service of the Province as the Legislature might direct. Sloan was proposing to circumvent this restriction by placing the Forest Service under a commission empowered to collect all direct forest revenues and to expend all or part of it as necessary.

It was proposed that the commission should have two main purposes, Firstly, it would formulate and administer a long-term system of planned forest management and forest industry regulation. Secondly, it would supply the machinery for long-range financing divorced from the system of annual departmental appropriation from general revenue. The commission would have jurisdiction over all aspects of forestry

within the Province, all extraction operations and conversion industries. These powers would extend to multiple forest uses that were an essential part of forest management. It was suggested that the commission should also include in its functions research designed to establish secondary industry manufacturing wood products. It was intended that the commission should receive all forms of direct forest revenue including grants from the Crown, federal or provincial, to the fire protection fund. It would have jurisdiction to assess the forest industries and collect whatever taxation levies might be found necessary to meet the financial requirements of the commission should the direct forest revenue prove inadequate and general provincial revenue be not available. The commission itself would be composed of not more than five and not less than three members, the Deputy Minister of Forests to be a member but not the chairman. No members would be appointed as representatives of any branch of the forest industries. The commission should not be composed "solely of experts in the multifarious sciences relating to forestry or forest economics." The appointments of the commissioners would be for at least ten years. Industry would advise the commission through a council of representatives from the extraction and manufacturing organisations of the industry. The commission would take over all the powers then exercised by the Forest Service, with the Forest Service becoming responsible to the commission. Finally, the commission could receive appeals from decisions of the Forest Service and insofar as the determination of questions of fact or mixed questions of fact and law were concerned, the findings of the commission would be absolute and final. On questions of law alone, appeals from the commission to the courts would be permitted upon a case stated by the commission. It would be obligatory for the commission to state a case for the opinion of the court upon the request of any person whose interests were adversely affected by any decision in point of law by the commission. Whilst the recommendations for forming a Forestry Commission in the Province and for Forestry Fund financing may have appeared to be revolutionary, in other countries of the Commonwealth and the world these devices are well established and highly regarded as solutions to the special problems of forest administration and financing.

Sloan recognised the importance of proper forestry education. As a result, he recommended that the Department of Forestry of the University of British Columbia should be raised to the status of a faculty, the teaching staff increased, and a properly equipped building be erected. The University curricula should provide more intensive training in forestry subjects during the first four years instead of postponing the study of forest sciences until the fifth year, as was the practice in 1945. Buildings, facilities, and money should be provided at the Pitt Lake Forest for increased practical field instruction and more intensive silvicultural practice and research. In point of fact, the university forest for this purpose was later established at Haney. Also, consideration should be given to suggestions of the student body at the University that students must work for at least two summers in the forests or forest industries before being granted a degree of Bachelor of Science of Forestry (B.S.F.) and that only one undergraduate degree (B.S.F.) should be granted with opportunities for post-graduate work leading to degrees of Master of the Science of Forestry (M.S.F.) and Doctor of Philosophy (Ph.D.)

Sloan wanted an emphasis to be placed by Governments on research into all forestry matters and, in the fields of forest pathology and entomology, he wanted to see a closer cooperation between the Forest Service and the Dominion Government Officials established.

The report gave general consideration to the question of watershed protection, mentioning the irrigation requirements of the Okanagan Valley, the necessity

of maintaining even stream flows in streams in which salmon spawn, the water requirements of stock-raisers in the Interior, and the use of water for domestic and power purposes.

In the evidence presented to Sloan, complaints had been made, referring to the Interior of the Province, that the practice of selling Crown timber to the highest bidder meant that an operator who had built an expensive road system faced the possibility of another purchaser outbidding him for Crown timber, contiguous to his operation. The proposed new systems of tenure would solve this problem but, during the transition period until creation of the new tenures, Sloan had no hesitation in recommending that the operator who had pioneered and "opened it up should, where practicable, have reward for his effort in having allocated to him at a fair price Crown stumpage on those areas which are contiguous to or advantageously located near his operation." The same principle would apply to the Coast where circumstances warranted it.

The orchardists of the Interior, mainly those of the Okanagan Valley, had expressed concern that ponderosa pine was being overcut. As we have noted, previously, it actually was. Apple-growers were using about seven million boxes per year and ponderosa pine was a favourite material for these boxes, although its lumber brought a higher price in other markets. Sloan recommended replanting, allocation of the remaining and available stands to Interior manufacturers of box shooks and, possibly, price regulation and subsidy measures. Virtually nothing was done to implement this recommendation and wooden boxes were largely replaced by corrugated pulp containers.

The problems of grazing have been reviewed and Sloan recommended immediate regulatory controls to prevent over-grazing. He regretted that the Dominion range experiment sub-station at Tranquille near Kamloops had discontinued its activities in 1940, after five years of experimental work, and recommended that another station be established either by the Provincial Government alone, or in collaboration with the Dominion Department of Agriculture. The Dominion range experiment sub-station was later re-opened.

In the Interior Wet Belt there were, and are, considerable areas of very decadent stands of western red cedar and western hemlock, chiefly in the Nelson, Revelstoke, and Big Bend areas. He recommended that these stands should be sold at a nominal stumpage without reservation of royalty or, perhaps in areas in which western white or ponderosa pine would constitute the greater part of the next crop, to subsidize operations to clearcut the decadent stands.

A suggestion had been made to form a separate forest administration for the Interior but Sloan rejected this idea and recommended instead the creation of an Interior advisory council. Representatives of logging lumber interests, water-users such as stockmen, farmers, and orchardists, and perhaps trappers would be included. This body would formulate recommendations in a spirit of mutual cooperation and present them to the proposed forestry commission.

Dr. C.D. Orchard, Chief Forester and Deputy Minister of Forests, gave the opinion that the Forest Act should be broadened to permit the use of the cubic foot scale as well as the board foot scale of measurement and the Commissioner agreed with this suggestion. However, he did not agree that it should be made mandatory in measuring pulpwood volumes.

The question of the administration of Provincial parks had been raised. The Commissioner recommended that parks created under the Land Act should be administered by the Forest Service and he opposed the creation of a Parks Board, since he felt that Forest Service administration would permit a close integration between all forest uses in the park areas.

The question of a Severance Tax on Esquimalt and Nanaimo Railway lands was the subject of the recommendation by Sloan but this is described later when dealing with Federal-Provincial relations.

The report of the 1945 Royal Commission was a land mark in the history of British Columbia forestry, the policy governing it and its administration. It may be said that its major result was the adoption by the Province of a policy of practicing sustained yield forestry. A number of the other recommendations, for example, that of forming a forestry commission, were not adopted and still more implemented in a form different from that which the Commissioner had suggested. Nevertheless, it can be regarded as the start of an era in which definite attempts were made to introduce better organisation and regulation into provincial forestry. This era is, in fact, still continuing and many of the problems noted by Sloan in 1945 have still not been satisfactorily resolved. In the following chapters, the attempts to achieve good forestry in the Province are described.

CHAPTER NINE

The Period From 1946 - 1970 The Forest Act of 1945

With the end of the Second World War and the report of the 1945 Royal Commission on Forestry, the Province was to enter into the modern era of the development of sustained yield forestry. The activities of the Forest Service are governed by the Forest Act and it is useful, at this point, to review some of the provisions of the Forest Act of 1945.⁵² Then, as now,⁵³ the Act provided the Forest Service with jurisdiction and control over, and the administration of, all matters relating to or connected with forestry. These are general powers and the Forest Service was specifically given jurisdiction to control and regulate, receive and administer, or make and enforce (subject to the current Provincial Statutes), the following:

All the rights, properties, interests, claims, and demands of the Crown in right of the Province in Crown timber;

All revenues and monies of the Crown in right of the Province arising from forestry, Crown timber, and grazing;

Conservation of forests;

Reforestation;

Prevention of forest fires;

Sales and dispositions of Crown timber;

Cutting, classifying, measuring, manufacturing, branding, and exporting of trees, timber, and products of the forest; and

Statutes, rules, and regulations relating to the regulation of forestry, the protection of forests, and the grazing of Crown lands.

In the exercise of any of these powers or duties connected with matters under its jurisdiction, the Forest Service is empowered to enter into or upon any lands or premises, other than dwellings.

The 1945 Act provided for the prevention of trespass upon Crown timber lands and its provisions have remained virtually unchanged since. The cutting of timber without a licence is prohibited and a financial penalty is provided where unlawful cutting has occurred, although travellers and explorers are exempted where they are providing for their bona fide needs. Timber which has been unlawfully cut may, of course, be seized and where it is mixed with other timber, the whole of the mixed timber is held to be cut unlawfully. If the timber cannot be recovered, the person who cut and removed it must pay to the Crown a sum of money, in lieu of stumpage and royalty, of an amount that the Minister of Lands and Forests determines. To enforce this, the Crown may recover the sum by court action or through a lien upon a specified variety of property. The burden of proof in cases of trespass requires the defendant to prove his authority to cut or remove the timber and the person seizing the timber or prosecuting need only show that he is employed or cutting under the authority of the Forest Act.

An important part of the 1945 Act dealt with the disposition of timber by the Crown. The Minister was empowered, at the instance of an applicant, or of his own volition, to advertise for sale and sell by public competition a licence to cut and remove any Crown timber which was subject to disposition by the Crown. The

potential purchaser had to offer to pay to the Crown, in addition to all the royalties and taxes, the costs incurred by the Forest Service in cruising, surveying and advertising the proposed timber limit. The offer also included stumpage which could not be less than the upset price fixed by the Minister, and an annual rental based on the acreage of the licence. The cost of cruising could include, at the discretion of the Minister, a sum to cover the actual and necessary expenses incurred by the original applicants of the licence which would then be paid over to or allowed as a deduction to the original applicant, depending on whether or not he was successful in the public competition. In the case of sales of timber in which the stumpage due to the Crown was less than \$1,000.00, the Minister was authorized to remit the cruising, surveying and advertising costs, the annual rental and forest protection tax and he could make the sale at his discretion in any way he saw fit. In addition to all this, the Minister had discretionary powers to reject any or all of the offers made for the purchase of a licence. If no offers to purchase a licence were received, the Minister could sell upon the original terms and conditions without any further advertisement, except that the original applicant's preliminary cruising costs were not payable by the purchaser. Whilst the Minister thus has the power to put up timber for sale on his own volition, the approach has almost always been taken that the industry should apply for timber in locations of the industry's choice. There may be advice or direction from the Forest Service but, fundamentally, the choice has been and is that of industry. This system will eventually prove to be a major setback to rational forest management and increased control or outright allocation by the Forest Service is to be expected in the future.

Under Part V of the "Forest Act" where the timber sold was chiefly valuable for wood pulp, the licence was described as a "pulp licence." The potential purchaser had to have a wood pulp or paper mill of suitable capacity or could be required to bond \$50,000.00 and any other guarantee required by the Minister, with the Government, ^{to} ~~that~~ a guarantee that such a mill would be built within a specified period. The pulp licences issued, as we have noted previously, were appurtenant to a particular mill and could not exceed, at any one time, thirty years supply of pulp wood for that mill. If the mill did not operate or was not built to specification within the agreed time, the licence would become null and void unless the Minister consented to the closure of the mill or agreed to defer its construction completion date. The annual rental of a pulp licence was one-half of the rental payable on a timber licence, although when timber suitable for sawmilling was cut or removed from one, full rental was payable. Each 15,000 board feet of timber was taken as the equivalent of one acre when setting the rental. Royalty was also payable on saw timber. Pulp licences were not actually issued after 1907, except by conversion of Special Timber Licences.

In the case of a licence being issued to cut dead timber, stump wood, or wood suitable for turpentine and other distillates, the Minister could reduce rental to not less than half the amount payable on a timber licence. Also, where any lands were not timber lands (as defined in Section 45 of the Land Act) rental on these lands was one-half the amount payable on the timber licence.

The Minister could also dispose of timber under the Act of 1945, by Hand Loggers' Licences, a provision which was repealed in 1966. These licences were personal to an individual on the Provincial Voters List or to an Indian specified under the "Provincial Elections Act." The area proposed for the licence had to be inspected and approved by a Forest Service officer prior to granting the licence. The holder of the licence could not use machinery operated other than by muscular power and he was subject to slash disposal and fire prevention regulations. The annual fee for a Hand Logger's Licence was \$25.00.

Another method of timber disposal by the Crown applied to the case of a pre-emptor or purchaser of Crown land who wished to cut, remove, or dispose of the timber standing on the land. In these cases, the Minister was empowered to issue a permit, under any terms and conditions which he prescribed, allowing the operation to take place. The pre-emptor or purchaser was required to pay royalty on the timber cut.

In the case of free miners, actual settlers who were occupiers of agricultural lands, persons cutting cordwood for personal use as domestic fuel, actual settlers who for periods of six months had made use of lands purchased from the Crown and pre-emptors who were complying with the provisions of the "Land Act" and who were cutting cordwood, pulpwood, or fence posts for sale, the Minister could issue a free-use permit. A free-use permit was personal, could only be issued for a maximum area of 160 acres and a maximum period of one year and it was only issued to an applicant who did not have enough timber on the land which he owned or occupied for the purposes specified in the permit. Again, the holder of a permit was subject to slash disposal and fire prevention regulations.

Free-use permits could also be issued to a municipality or organisation charged with the care of unemployed and needy persons, provided that only these persons were employed on the cutting and that proceeds from the sale of produce were used only for unemployment relief.

The Minister could sell "resin-licences," by public auction, to permit the cutting of trees for resin, provided that the lands in question were not part of any application to purchase timber leases or timber licences. The annual rental could not be less than two cents per acre and the licensee could not limit or affect the disposition of lands or timber contained in the resin-licence. Subject to the payment of a royalty (three-quarters of one cent per gallon), the Minister could grant a timber lease or licence-holder a permit to tap trees on the lease or licence for resin. Similarly, a permit could be issued to a pre-emptor of land or to an applicant to purchase land. It appears that no resin licences or permits were actually issued and the provision was repealed in 1966.

An important provision of the 1945 Act was that Crown lands could be declared forest reserves by the Lieutenant-Governor in Council, by proclamation. We have seen that by 1945 a large area of these reserves had in fact been created. All land within a reserve was withdrawn from sale, settlement, or occupancy under the provisions of the "Land Act" or "Taxation Act." Any part of the forest reserve which was occupied, settled, or sold under the "Mineral Act," "Placer Mining Act"

and "Coal and Petroleum Act" was subject to any conditions imposed by the Lieutenant-Governor in Council. The reserves were placed under the control and management of the Minister for the "maintenance of the timber growing thereon, for the protection of the water supply and for the prevention of trespass thereon." If a land owner holding land within a reserve agreed, the Lieutenant-Governor in Council could exchange this land for Crown land (other than timber land) outside a reserve. Similarly, a timber leaseholder or timber limit-holder within a reserve could receive Crown timber on a corresponding area of Crown land outside the reserve, where he agreed to an exchange.

To meet the cost of development and protection of forest reserves, the planting of community forest areas and the maintenance of the growth of continuous crops of timber, there was established in the Provincial Treasury the "Forest Reserve Account." This account was to receive annually from the Consolidated Revenue Fund

an amount equal to 3% of the annual gross receipts from timber royalty or tax and stumpage. The Minister of Finance made payments from this account on vouchers certified by the Minister of Lands and Forests. Expenses which were incurred in experimental or demonstration cutting or removal of trees, timber, forest products, brush, or debris in forest reserves were payable out of the fund and monies received by the Crown from the sale of trees, timber, or forest products from the reserve were credited to the ~~Forest~~ Reserve Fund.

In the event of war, the Minister, with the approval of the Lieutenant-Governor in Council was empowered to suspend the Act and regulations relating to cruising, advertising, or the competitive sale of Crown timber or forest products where they were urgently needed for war purposes. Timber which was standing on coal leases, coal licences, or mineral claims, where Crown grants of surface rights had not been issued, could be sold without compensation to the licensee or lessee. Also, any condition or provision of the timber sale contract likely to retard production or create waste of needed war materials could be suspended or cancelled. The British Government or its agent, on payment of stumpage and royalty was authorised to export pit props or mining timber to Great Britain, the stumpage and royalty being refundable where they were used for war purposes.

The 1945 Act contained provisions for the renewal, for twenty-one year periods, of the timber leases granted prior to the 27th of February, 1912, and which were duly surrendered and renewed under the provisions of the "Land Act Amendment Act, 1901." As described elsewhere, there was no provision for the issue of more of these leases.

Within special timber licences, where a dispute arose between holders as to the areas to which they were entitled, priority of location was the determining factor. The licence-holder held rights of property to trees, timber, and lumber cut within the limits of the licence and he could seize pursuant to these rights any of these items in the possession of an unauthorized person and institute action to prosecute trespassers or other offenders to punishment and recover any damaged involved. Licence-holders who had observed the appropriate provincial statutes were entitled to have their licences made transferable and renewed from year to year so long as there was enough merchantable timber left to make the licence commercially valuable. In this connection, the Minister could require the holder to cruise the timber to evaluate the commercial value of the licence. The special timber licence was subject to tax and royalty and terms, conditions, regulations and restrictions imposed by a statute or an order in council. In addition, an annual renewal fee of \$140.00 west of the Cascade Mountains or \$100.00 in all other cases was charged. There were certain exceptions to this particular fee. If the Minister considered that the whole or any part of the land within the special timber licence was fit for and required for settlement, he could require the licence-holder to remove the timber within a specified period of time and open the land for settlement or sale. The Minister could also require proper definition of timber lease hold, or limit the boundaries on the ground, or ^{Order} a re-survey at the licence-holder's expense. If the licence-holder did not do ^{the latter} this, when he was instructed, the Minister could cause it to be done, after which the Crown held a lien for the expenses of the survey and the expenses of seizure, detention, or sale incurred in

enforcing the lien on the sawmills, engines, logging plant and equipment of the lease hold or limit-holder.

The Minister with the approval of the Lieutenant-Governor in Council could create pulp districts where he considered that this would secure the establishment or continuance in operation of a woodpulp or paper mill and ^{where he also considered} that a pulp district would aid in land development and conservation and perpetuation of the timber concerned. A special timber licence which became included in a pulp district, which was suitable for the manufacture of woodpulp and which was held by the owner of a woodpulp or paper mill could be converted into a pulp licence. Certain other restrictions as to the size of the district and the quantity of timber which might be cut, were made. The Powell River Company Limited and Pacific Mills Limited were permitted to sublet, assign, or transfer a pulp licence obtained in this way between each other. Crown timber, within a pulp district, which was tributary to a pulp licence and formed part of the same logging unit or was tributary to an existing pulp mill, could be reserved by the Minister for the use of the holder of the licence or the operator of the pulp mill and sold to the holder from time to time to enable him to complete operations in that logging unit. However, the needs of established local industries and industries essential to the welfare of the community which were dependant on Crown timber could be met by providing exceptions and conditions on the reserve timber, if the Minister considered it to be necessary. Similarly, these industries could acquire timber from a pulp district where the latter was not tributary to an existing pulp mill and where most of the timber in the district was Crown timber. We have seen that the 1945 Forest Act provided for the exchange of special timber licences within a pulp district for a pulp licence, subject to certain conditions. In addition, where the timber in any special timber licence was of greater value for woodpulp manufacture than lumber manufacture, it could be exchanged for a pulp licence covering the same land, provided that the holder was the owner of an operating woodpulp or paper mill.

Under certain conditions, a pulp lease issued under the provisions of Section 9 of the "Forest Act Amendment Act, 1914" in renewal of a prior lease issued under the provisions of Section 6 of Chapter 30 of the statutes of 1901, or under the provisions of Section 14 of the "Forest Act Amendment Act, 1936," could be exchanged for a special timber licence. To do this the lease had to contain chiefly Douglas fir, cedar or other species unsuitable for the manufacture of woodpulp or paper. The holder also had to pay the difference in rentals retroactively to the time of issuance of the pulp lease.

Actually, the bulk of these provisions and powers were not used since no pulp districts were actually formed. The whole question of the disposal of Crown timber was to undergo radical revision. Starting in 1945, a whole series of new tenures has been developed and these developments are still continuing at the present day.

In a mountainous country such as British Columbia, the pattern of settlement has tended to be in the valley bottoms, where the land is usually more level and suitable for agriculture. Consequently, most of the private land which was obtained either for agriculture or urban settlement lay in the valley bottoms. These

private lands could frequently lie between a forest area and the manufacturing plant to which the logs would be transported. The Forest Act of 1945 specified that, for the carriage and transport of timber and products of the forest, any land could be taken and used for a right-of-way for, or by, or on behalf of the person wishing to transport, without the consent of the owner of the land, or of any person having an interest in the land. However, when this transportation involved the construction, operation and maintenance of a logging railway, entry could only be effected upon a highway with the consent of the Minister of Public Works or, where the highway was within a municipality, with the authorization of a municipal by-law. The breadth of the right-of-way which could be taken without consent of the owner was forty feet plus an additional width, where necessary, to accommodate the slope and side ditches. Since these were provincial provisions, they did not apply to lands under Dominion jurisdiction or to Indian reserves. Basically, they have been virtually unchanged up to the present day.

Royalty was payable, in 1945, on timber cut upon Crown lands or upon lands held under pre-emption entry and record, or upon lands Crown-granted on or subsequent to 7th April, 1887, subject to the provisions of the "Timber Royalty Act" as follows:

- (a) Timber suitable for lumber and shingles—50¢ per thousand board feet but where the timber consisted of shingle bolts, royalty was 25¢ per cord.
- (b) Timber suitable for piles and poles—1¢ per four lineal feet.
- (c) Timber suitable for hewn railway ties or for mining props or lagging—50¢ per cord.
- (d) All other timber, wood, or bark—25¢ per cord.

The Lieutenant-Governor in Council could remit the royalty upon wood actually consumed for experimental purposes by a corporation engaged in manufacturing distillates and other by-products from wood, Crown-granted land which was acquired by virtue of a pre-emption claim recorded prior to 7th April, 1887, or by an application to purchase made under the "Land Act, 1884" or under any other land act before 7th April, 1887, where exempted from payment of the royalties given above.

However, Section 57 of the Act amended the rates of royalty expressed above, for timber cut upon Crown lands or upon lands held under pre-emption entry and record or upon lands Crown-granted subsequent to 1st March, 1914, as follows:

- (a) Timber suitable for lumber or shingles cut upon land situated west of the Cascade Mountains;
 - (i) numbers one and two grades, in the Vancouver Forest District—\$2.00 and \$1.50 per thousand board feet respectively.
 - (ii) numbers one and two grades, in the Prince Rupert Forest District—\$1.65 and \$1.25 per thousand board feet respectively.
 - (iii) number three grade and species not specified in the (grade) schedule irrespective of grade—60¢ per thousand board feet.
- (b) Timber suitable for lumber or shingles cut upon lands situated east of the Cascade Mountains;
 - (i) white pine—\$1.50 per thousand board feet.
 - (ii) yellow (ponderosa) pine and spruce—\$1.05 per thousand board feet.
 - (iii) all other species—60¢ per thousand board feet.

These rates had been introduced in January, 1941, were in force in 1945, and were to continue until other rates were provided by or under act of the Legislature.

Section 57 of the Act [sub-section (4)] also provided for a variety of rates of royalty for poles and pilings; hewn railway ties; hewn mine ties; shingle and other bolts; mining timber, mining props, caps, and lagging; shingle shakes; fence posts and hop poles; car stakes; Christmas trees; cordwood; fuel logs and other wood products.

"Pulpwood" was defined as timber which was cut into lengths not exceeding four feet or cut upon land specified in a pulp licence or declared by the Minister to be pulpwood and, in all cases, was used in the manufacture of woodpulp and paper. The royalty on this wood for lands Crown-granted on or before 7th April, 1887, and prior to 2nd March, 1914, was 25¢ per cord. For Crown lands, lands held under pre-emption and record, and lands granted after 1st March, 1914, a royalty of 40¢ was payable except where an existing pulp lease provided for another rate.

Instead of charging royalty for pulpwood on the basis described, the Minister could, if he thought it to be desirable, charge on the mill product by taking one ton of air-dry groundwood pulp or one-half ton of air-dry chemical pulp as the equivalent of a cord of pulpwood. Alternatively, an equivalent royalty could be paid by taking seven hundred board feet as the equivalent of one cord of pulpwood. Again, one hundred cubic feet could be taken as the equivalent of a cord, the cubic foot scale being determined by the scale of logs computed on the mean diameter or diameter at the middle of each log.

Where standing timber had been killed by fire, resulting in a material decrease in value and where the owner or holder had not negligently or by design caused the damage, the Minister could (upon the recommendation of the Deputy Minister) allow a rebate of up to one-half of the royalty payable. All grants of Crown lands made before 25th April, 1901 to railway companies in aid of railway construction were subject to royalty.

The royalty on resin, as mentioned previously, was three-quarters of one cent per gallon.

An important part of any forest administration lies in the legal methods of measuring timber. The Forest Act of 1945 provided for both licenced scalers and Official scalers to scale all timber cut in a lumbering operation prior to sawing or export. The licenced scaler was employed and paid by the person carrying on the lumbering operation and was required to file an affidavit with the Forest Service as to the proper performance of his duties. Official scalers were appointed as members of the Civil Service, although their salaries could be paid from the Scaling Fund of the district and not by way of a yearly salary voted by the Legislative Assembly. In practice, Official scalers carry out all of the scaling west of the Cascade Mountains and for a limited number of companies east of the Cascade Mountains. The latter are not legally Official Scalers since no official Scaling Districts exist east of the Cascades. Most of the scaling east of the Cascades has been and is carried out by licenced scalers.

The Act also provided for a scaling fund for each district designated for official scaling. All salaries, expenses and outgoings incurred in maintaining the scaling service in each district was paid by the scaling fund of the district. The Minister was empowered to set scaling fees at a level sufficient to meet the actual cost of maintaining this scaling service and these fees, along with any other receipts, were paid into the scaling fund. If the amount of credit in the

fund was insufficient to meet liabilities, the Minister of Finance was required to make the necessary advances from the Consolidated Revenue Fund. These advances were repayable by the Forest Service from scaling receipts.

A series of sections of the "Forest Act, 1945" provided for the marking of all timber cut within the Province with registered timber marks issued or cancelled by the Forest Service upon authorisation of the Deputy Minister of Forests.

Sections 90 to 95 dealt with the subject of "manufacture within the Province." In principle, all timber cut on Crown lands, or on lands granted after 12th March, 1906, by the Crown Provincial, or on lands held under pre-emption record were required to be used or made into forest products within the Province. All camps or premises connected with cutting and manufacturing of this timber were to be located within the Province. The Crown could seize timber or boats within Provincial waters, suspected of contravening the foregoing requirements and the onus of proof that no contravention had occurred was upon the owner, holder, or any person in possession of the timber or boat.

The Lieutenant-Governor in Council could, however, permit the export of any timber from the lands concerned under conditions and charges imposed by him. These powers specifically included timber from areas adjacent to the boundary of the Province where this could not, for topographical reasons, be manufactured within the Province.

Because of the pre-occupation with and the public attention given to forest fires from the early days of white colonisation of British Columbia, a considerable portion of the Forest Act of 1945 was occupied with this subject.

The forest protection provisions of the Act applied to all railways constructed and operated within the Province and under Provincial Charter and to all municipalities. A "close season" was established from 1st May to 1st October of each year, a season which could be extended by Proclamation in the public interest. During this season, with certain exceptions, a fire could not be prepared or started within one-half mile of any forest or logging slash, unless a permit had been obtained from the Forest Service or other authorised person.

The Lieutenant-Governor in Council was provided with strong powers in that he could prohibit the issuing of permits in any part of the Province as he thought fit and could exempt any portion of the Province from the forest protection provisions of the Act, as he thought fit. During the close season, anyone who used explosives, dropped burning matches or tobacco ashes within a half mile of any forest was required, without leaving the spot, to completely extinguish any fire caused and he became liable for all Forest Service expenses in controlling or extinguishing such a fire. It was mandatory for operators using a stationary or portable engine or explosives within the one-half mile limit to maintain a watchman at the place for at least two hours after cessation of operations. These engines, including locomotives, traction engines, and logging engines were required to be fitted with spark arresters and devices for preventing the escape of fire from ash pans and fire boxes. Steam boats on any provincial lake or river must have a spark arrester. Wood waste from manufacturing could not be destroyed during the close season without the use of spark arresters on smoke stacks, chimneys or outlets liable to emit sparks or, in "open" burning, with confining the burning, safeguarding

surrounding property. In all cases of engines, industrial or logging operations, equipment such as tools, hoes, and other fire fighting appliances had to be maintained on a scale and condition specified by regulation.

In connection with railways, ^{under Provincial Charter} the Minister was empowered to order any railway company to provide patrolmen for following trains and extinguishing fires (or, if the company did not comply, to employ patrolmen and recover costs from the company). He could also appoint Forest Service officers to act as supervisors to these patrolmen, the cost of supervision being paid by the company.

In the case of a fire starting within three hundred feet of the railway track, the railway company was presumed to be responsible and was required to fight and extinguish the fire, being given the right to enter upon any lands joining its right-of-way for this purpose. Any expenses incurred by the Forest Service in fighting and extinguishing the fire were charges against the railway company. If these fires were not caused by the railway company, they were permitted, under the Act, to recover expenses from the Crown by court action or if the Minister was satisfied that the company was not responsible, he would relieve them from further liability and, where the company could not recover expenses from the person causing the fire, it was entitled to have these expenses borne by the Forest Protection Fund.

Railway companies who were completing construction of the track, were not allowed to operate locomotives for passenger or freight traffic until they obtained a certificate from the Minister, certifying that slash and debris were cleared from the right-of-way and adjoining lands. Railway construction could be supervised by the appointment by the Minister, of the necessary number of patrolmen, under a chief ranger. The railway company or its contractors was required, upon demand of the chief ranger, to place as many of their employees at his disposal as were needed to fight the fires along or adjacent to the line under construction, at its own expense. The liability of railway companies was not confined to the expenses of extinguishing fires. If a fire was started by sparks etc, from a locomotive or carriage and started on or spread to, lands adjacent to the right-of-way, the company was liable to a fine of \$1,000.00. It was a sufficient defence to avoid conviction, however, if the company could show that it had followed the Minister's prescriptions for spark arresters and patrolmen and that no negligence or violation of regulations by the servants of the company had occurred. For an offence against the Act or violation of any regulation, the company was liable to a penalty of \$200.00.

In the case of logging railways or other railways not under charter as a common carrier, the operator was required to dispose of debris alongside the track and, at the Minister's direction, to maintain patrols after the passage of a locomotive. The Minister, if his instructions were not immediately followed, could have the work done by the Forest Service, when the Crown would have a lien upon the operator's equipment to recover the expenses, or could recover the expenses by court action.

If an operation for the cutting or removal of trees or timber resulted in the creation of slash, including brush and debris, the operator could be required to dispose of it by burning. If this were not done upon demand, the Minister was

empowered to do it at the expense of the operator. In the Vancouver Forest District, however, the operator was obliged, at least once in each calendar year, to dispose of both slash and dead standing trees by burning or felling, with appropriate safeguards to prevent the spread of fire or damage to property. The Deputy Minister, in these cases, was empowered to designate the time and manner of slash and tree disposal, could require part or all of the slash to be left on the ground and require measures to be taken by the operator, to safeguard forest soil, seedlings, young trees, and standing timber from damage. The Deputy Minister was also authorised to exempt any part of the Vancouver District from these disposal provisions and, if conditions were unsuitable or a bona fide attempt to remove slash and dead, standing trees had failed, he could extend the time for disposal to the next calendar year. If an operator failed to dispose of slash or dead, standing trees or to take precautions and safeguards, he was required to pay \$5.00 per acre to the Forest Protection Fund, subject to the decision of the Deputy Minister. If an operator who had paid this penalty subsequently carried out disposal operations, with the prior written consent of the Deputy Minister, then the Minister could refund an amount not to exceed 75% of the penalty paid. As an enforcement measure, the Crown was entitled to a lien on all engines, logging plant, equipment, material, cut-timber, wood and lands involved in an operation in which slash and dead, standing trees were created or accumulated. The Crown could also recover costs by court action. In addition to the foregoing penalties, the operator in the Vancouver District, who failed to take reasonable precautions and safeguards in slash and tree disposal was guilty of an offence and liability to pay all Forest Service expenses incurred in controlling and extinguishing the fire where it spread or threatened to spread, beyond the area required to be burned.

When an operation in the Vancouver District was creating or accumulating slash or dead standing trees on logged areas, then the Minister could, at any time, require the person carrying on the operation to make a cash security deposit. The deposit was refundable if the disposal conditions were satisfactorily met, otherwise the Deputy Minister retained all or part of it to carry out the slash disposal. Failure to pay a deposit within a specified time period made the operator liable to a penalty of \$5.00 per acre on the area of slash and dead standing trees—the area being determined by the Deputy Minister.

Where the Deputy Minister considered it to be inadvisable, by reasons of war or national defence conditions, or labour factors arising from these conditions, he could relieve the operator of the obligation to dispose of dead standing trees. Applicants for this kind of relief were required to pay \$4.00 per acre for each acre of "unbroken, logged area" but could recover this sum if they subsequently felled the trees within one calendar year after the 31st December next following the conclusion of the (second world) War. If the Forest Service felled them at any time, no refund was available. The \$4.00 per acre was credited to the Forest Protection Fund and used by the Forest Service for the disposal of dead standing trees on the exempted areas or elsewhere within the Vancouver Forest District, as decided by the Deputy Minister.

Section 114 of the "Forest Act, 1945" specified at least some of the precautions and safeguards which the Minister could require. Debris caused by any

lumbering or other industrial operation which endangered forests or timber could result in a requirement for the operator to cut down all dead trees and stubs and establish a fire-guard around the area. Every camp, mine, sawmill, portable or stationary engine within a half mile of a forest was to have a space surrounding it cleared of inflammable debris and maintained in that condition. Every person clearing their right-of-way for any road, trail, telephone, telegraph, power or pipeline, tote road, ditch, or flume was required to pile and burn on the right-of-way all slash as rapidly as the clearing could best be carried out, subject to weather conditions, at the direction of the Minister, and, during the close season, under permit from the Forest Service. The felling of trees or brush on land owned by another person was prohibited. Finally, anyone causing accumulations of inflammable debris within three hundred feet of a railway right-of-way was required to pile it immediately and, subject to the provisions of the Act, burn it. The Minister was empowered in the event of failure of the operator, to carry out the requirements of Section 114, whereupon the Crown acquired a lien for the expenses concerned on specified property of the person in default or could recover costs by court action.

The Minister also had the general power to declare any inflammable material which endangered life or property a public nuisance and could require the immediate removal or abatement of the nuisance by the owner, occupier, or person conducting operations for the cutting or removal of forest material from the land.

There were also a number of requirements connected with fire fighting itself. It was the duty of every adult resident of the Province who found a fire within one-half mile of the forest to do his utmost to prevent the spread of the fire and to report it to the Forest Service by the quickest possible means. In the case of a fire burning on or across land on which a person was conducting land clearing, lumbering, industrial, engineering, or construction operation, he was required, no matter where or by whom the fire was started, to attempt to control and extinguish it, using up to the total number of men employed by him. If a Forest Service officer required it, the occupier was obligated to place these men at the officer's disposal for fire fighting and was required to pay for their services. Where the fire had not started on the occupied land but burned onto it, provided that the requirements of the Act concerning the foregoing fire fighting obligations were met, the Forest Service had been notified immediately, and fire protection taxes had been paid, then the total amount expended by the occupier on fire fighting was borne by the Forest Protection Fund except that the amounts allowed for wages could not exceed the rates prescribed by the Forest Service for such work. An occupier who did not follow the above requirements or who, without Forest Service consent, continued his operation or resumed it before the fire was out was liable for all expenses of all parties fighting the fire. Where the fire started on occupied land, the occupier was required to fight it at his own expense.

If the Minister considered that safety of life and property was endangered through a hazardous forest cover condition or the occurrence or spread of a forest fire, he could declare the area a closed district. Under these circumstances, no travelling, camping, fishing, hunting, recreation, prospecting for minerals or similar activity was permitted without a Forest Service permit. All operations

within one-half mile of any forest were debarred. However, permanent residents and land owners gaining access to or egress from their property, persons travelling on public highways or engaged in operations not specified, were unaffected by the closure.

Within a closed district a Forest Service officer, authorised by the Minister, could take any action he considered necessary to control fires and safeguard life and property. He could also summon any male person, aged between 18 and 60 years, for fire fighting. Trainmen, telegraphers, dispatchers on duty, medical practitioners and persons physically unfit were excluded from a summons of this kind. The penalty for violation in a closed area or refusal of a summons was from \$25.00 to \$300.00. If an operation was carried on against the provisions of the Act, the penalty applied to each day of its continuance.

The Minister, through the Forest Service and by means of the Forest Protection Fund, could maintain and equip a patrol and fire prevention force. He could authorize the employment of assistants to the Forest Service required for fire fighting, expenditures for advertising, slash disposal and cooperative programmes with other forest protection agencies. Monies from the Forest Protection Fund, or jointly from it and appropriations from the Consolidated Revenue Fund, were to be used by the Minister to acquire or construct trails, lookout stations, ranger stations, telephone lines, other permanent improvements and any property necessary for the purposes of the Act. Also, of course, any of these items could be sold should they become superfluous. The Minister was permitted to reimburse the expenses incurred by a person in fighting or controlling fire within one-half mile of a forest provided that the expenses were for the protection of forest growth, that they were not a result of duties or obligations imposed by the Act on an owner or occupier of land and that the Forest Service had been notified of the fire and control measures by the best available means. Officials of the patrol and fire prevention forces were given rights of entry upon lands or premises other than houses, in the performance of their duty. Anyone obstructing them was guilty of an offence. Also, officers and employees of the Forest Service who were appointed Constables by the Lieutenant-Governor in Council were given powers to arrest, without warrant, any person found to be violating any provisions of the Act. The powers of summons of persons for fire fighting were conferred on the Provincial police force (now absorbed by the Royal Canadian Mounted Police) and the Forest Service and applied to any part of the Province. The powers conferred upon the Forest Service were also conferred upon forest fire prevention officers. These could be appointed by timber licence or timber lease holders, by forest owners or by persons carrying on land clearing, lumbering, industrial, engineering or construction operations within one-half mile of a forest, provided that the Minister approved the appointments.

The Act provided for a Forest Protection Fund. It was supported by the annual payment of a tax of six cents per acre by the owners of the lands classified as timber land (under the provisions of the "Taxation Act") and from holders of timber leases, timber licences, and resin licences. In addition, the Minister of Finance added \$650,000.00 annually from the Consolidated Revenue Fund. Also, advances could be made from the Consolidated Revenue Fund, but these were repayable from the Protection Fund. If the total input into the Fund proved to be insufficient,

the deficit could be met by a suitable pro rata increase in the acreage tax and in the amounts added from the Consolidated Revenue Fund. Conversely, if a surplus accrued of an amount considered adequate to meet the ensuing year's expenses, the annual payments from all sources could be suspended or reduced pro rata to an amount less than that usually payable. The protection of forests against insects received a good deal less attention than did protection against forest fires. The Minister was provided with powers to require the disposal of trees, timber, or slash infected with injurious insects. The powers applied to timber leases, timber licences and privately-owned lands. If a holder or owner refused or neglected to follow instructions, then the Forest Service could enter upon the land and carry them out. In the case of timber land (as defined in the "Land Act" and in the "Taxation Act"), one-half of the net cost of disposal of trees and timber infected by injurious insects was to be borne by the Crown, and one-half by the owner of the land; where on Crown lands under timber lease or licence, the cost was to be shared equally between the Crown and the lease or licence holder and where the disposal operations were not on Crown land or on timber land the entire net cost was to be borne by the Crown. Except in the latter case, the disposal of slash was always to be borne by the owner, lessee, or licensee. The Crown assumed the usual lien in the case that any monies due to it were not paid to it upon demand.

It is indicative of the prevailing viewpoint towards forest protection in 1945, that where a prosecution or action was brought against any person for any contravention of the "Forest Act," the burden of proving that the requirements and provisions of the part of the Act dealing with forest protection had been complied with rested with the defendant. The rights of any person to bring the civil action for damages occasioned by the fire were not interfered with nor limited by the provisions for forest protection. In practice, the Government seldom, if ever, prosecuted unless there was a good chance of proving the case.

The Forest Act of 1945 provided the Lieutenant-Governor in Council with powers to create, expand, reduce, or cancel provincial parks, classed as A, B, and C. For this purpose land, improvements on land and timber rights could be acquired by purchase or other means of acquisition, including exchange for timber rights. Class A and Class C parks were absolutely reserved from pre-emption, sale, lease or licence under the "Land Act" and were reserved from mining or any other matter subject to the discretion of the Lieutenant-Governor in Council and the provisions of the Forest Act. However, a holder or owner of a mineral claim within A and C parks could not receive a Crown grant of surface rights of the claim and could be subjected to such terms, conditions, and restrictions, including restrictions on the cutting and use of timber as the Lieutenant-Governor in Council might prescribe.

Crown timber in a Class A park was reserved from cutting or sale except where the Deputy Minister felt it to be advantageous for park development and public amenity and, in any event, it could not be sold for the primary object of revenue. The Crown timber in a Class B park could be sold and the land was available for disposal of timber except where the Deputy Minister felt it to be detrimental to the recreational value of the area. Advisory boards could be appointed for A and B parks and park boards could be appointed for C parks. The latter board had powers to manage, administer, regulate and control the park and they were bodies corporate.

There were a number of general provisions, dealing mostly with legal matters such as liens, penalties and liabilities under the Act. In addition, a provision was made for the "Forest Service Boat Account", supported from Government revenues.

It is clear that the "Forest Act" of 1945 did not express comprehensive forest policy which, translated into management practice, would ensure the perpetuation of fully productive forests, rather it was mainly an expression of the policies and administrative methods of encouraging industry by the provision of timber, with a strong emphasis on forest protection; it contained little of direct importance to silviculture or sustained yield management. The Act was to be changed to/^aconsiderable extent over the next two decades.

CHAPTER TEN

The Period From 1946 - 1970 The Introduction of Tree Farm Licences and Public Sustained Yield Units Under the Sustained Yield Policy

The Sloan Commission of 1945 was an important juncture in British Columbia's forest history. It marked the first attempt to introduce sustained yield forestry. Before describing the new forest tenures which were created as a result of the Sloan Report, it is beneficial to look again at the situation of the Province. The political situation in Canada and British Columbia at the time/^{also} must not be overlooked since because of the economic importance of forestry, politics has always had an important influence on forest policy in British Columbia. The subject of Dominion-Provincial relations in the field of forestry is dealt with in a later chapter but it is of importance to consider briefly the general political scene within which Provincial forestry was developing.

Sherman⁵⁴ has related that, when the liberal Duff Pattullo became Premier of British Columbia in 1933, the Province was in severe financial straits. Half of the Provincial income was expended on debt charges and the Province owed \$165,000,000.00 on behalf of its 700,000 residents. Pattullo endeavoured to change the situation and was bitter in his references to the Federal Government. The latter refused to pay off the Provincial debt and, although they eventually lent British Columbia \$10,000,000.00, it was only after Prime Minister R.B. Bennett had said that Ottawa would help only if it acquired supervision of provincial finances. Sherman quotes Pattullo as retorting:

"Under no circumstances will British Columbia consent to Dominion control over Provincial expenditures. It seems obvious that surrender by the provinces of their jurisdiction under the terms of union very soon would lead to disunion or a centralised control."

At this time, the Province was budgeting for a \$2,000,000.00 annual deficit. In the fiscal year 1939 - 40, when the Second World War introduced a very marked period of change, including economic change, the Provincial Government's revenue was a mere \$32,600,000.00, but even so, it was the highest revenue recorded up to that time. Income tax, which was collected by the Province, totalled \$10,000,000.00 and had doubled in five years. With the huge size of the Province and its needs for communications through its rough terrain, these revenues were a pittance. There were, at this time, 23,000 miles of road, none paved outside the cities and few of them graveled. Within two decades, however, the Provincial Government was to spend \$100,000,000.00 on highways alone.

In November of 1940, the Rowell-Sirois Commission, appointed in 1937 by Prime Minister Mackenzie King reported on the controversy between Dominion and Provincial Governments. It recommended a major degree of centralisation of power in Ottawa. Canada should take over all relief costs and the dead-weight costs of servicing provincial debts, it said, and future provincial borrowings should be under federal control. Provinces should give up their subsidies, their personal income and corporation taxes and succession duties and receive instead an annual sum "sufficient to enable (each province) to provide normal Canadian services with no more than normal Canadian taxation." British Columbia, Alberta, and Ontario refuted these proposals and they were not adopted, although Pattullo was unpopular in British

Columbia for his opposition. However, in 1942, the provinces agreed to give up income tax to the federal government for the remainder of the War. British Columbia accepted in return a fixed \$12,000,000.00, the yield of those taxes in 1940 - 41.

Following the War and up to the present day, the politics of British Columbia have been largely concerned with the industrialization of the Province, particularly in the fields of roads, power supply, and railways, including the Provincially owned Pacific Great Eastern Railway. Along with the development of these items has gone the development of natural resource industries—forestry, mining and oil. It is only during the post-War period that government revenues have approached levels permitting the large-scale development of roads, power supply, and the Pacific Great Eastern Railway. The post-War period has also seen very rapid inflation. Sherman has noted that the 1948 - 49 Provincial budget stood at \$77,000,000.00, more than double that three years before. The cost of living was increasing rapidly. In the three years to January 1946, the cost of living index went up less than three points to 119.9. In the next eleven months it jumped seven points and then remained relatively stable for three months. Then, in a year, it increased twenty-three points to 150. The population had reached 1,047,000 by 1948 and the costs of social services had increased in three years from \$9,000,000.00 to \$19,000,000.00.

As mentioned previously, in 1942 in return for a rebate the British Columbia Government had ceded its income tax rights to the Dominion Government and these have not been returned. By 1945 the income tax raised \$160,000,000.00 in the Province, only \$14,500,000.00 of which was returned directly to the Provincial Government. In spite of adjustments to this, the Province found it necessary by 1948, to impose an unpopular 3% sales tax. In addition to all these financial problems, the Government spending continued to emphasise welfare, as for example, the proposal by Premier Johnson for a compulsory hospital care insurance plan under which a family would pay a maximum of \$33.00 a year, with the rest of the necessary funds coming from Government revenue surplus and the hospital grants it already paid. This proposal came into effect and was subsequently abolished due to high deficits in its operation.

By 1950, the Finance Minister, Herbert Anscomb, put out a budget of \$105,000,000.00, a sharp contrast with the \$29,000,000.00 of ten years before. Even at this level he complained, as every British Columbia Finance Minister has done, that Ottawa was taking too much money from British Columbia. The Dominion Government had collected \$158,000,000.00 in 1948 - 49 and returned only \$25,000,000.00, he said. However, the Province had amassed almost \$50,000,000.00 in budget surpluses during the previous decade. Sherman quotes Anscomb as saying:

"We should have thousands upon thousands of people, and a highly industrialized and prosperous province, but we have neglected the full development of our natural resources, agriculture, fisheries, mining, and forestry, on which the basis of our future rests, and this neglect was mainly due to the lack of necessary funds."

This was the traditional approach and the only answer was more money from

Ottawa. It is probably unnecessary to review the details of the majority political thinking in the Province further. The main threads have remained relatively constant up to the present day, even though the rate of accomplishing the objectives has increased rapidly and the range in Government activity has broadened. The objective of industrialization has been pursued vigorously, the latest major changes being the increases in pulp and mineral production, the former of which is described later.

The Budget Speech of the Premier and Finance Minister, W.A.C. Bennett⁵⁵, in February of 1966 included as its first four items, reports on the position of Federal-Provincial relations, the British Columbia Hydro and Power Authority, the Pacific Great Eastern Railway Company, and the British Columbia Ferry Authority. The last three items deal with power supply and communications, a continuing theme in provincial politics. His remarks on the first item sum up the dominant theme in provincial politics for many years.

"While the economic policies of the Province have enhanced Provincial revenues, these same policies have also stimulated the national economy and revenues of the Government of Canada. Over the five-year period between 1957 and 1962, the latest Federal figures available, business earnings within the Province, and accordingly Federal corporation tax revenues, increased 32.2%, while those in the rest of Canada increased only 19.9%. We accept this as a fact of our Federal System, and welcome the opportunity to make a contribution to a greater Canada. However, exception is taken to a Federal fiscal-sharing policy which ignores significant cost variations in physical and human resource development and in Government service expenditures. For example, because of our mountainous terrain, British Columbia highway and resource-road costs are from 66% to 120% above those of the rest of Canada, and . . . secondary education costs are 39% above the national average.

"While the Province has been given greater responsibilities under our Constitution for resource development, health, welfare, education, and training, it has been limited in the raising of funds to direct taxation. The Government of Canada, however, which has the complete field of indirect taxation, still, twenty years after the War, retains 82% of the direct corporation tax and 76% of the direct personal income tax paid on earnings in British Columbia. British Columbia has repeatedly pressed for a more equitable sharing of these direct revenue resources.

"There has been a new development in Federal-Provincial relations. I refer to the Government of Canada Act which allows 'contracting out' or 'opting out' by a Province on shared-cost programmes (and receiving abatement of the Federal share of personal income tax, cash payments, and/or payments of equalization in lieu) . . . 'Opting out' provisions, where exercised by one particular province (Quebec), further distort equalization.

"Federal tariff policies operate against the export-oriented economy of British Columbia and, in fact, are discriminatory in their application across our nation. . . The Government of Canada should initiate monetary and trade policies which will foster expansion and increase competitiveness of the national economy in world markets. The Government of Canada, if it does not vacate the direct taxation fields, must make greater contributions to provincial resource development and transportation facilities, if the full potential of our resource-rich northern areas is to be realised for the benefit of the whole nation. I repeat, we must either receive increased Federal participation in specific programmes, or a return to the Province of a larger share of the direct tax field. British Columbia's vast export trade is a prime factor in maintaining proper national balance of payments and should be encouraged in every way possible by the Government of Canada."

As will be seen later, these remarks are of considerable significance to

British Columbia forestry.

It was in 1945 that the Department of Lands was reorganized as the Department of Lands and Forests, with a Deputy Minister of Forests and a Deputy Minister of Lands. In effect, this made the Forest Service a separate department of Government.⁵⁶ In 1945, also, a public relations division of the Forest Service was formed.

The posts of Deputy Minister of Forests and Chief Forester were both held by Dr. C.D. Orchard, an arrangement which continued until his retirement. He attended the Fifth Imperial Forestry Conference in London, representing British Columbia⁵⁷ which thus continued its long participation in these conferences. An important piece of legislation was also passed in 1947, providing for the creation of forest management licence areas, now called "tree farm licences", with the object of facilitating the practice of sustained yield forest management by the forest industries. The legislation was intended to implement the recommendations of the 1945 Royal Commission and was ranked in importance by the 1947 annual report of the Forest Service, with the formation of the Service thirty-five years previously.

Moss⁵⁸ described the forest management licences up to 1956. The Royal Commission on forestry of 1945 had been concerned over the methods which should be employed to maintain lands in continuous production and to achieve a regulation of forest cut from these lands on a sustained yield basis. The Commissioner, Chief Justice Sloan, had recommended that "private working circles" should be allotted to some established wood-using industries and that "public working circles" should be managed directly by the Forest Service and established for the maintenance of other wood-using industries. As a result, the Provincial Government established two types of area, known as "forest management licences" and "public working circles." These names were later changed to "tree farm licences" and "public sustained yield units" at a later stage.

A description of the terms and conditions under which a tree farm licence was issued is included as an appendix to this history and, at this point, it is sufficient to deal with the purpose and history of the tenure. The objectives of the Government were to achieve rational, sustained yield management of the forest lands by industry, so as to produce the greatest possible return in wood and wealth. Secondly, it was hoped to stabilize and perpetuate industry and those communities which were dependent or partially dependent on the forest industry. The history of the North American forest utilisation industry has seen the occurrence of "cut out and get out" policies in which industries had been built up on a basis of rapid forest liquidation only to disappear with the failure of the timber supplies. Under these conditions, communities had been unstable and the Government, by sustained yield forestry, including that in tree farm licences, hoped to prevent such trends. Thirdly, the Government hoped to achieve closer utilisation of the forest crop and, fourthly, to perpetuate the forest resource.

Other benefits would accrue to the Province. Indirectly, a large body of foresters working with the industry and their logging crews would turn their attention to sustained yield forestry. Without them, the Government would have an overwhelming problem in trying to adequately manage British Columbia forests through the Forest Service, without greatly increasing the strength of that Service. As

the situation was at the time, the management of public working circles and sustained yield units placed a heavy strain on the existing Forest Service strength. However, by bringing industry into forest management, a better standard of management in both types of areas should result. The requirements of sustained yield forestry and the security which it afforded the industry in its timber supply would encourage them to provide forest access at a considerably accelerated rate.

A tree farm licensee should be able to coordinate operations much more closely than was possible with timber sale sources of supply and could undertake long-term planning with the assurance of long-term tenancy. Better reasons would exist for industry to study the forest more closely, eventually bringing the plant production capacity into balance with the sustained yield level of cutting. For those who held lands under "private tenures", such as timber berths and licences, some relief was provided from heavy annual taxes and carrying charges unrelated to the economics of the tenure. Finally, the licensee acquired an assured supply of wood in sufficient quantity to maintain the licensee's industry indefinitely or, alternatively, to maintain a definite proportion of his requirements.

The acceptance of tree farm licences by industry was remarkably good. By 1956, twenty licences had been awarded, covering the productive area of 2, 992,664 acres. A further eighteen had been approved subject to the submission of satisfactory working plans and these covered 2,449,183 productive acres of land. In addition, sixty-eight applications, involving a productive area of 4,295,670 acres had been advertised.* Many applications which had not been advertised had been made to the Government.

Acceptance by some sectors of the forest industry however, was poor and political controversy arose over tree farm licences in general and over some in particular. The controversy was highly publicized and ranged about a number of issues. Prior to the inauguration of tree farm licences and public working circles, unalienated Crown lands bearing mature timber were open for timber sale applications. In this situation, a mill owner or logging operator would apply for an area of timber which would subsequently be sold to the highest bidder. This kind of sale was still made (in 1956) in public working circles, although the method of sale has subsequently been amended to a considerable extent. In the tree farm licences, the element of competition was removed. The basic objection to this was that, whereas a tree farm licensee could always obtain his timber at upset stumpage and royalty, the operator buying a timber sale might have to bid a unit price higher than the upset stumpage and royalty. However, it was noteworthy that the number of timber sales actually bid above the upset stumpage and royalty had been quite low prior to 1956.

Tree farm licences were held by some to mean the end of the "small" saw-mill operator or logger. In 1956, a small logger in the Coastal Region might cut for example, two million cubic feet of logs per year whereas a small logger in the Interior would cut only about one hundred thousand cubic feet. A large company in the Coastal Region might consume twenty million cubic feet of logs or more per year,

* If the Minister considered an application for a licence worthy, it was advertised in the "British Columbia Gazette" for a specified period and observations and objections, if any, were received by the Government. Following consideration of these and, in some cases, the holding of public hearings, the Minister would decide whether to issue a licence or reject the application.

whereas a comparable figure for a large Interior company would be four million cubic feet. The objectors held that only large companies could operate a tree farm licence even though there was no minimum size of licence and a number of small licences were issued.

Another complaint was that the issue of a tree farm licence to a company increased the value of that company. In some cases, charges were made that licences were obtained for this purpose after which the company sold out making a (non-taxable) capital gain. Mergers and purchases of companies with a licence had occurred and there was much difficulty in preventing such transactions in a free enterprise economy. Whilst a licence could only be transferred with Government consent, a change of ownership by transfer of shares did not change the corporate entity and the licensee remained, for legal purposes, the same. The licence remained appurtenant to industrial plants in specified localities and all of its conditions remained unchanged.

The original method of approval of issue of the licences by cabinet meetings closed to the public also came in for severe criticism and a suggestion was made that objections to applications should be heard in public. The Government did change its procedures and held a number of public meetings.

Other forest users such as cattlemen, irrigation interests, hunting, fishing, and other recreational interests were critical of tree farm licences on the basis that their own particular interests were inadequately protected. The legislation and agreements, however, did provide in general terms for these other uses and they had experienced very little restriction. The growth of pressures for "multiple use" or "combined use" or "single use" could not be properly charged against tree farm licences. Demands for protection of other uses were a growing problem in the more densely populated parts of the Province and they existed and have continued to exist irrespective of the form of tenure. It is also true, that the tree farm licensee does not have direct jurisdiction over other uses.

Some tree farm licensees, fearing catastrophic forest fires, had endeavoured to have their responsibility for fire fighting reduced. The operator of the timber sale was responsible only for fires starting within the timber sale areas and was required to commit the manpower and equipment working on that area at the time of outbreak to fire fighting, at his own expense. Thus, his "area of occupancy" was defined as the timber sale area. The holder of a tree farm licence, by contrast, was responsible for fire fighting and the costs involved over the whole area of the licence and not simply the areas under cutting permit, that is, those areas approved for logging. Some licensees held this situation to impose too great a burden.*

The Royal Commission of 1956 was the second in which Chief Justice Sloan was appointed as sale commissioner. F.D. Mulholland was, again, his forestry staff advisor. The Commission was appointed under the "Public Inquiries Act" and its report was much more lengthy and detailed than was that of the 1945 Royal Commission.

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maintained and protected. The major opponent of tree farm licences on this point was the Truck Loggers Association. Sloan felt that the basic criticism of the tree farm licence policy, that it created monopolies in which Crown timber was sold to the licensee without competition, greatly under-valued the contribution which the policy should make to the permanent, sustained and increasing production of manufactured commodities, upon which the critics themselves largely depended. It probably also arose out of a lack of appreciation of the implications of the policy for long-term forest management. The conflict arose through the desire of each of the classes composing industry to expand outside its field:

"The logger, not content with the profit to be made in a logging operation, wishes to make a profit also on the stumpage value of timber without taking the responsibility for management of the forest in which it grows. The millmen, and this is particularly the case in the Interior, not content with the profits to be made by manufacture of logs bought in an open market, seek also a profit through buying an assured supply of Crown timber at non-competitive prices and doing their own logging. The timber owners, the largest of whom are timber owners of necessity in order to protect their great investments in integrated conversion plants, show increasing willingness to undertake the responsibility for permanent forestry on their own lands, provided the Government will allot them sufficient Crown timber to assure them a non-competitive supply for all, or a very large percentage of, their mill capacity; but they also seek the profit from stumpage values above the appraised price and the profits from their own logging divisions. Finally, the Government, unable to achieve the standard of forest management which it would like on all forest lands, is willing to delegate some of its responsibility to private enterprise, but finds it difficult to decide to what extent and to whom it should be delegated, difficult to cut the apron strings of detailed control, and difficult to renounce the temptation to charge all the traffic will bear in the sale of its timber and of the timber grown by private enterprise on Crown land, even to the extent of including in its appraisals some of the profit of manufacturing which it does not undertake."

A major cause of these phenomena, in addition to increasing competition in an expanding industry, was a tendency toward integration of growing, logging, manufacturing and sale under single control. However, the Commissioner felt that integration, if economic and efficient, could be regarded as undesirable only if the social effects were unacceptable to the people of the Province. Loggers and small mill operators had placed the blame for their difficulties, not always logically, on the allocation of timber to forest management licences. Provision for the maintenance of an independent logging industry had long been made by the Government, however, in the establishment of forest reserves and new public working circles from which the allowable cut was sold in small parcels to contract loggers. As mentioned previously, the Commissioner felt that an adequate field for an independent logging industry should be maintained and protected.

When valuable natural resources were to be awarded by selection rather than competitive bidding, selection should be based upon clearly expressed Government policy. In the Commissioner's opinion, insufficient distinction had been made in the award of tree farm licences, between those applicants whose services to the community had justified their selection for a preferred position of security above their competitors and those who were merely shrewd enough to seize an opportunity. There had been no clear principle to guide the selection process and, whilst each application was treated "on its merits," a consistent estimate of "merit" was not apparent and the particular merits of each award had not been made public. There was no adequate provision for those opposing an application to present their views and the very fact that an applicant had to obtain departmental permission before

advertising his intention implied a certain ex parte approval, even though no definite commitment was made. Apart from the allocation of timber in undeveloped regions to encourage development of a new industry, the two basic reasons for granting a licence were support of a mill of proven value to the community and inducement for private forest land owners to place their lands under good forest management. Sloan felt that, in the Interior, the latter objective appeared to have been lost, ^{sight of} since the area of private land which had been brought under forest management by the tree farm licence policy in the Interior was insignificant. In making this statement, Sloan appears to have overlooked certain significant facts. In the Interior, the licences which had been awarded up to the time of the Commission hearings contained more than 99% of Crown land. The Coast licences contained 13% of Crown-granted forest land, 25% of land held under temporary tenures which had been made permanent by their inclusion in the tree farm licence, and 62% of previously unalienated Crown land. However, because of the history of tenures in the Province, the Coastal industry had a much greater area of land under permanent or temporary private tenure than did the Interior industry. In themselves, the Coastal tenures were a stabilizing influence for the Coastal industry and they contributed largely to the growth of industry in that region by providing standing timber at a cheaper price than was available in the Interior Crown forests, even without considering the timber quality advantages of the Coastal timber. The need to stabilize industry in the Interior communities was greater than was the case in the Coastal Region and it can be argued effectively that this justified the granting of licences in the Interior.

Sloan continued that the objective of the tree farm licence policy was commonly defined as sustained yield management but he pointed out that sustained yield management was actually an essential tool to achieve social and economic, rather than technical, purposes.

The award of licences, for the two reasons given by Sloan, should not imply, he felt, a priority for "existing industry." Since the ultimate objective of British Columbia forest policy was the perpetuation of the export trade, first priority must be given to the pulp and paper industries and other large conversion units, especially the great integrated organizations because of their relative stability, the enormous investment required for their establishment, their continuous prosecution of research and development of new and better uses for wood, their ability to offer continuous, profitable employment, the support of communities and their direct and indirect contribution to the Provincial taxation structure. It was implicit in this recommendation that existing companies with operating mills, planned integrated expansion and providing support to existing communities should be carefully examined before further awards of Crown timber were made to encourage new companies to invest in the pulp and paper and large-scale conversion fields. This point, Sloan noted, was particularly important on the Coast and remote and undeveloped areas of the Province were excepted.

The Commissioner recommended that no further tree farm licences should be awarded except those approved subject to a satisfactory working plan, until all licencees had completed satisfactory inventory surveys, established permanent boundaries and produced more reliable yield capacity and allowable cut estimates.

The Commissioner would allow five years for this to take place. This was a general indication that, in his view, no tree farm licences should be awarded during the same period unless special circumstances justified a grant in the public interest and full opportunity was afforded to organize industry in the forest district concerned to express their opinion. The Commissioner had recommended, in his 1956 report, the formation of a Provincial advisory council and felt that their opinion, to be given weight, should be obtained by the Government in special cases. An exception to the general moratorium on awards for a five-year period lay in the undeveloped areas, particularly in the Interior, where the establishment of economic, integrated industry should be encouraged. Also, major integrated industries at the Coast whose applications had not been approved, including such industries at Powell River, Ocean Falls, and New Westminster, should be regarded as exceptions and awarded. In tree farm licence number two, the licensee had allocated enough private timber to satisfy the allowable cut of the licence and the Crown had added logged-off and immature areas with little or no mature timber. Tree Farm Licence No. 2 contained 280,558 acres of productive forest. The Commissioner regarded the arrangement as exceptionally advantageous to the Crown since the Forest Service could sell merchantable Crown timber in the Crown portion of the licence area by public timber sales with the responsibilities of management, following logging, being undertaken by the licensee. This kind of arrangement should also be regarded as an exception to the five-year moratorium.

In general, the Commissioner felt that priority in award of a licence should be given to a major holder of private timber, a priority which would be absolute if the major owner contributed a volume of timber equal to one-half or more of the volume of Crown timber within the proposed licence area. If there was no owner with that proportion of timber within the sustained yield unit area and more than one with 10% of the Crown volume, no licence should be awarded except by consent of such private timber owners in the licence area. Unless an applicant was prepared to contribute not less than 25% of either the merchantable timber or the productive forest land within the proposed licence area, Sloan stated, no licence should be awarded without provision for public competition. It may well be observed of the various recommendations, qualifications, and exceptions stated by the Commissioner do not, taken together, define a clear policy. Some recommendations do not correspond well with others and it may be taken that they represented a series of points of principle from which policy could be derived. To the reader without a good knowledge of British Columbia forests and forest industry they could be confusing. Some recommendations, for example, although their region of application was not defined, clearly apply to the Coastal Region only and they would be meaningless in the context of the Interior.

Chief Justice Sloan next dealt with some of the provisions of the tree farm licences. He recommended that all licence contracts should require that a percentage of the annual cut, regardless of tenure, not less than the original percentage of Crown timber in the licence, must be manufactured in the licensee's own conversion plant. If a licensee had no conversion plant, the contract should require that this percentage be sold in the open log market. This point refers only to the Coastal Region, since no open log market exists in the Interior. There were indications, from the evidence placed before the Commission, that some management licences might be overstocked. The Commissioner meant that they might contain more timber

than was thought to be the case at the time of issue. These licences would thus be capable of producing a greater annual yield than was estimated at the time of their award. He did not feel this to be in the public interest and this matter was one reason for the recommendation for prompt and accurate surveys of the capacity of each licence. If the licence did contain an excess of timber, the licensee should be given reasonable time to provide manufacturing capacity to utilize the extra volume, or, failing that, the surplus volume should be advertised for competitive sale by the Forest Service each year until the licensee was able to make proper use of the whole annual yield. It would not be in the public interest to destroy or damage the efficiency of a tree farm licence by arbitrary reduction of area to suit an arbitrary production volume.

In order to make the Crown interest more evident to the public, it was recommended that, in future contracts, the "perpetual" term should be eliminated and a term of twenty-one years substituted or a term when the sum of actual annual cuts from the licence area, had reached a volume not less than the volume of private timber contributed to the licence by the licensee. At the end of this period or twenty-one years, whichever was the greater, the licence should be renewable, subject to renegotiation of terms and conditions in accordance with the "Forest Act" at that time. This was done. At present (1971) the Forest Service maintains that even those licences with the perpetuity clause have a life of only twenty-one years. The licensees disagree. The situation foreshadows a possible legal battle beginning in 1978.

Sloan also recommended that the boundaries of each tree farm licence should be permanently defined on the ground, in order to forestall future boundary conflicts. To assist in this process, he felt that there was a need for experiment in the use of aircraft and air photography for marking and mapping monuments on watersheds and other topographical features. The definition of boundaries on the ground would have constituted a heavy burden on the licensees and posed a number of technical problems since existing maps were not always accurate enough to allow for legal definition of boundaries.

The Commissioner next referred to what is commonly known as the "thirty percent clause." Independent loggers had complained that the traditional areas in which they had been accustomed to operate on competitive Government timber sales were being closed to them to some degree by inclusion of these areas within tree farm licence boundaries. As a result, the Government, starting with tree farm licence number fourteen in 1953, had included a clause in the contract:

"In the process of harvesting the crop from the licence area, the licensee shall provide the opportunity for contractors other than the licensee's own employers or shareholders who own more than one percent interest to harvest a minimum of thirty percent of the allowable cut on Crown land not held under other tenure as set forth in each succeeding management working plan, but where the Minister is satisfied that such contract operation is not feasible, either by reason of lack of operators or for other good and sufficient reason, the Minister may relieve the licensee in whole or in part from this responsibility."

This procedure was varied somewhat in the case of tree farm licence number twenty-two where the amount of contract work was increased from thirty percent to sixty-five percent because of the area in this licence which was formerly within the Clayoquot public working circle, where contractors could formerly obtain timber sales,

Since Sloan had indicated that the provision for contract work should apply only to Crown timber, it would be possible for all logging in any year to be done in private timber in a licence, with none available to contract loggers under the Thirty Percent Clause. In his opinion, the provision should apply to all of the timber in the licence, regardless of tenure, but the annual volume should not exceed the percentage of Crown mature timber allocated to the licensee, a volume which averages 62% in the Coastal Region at that time. Disputes between a licensee and a contractor as to price and terms that could not be settled by negotiation should be determined by a board of three to be appointed by the Chairman of the Provincial Advisory Council.

In order to have the contracting-out clause included in licences prior to number fourteen, the Commissioner gave it as his opinion that tree farm licensees should not be permitted to acquire additional timber from public working circles or unalienated Crown lands unless the clause were included in the licence. Sloan reiterated that the major objective of the new tenure recommended in the 1945 Royal Commission Report, was to enable private owners to maintain sustained yield management on their own land by adding sufficient Crown land to make economic units.

In 1960, the Honourable R.G. Williston gave a progress report on tree farm licences to the Legislative Assembly. Mr. Williston who had been Minister of Education had been appointed to succeed R.E. Sommers, Minister of Lands and Forests, who had been convicted and imprisoned for alleged irregularities in connection with the issuing of tree farm licences. Following the publication of the 1956 Report of the Royal Commission on forestry, Chief Justice Sloan had been appointed Forest Advisor to the Minister but died shortly thereafter. He had been dealing with two problems which had not been completed. The first of these was relative to the problems of tree farm licensees bidding on Crown timber in public working circles. The second involved the application of Empire Mills Limited of Squamish for a tree farm licence. This application had become a centre of controversy and its granting had been appealed to the Government.

On July 27, 1959, Judge C.W. Morrow had been appointed to advise the Government on this tree farm licence application and, as a result of hearings, he reported in favour of granting the licence, the report being accepted by the Government. Subsequently, Judge Morrow was appointed to examine the evidence presented to the late Chief Justice Sloan and to advise the Government on the problem of tree farm licensees bidding on Crown timber in public working circles. The results of Judge Morrow's considerations are considered later. In his address to the British Columbia Legislative Assembly on February 24, 1960, the Minister reported that the award of tree farm licences which had been approved subject to submission of satisfactory working plans and which the 1956 Royal Commission had recommended for issue, had been completed. The Report of the Commission had listed eighteen such applications. Of these, thirteen were actually awarded and the Minister stated that these awards completed this phase of the tree farm licence programme.

The Report of the 1956 Royal Commission on Forestry, as mentioned previously had also recommended that tree farm licences should be awarded to the Powell River Company and Canadian Forest Products, as exceptions to the general recommendation that no more licences should be awarded for five years. The Minister

of Lands and Forests, acting under authority of amendments to Section 33 of the "Forest Act," made in 1959, held hearings on this application in Victoria. However, before a decision was made, a prohibition order was filed in the courts by opponents of the application, restraining the Minister from making any decision under the existing legislation. In due course, on February 15, 1960, Mr. Justice Norris dismissed the case and the prohibition order and the applications were subsequently granted. At the time of the Minister's speech to the Legislative Assembly, thirty-six tree farm licences with 5,851,980 productive acres and as annual allowable cut of 226,140,000 cubic feet had been granted.

Judge Morrow had considered the evidence presented to the Honourable Gordon McGregor Sloan, concerning tree farm licencees bidding for Crown timber in public sustained yield units, and he reported his findings on March 4, 1960. The Commissioner had been appointed "to advise the Government concerning the allegation that tree farm licencees bidding for unalienated Crown timber, either within or without public sustained yield units have, on competitive sales, an unfair advantage over other bidders not holders of tree farm licences." Morrow stated his view based on the evidence, that tree farm licence operators bidding for unalienated Crown timber, either within or without public sustained yield units did not have, on competitive sales, an unfair advantage over other bidders not holders of tree farm licences but they did have advantages. The advantages of the tree farm licence operator in competitive bidding were, the Commissioner felt, the assurance of his timber supply which enabled him to finance his operations with greater ease than the timber sale operator. This situation was tied in with another advantage in that the performance deposits which were required by the Government from a tree farm licensee were lower than those required from a timber sale operator. These two advantages enabled the tree farm licensee to plan his road building on a long-term basis. It is worth emphasising that, within a tree farm licence, the licensee is responsible for his own road building, although he can expect a gradual refund of part of his cost through reductions of stumpage. The costs of road building into largely virgin forest is a very important cost consideration in licence management. The long-term tenure of the licences permit long-term planning, avoiding unnecessary duplication of road construction. However, Morrow also concluded that the tree farm licence operator had disadvantages in that he had to make a compulsory contribution of his own timber to the licence which meant that he could not liquidate his own timber as he wished but had to maintain a constant cut. The provision of protection against forest fires and of insect control bore more heavily on the tree farm licence than on the timber sale operator. As a result of these conclusions, he recommended that timber sale contracts should be altered to permit an action on contract for damages rather than exceptions of forfeitures of deposit and a review of the timber sale deposit system, in order to give timber sale operators some relief. He also recommended that the entire problem of forest tenures should be taken under advisement, particularly in relation to tree farm licences.

As time went by, it became clear that the Government was gradually moving away from the tree farm licence policy. Opposition to the policy had continued, particularly from special interest groups who received much newspaper publicity. It may be construed that this pressure and its potential effect on political views

of the electorate had a degree of influence on the Government. On May 24, 1961, the Minister of Lands and Forests addressed the Northern Interior Lumber Manufacturers Association. He spoke of the problems of superimposing or integrating the pulp economy on a large, vigorous, well-established sawmill economy. The pulp mill financier, investing tens of millions of dollars, would not accept any plan that did not guarantee an absolute security of supply of the raw product. Waste surveys in the Prince George area had shown that there were enough sawmill wastes and was left in the woods after logging to support two or three pulp mills without much difficulty. However, pulp investors, at least for the time being, would not accept this method of supply. The Government did not feel itself to be in a position to agree to grant a tree farm licence around Prince George to secure pulpmill investor's wood supply because the requirements of the sawmill industry, still the heart of the economy, must continue to be supported by the public sustained yield units. Thus, a new form of tenure, the "pulpwood harvesting area" had been devised (this will be described later).

But by 1965, the Minister of Lands, Forests and Water Resources was again, in effect, justifying tree farm licence extensions or awards by stating that special circumstances existed. In an address to the Fifty-Sixth Western Forestry Conference held on December 8 - 10, 1965 at the Bayshore Inn, Vancouver, he said

"It takes a lot of weighing of values before one can reach a decision on the best step and that next step may not necessarily be in the direction of the one we have been following.

"For example, a recent application by Tahsis Company Limited to extend its tree farm licence on face value went against the intention of not altering tree farm licence boundaries . . . but here was an opportunity of getting an entirely new pulp mill and establishing a needed service community on Vancouver Island's West Coast."

An extension of an existing tree farm licence was granted to the Tahsis Company. Skeena Kraft Limited had been awarded a tree farm licence, to support a proposed pulp mill at Prince Rupert on the grounds that the timber area concerned was remote and with no sawmills operating. The establishment of an industry in such an area, the Minister said, was bound to be expensive and a tree farm licence was awarded to

". . . give them additional benefits to help offset the heavy costs of development."

Another company, Eurocan, had been awarded a tree farm licence at Kitimat, the Minister explaining that in this case

". . . we were going back to an original intention to round out the economy in that area by providing the forest industry to complement the huge aluminum complex."

By 1964, there were forty-one tree farm licences in existence, with a productive area in excess of 7,000,000 acres and including approximately 1.5 million acres of private forest land. The bulk of the most valuable private lands are in the Vancouver Forest District and, in this district, 1.2 million acres of private lands are included in the 3.3 million acres of tree farm licences.

It is now time to turn our attention to public sustained yield units. P540
As we have seen, the Royal Commission on Forestry of 1945 recommended, in connection with the introduction of the sustained yield policy, that "private working circles" (tree farm licences) and "public working circles" should be established. For convenience, the latter will be referred to as "public sustained yield units" in keeping

with present day usage. The formation of public sustained yield units began in 1950,⁶⁰ when four public working circles, located in Provincial forests were analysed by the Forest Service, with regulation of cut to be initiated in 1951. In 1956, forty-seven public sustained yield units were in existence, comprising 21,668,787 productive acres and with an approved annual allowable cut of 267,640,000 cubic feet.⁴⁰ In 1965, there were seventy-five public sustained yield units, of 69,781,944 productive acres and with an approved annual allowable cut of 687,492,876 cubic feet.⁶¹

It is interesting, from an administrative standpoint, that the initial methods of organizing a public sustained yield unit did not follow a definite modus operandi. Rather, the units were established by a process of issuing a series of policy and administrative directions, sometimes related to specific public sustained yield units and sometimes of general application, as a need for clarification or change of rules arose. As a result, the administration of the units became extraordinarily complex for the Forest Service and industry. Once the boundaries of the public sustained yield unit had been established, the Forest Service set, from its inventory figures and yield calculations (the latter being confidential within the Forest Service), an annual allowable cut figure for the unit. All of the companies or individuals who were logging, or had logged in the previous five years, within the new public sustained yield unit were allotted a portion of the allowable cut. The particular portion or "quota" allotted was calculated by taking the average annual cut of each "quota holder" from within the public sustained yield unit area and totalling them. If the total of average actual annual cuts exceeded the annual allowable cut, the quota holder was allotted a quota which was reduced by the percentage difference between the average actual cut total and the annual allowable cut. Conversely, if the annual allowable cut exceeded the average annual cut, the quota holders were allotted a quota generally equal to their average three-year actual cut (the term might occasionally vary) and or their "commitment" (see below) whichever was the higher, the surplus of allowable cut was open for public auction in the form of timber sales, the successful bidder thereby acquiring additional quota.

The quota merely conveyed the privilege of applying for a timber sale, with the area of application for mature timber within the public sustained yield unit being generally at the discretion of the applicant. The timber sale would provide sufficient timber to fill the applicant's quota for a specified number of years, usually not exceeding ten years. Timber sold to a quota holder was (and is) described as a "commitment" and when the entire annual allowable cut has been sold, the public sustained yield unit is said to be "fully committed."

Once the quota holder purchased sufficient timber in a timber sale, his privilege of application ceased and remained so until approximately two years prior to the time when his timber, cut at the annual level of his quota, would run out. If he cut more than his quota and removed his timber at an accelerated rate, this did not affect the date upon which his privilege to reapply would take effect, so that he could have no timber supply during the intervening period. Conversely, if he did not remove his quota annually from a timber sale and, at the time when he could normally apply for more timber a volume of timber remained on the timber sale, it was usual to re-commit this volume against his future quota requirements. An added safeguard against highly erratic levels of cutting, it became usual for the

timber sale contract to include a clause specifying the maximum and minimum cuts which would be permitted in each year of the term of the timber sale. This clause allowed a cut of 50% over or under the quota in any given year but required a close adherence to the cumulative quota by the time of expiry of the timber sale. As an added complication, it was not infrequently found that the Forest Service cruise estimates were inaccurate and did not correspond to the quota multiplied by the term of years of the timber sale. As a rule of thumb, if at the expiry of a timber sale and assuming that the quota holder had cut the specified amount of timber, it was found that volumes of timber remained of a significant quantity, exceeding approximately 20,000 cubic feet, then that volume would be recommitted to meet the timber sale holder's future quota requirements. If a deficiency occurred and the timber on the sale was removed before the quota was satisfied, an application for additional timber would be considered by the Forest Service, although the application was not always successful.

In a case where a quota holder held more than one timber sale he could usually obtain permission to "group" them, if he so desired. This permitted the operator greater flexibility of operation. For example, he could carry on one logging operation on one timber sale instead of conducting small cuts on each timber sale. The group of sales was then controlled as to annual cut, rather than the individual timber sale.

After a period, it became evident that public competition for timber sales within public sustained yield units could result in an operator losing his quota. If another bidder purchased the sale he acquired the commitment and the applicant's quota (or privilege to apply for further commitment of timber in the future) was automatically transferred to him. Thus, a sawmill could be deprived of its supply of timber by an aggressive competitor seeking to acquire more quota to gain a foothold in a specific public sustained yield unit. In order to counteract this situation which was considered to be undesirable, the Government made certain provisions. Firstly, in a fully committed public sustained yield unit, only an established quota holder could apply for timber but anyone could bid on it. In a case where the Forest Service put up timber for sale in a public sustained yield unit which was not fully committed, i.e., the annual allowable cut was not taken up by the existing quotas, anyone could bid on it and the commitment and quota went to the successful bidder. Secondly, should a quota holder apply for timber, he could elect public auction or sealed tender bidding. In the case of sealed tender bidding, the applicant was given the opportunity to meet the highest bid, should it not be his own, and thus to acquire the sale without further competition. Thirdly, the Minister of Lands, Forests and Water Resources already possessed discretion to reject any, or all, bids on a timber sale where he considered that they were unreasonably high, and he could award the sale to the applicant. The Minister began to employ this discretionary power. Finally, a bidding fee was introduced in 1964/65 under which bidders other than the applicant were required to pay 5% of the stumpage value of the timber in order to be able to bid. This was clearly a deterrent since the fee would almost invariably be lost along with the sale. The applicant did not have to pay such a fee.

The Royal Commission on Forestry of 1956⁴⁰ commented that many witnesses appearing before the Commissioner thought that the primary reason for the creation of public sustained yield units was to establish managed areas from which the smaller operator, who did not have a forest management licence, could be supplied in perpetuity with timber. Sloan believed that, although this might be the effect of setting up sustained yield units, the underlying reason for their existence was the need to bring unalienated Crown lands within the sustained yield programme of management under the Forest Service and at the public's expense.

The Commissioner held that the public sustained yield units were, in part, the direct lineal descendants of the forest reserves which were established by the Dominion Government in those land areas conveyed by grant from the province to the Dominion in consideration for Canada's undertaking to construct a trans-Canada railway. In 1911, the Federal Government set up seven forest reserves in the Interior, along the railway belt and it added three more in 1913. The boundaries of eight of these reserves were changed in 1919 and, in 1930, they were re-conveyed to the Province along with the areas remaining unalienated in the railway belt and the Peace River Block. The latter block was also termed "the 'lieu' lands" since it had been ceded to the Dominion Government in lieu of unproductive land contained in the original railway belt. Paralleling the establishment of forest reserves by the Dominion, the Province by enactment of the "Forest Act" of 1912 was empowered to set aside areas of Crown forest land as Provincial forest reserves, as we have seen previously.

Sloan noted the observations of Mulholland on these Provincial forest reserves, in 1937.⁴⁰ At the time Mulholland made his remarks, there were thirty-nine forest reserves in the Province and he wrote of them, in part:

"When a forest, or a combination of forests, economically suitable for management as a unit, is being cut on a scale exceeding or even comparable with its capacity for sustained yield, then it is time to regulate its yield; every year of overcutting makes regulation more difficult, the ultimate disturbance more severe, rehabilitation of the forest more expensive, and the effect on the general public interest more harmful.

"As these Provincial forests have been set aside for the purpose of producing timber in perpetuity, they are the logical place for the commencement of planned forestry. Not that every Forest should be regarded as a unit in itself, but suitable groups of Forest may be managed to provide permanently the raw material necessary for established industries and communities already dependent upon them. Many of the Provincial Forests are already overcut, particularly on the Coast.

"With many surveys and preliminary outlines for working plans already made, the Forest Service is seeking the cooperation of timber owners, the forest industries, and the public in its attempt to introduce forest regulation where it is needed."

The working plans to which Mulholland referred were not actually brought into use and new working plans for the public sustained yield units have not yet been completed. There do exist yield and allowable cut calculations but these are not in a form which the Forest Service is prepared to release, at least for the time being. These documents appear to be analogous to the "paper plan" in the formative days of Indian forestry, ie. a plan which simply regulates the cut, based on available inventory information but which has little silvicultural, engineering, protection, cutting priority or other provisions. By contrast, some of the preliminary outlines for the working plans to which Mulholland referred were substantial documents, for example, Nixon and McBride's preliminary working plan for the Okanagan Valley.

Mulholland also noted the secondary uses of the Provincial forests, such as regulation of irrigation water in the Okanagan, cattle and sheep grazing, maintenance of game, fish and fur-bearing animals, which must be coordinated with forestry in the public interest, employing technical knowledge and economic planning.

In 1945, Sloan, in recommending the sustained yield policy, noted that little, if anything, had been done towards regulating cutting in the Province to the sustained yield capacity. In 1956, he noted that there were then twenty-six forest reserves on the Coast and thirty-one in the Interior. Sustained yield management was taking place in parts of these reserves where they had been included within twenty-two tree farm licences. In evidence before Sloan in 1956, Dr. C. D. Orchard, Deputy Minister of Forests and Chief Forester, had stated that it was the ambition of the Forest Service "to have eventually one-half of the Crown lands included in forest management licences (tree farm licences) and one-half in the public working circles (P.S.Y.U.s)." Orchard described the procedure employed by the Forest Service in setting up public sustained yield units. The first step was to assemble the best available information relating to the forest inventory, to the operations established in the area, to the average annual requirements of that industry and to forecast a future demand. On this basis and in keeping with the topography of the region, boundaries for the proposed working circle (P.S.Y.U.) were delineated. Following approval of these proposals by the Chief Forester, a management working plan should be drafted and submitted to the Working Plans division of the Forest Service for approval. However, Orchard noted, if adequate inventory data was not available, it might be necessary to postpone submission of the working plan in which case the procedure should be to make an estimate of the allowable annual cut based on such information as was at hand. This estimate would be submitted to the Working Plans division for review and, if satisfactory that division would approve an interim allowable cut that would be subject to revision in the light of future surveys and a future working plan. As noted previously, the latter procedure was followed in virtually all cases, although the Working Plans Division was later absorbed into the Management Division. The key to the matter was the inventory position in the Province. Prior to the publication of the "Continuous Inventory of British Columbia, Initial Phase, 1957," only sketchy, rather general information had been available through the publications of Whitford and Craig²⁰ and Mulholland.⁴⁰ The Continuous Inventory was based on stratified random sampling with sampling strata consisting of groups of forest types recognized in the forest classification. The accuracy objectives of the forest inventory were to produce estimates of gross cubic foot volume by species in the entire Province with a sampling error not exceeding 10% at a probability of .95. The accuracy of the estimates of gross volume at a close utilization standard in live, merchantable trees, ten inches diameter breast height and over, in mature forest stands in the Province was $\pm 4\%$ sampling error. In each of the nine inventory zones into which the Province was divided the sampling error ranged from $\pm 6\%$ to $\pm 10\%$. Each inventory zone consisted of a number of sub-zones of approximately one to two million acres in size. In each sub-zone the ultimate accuracy objective was similar to that used in inventory zones, with the modification

that the accuracy applied to the estimate of gross volume of all species collectively. The foregoing remarks do not take into account non-sampling errors such as tree measuring or applicability of volume tables. In addition to this inventory of mature forests, growth estimates were made for all the forest which the Forest Service considered to be sufficiently accurate for the large areas to which the figures applied, but the reliability of which, when applied to small areas, was unknown. The Forest Service also stated that the sampling errors quoted for the inventory of mature forests, as given above, were indications only of the accuracy of zonal volume estimates and that no assumptions should be made from them concerning the reliability of estimates within more localized units of area. In consequence, a problem arose in applying the forest inventory to the public sustained yield units. Whether or not the Forest Service took a conservative approach to the problem is unknown but a number of foresters and others have questioned the current annual allowable cuts, indicating their belief that they are too low. The Forest Service has continued to pursue inventory work in public sustained yield units by adding to existing

plots so as to bring the sampling error, both in terms of mature timber inventory and growth to an appropriate level for adequate unit yield calculation.

Once the allowable annual cut for a given public sustained yield unit had been determined, Orchard continued, the fourth step should be an analysis of the situation in the unit "relative to the balance between requirements and the ability of the land to produce" and submission to the Management Division of proposals for initiating regulation of cut.

In 1956, it was interesting that the actual cuts made from the public sustained yield units were considerably lower than the allowable annual cuts, as is demonstrated by the following figures derived from the Report of the Royal Commission on Forestry of 1956.

ALLOWABLE ANNUAL CUTS AND ACTUAL CUTS IN
PUBLIC SUSTAINED YIELD UNITS - 1956

<u>Region</u>	<u>Total Productive Area (Acres)</u>	<u>Mature Volume Thousands of Cubic Feet</u>	<u>Allowable Annual Cut Cubic Feet</u>	<u>Actual Cut Thousands of Cubic Feet</u>
Coast	2,100,558	6,514,873	86,560	62,399
Interior	19,568,228	12,531,904	181,080	126,056
Totals	<u>21,668,786</u>	<u>19,046,777</u>	<u>267,640</u>	<u>188,455</u>

In reviewing the situation as it was in 1956, Sloan commented that the objective envisaged by Dr. Orchard, of dividing the forest area equally into tree farm licences and public sustained yield units, was a long-term programme and he thought that many years would pass before it was brought to fruition and the nineth million acres of productive forest land in the Province were included in tree farm licences or public sustained yield units. Nevertheless, the Forest Service⁶¹ stated that there were 79,301,951 acres operating under approved annual cuts in 1965. Tree farm licences accounted for 6,392,115 acres, Christmas tree permits covered 98,000 acres, public sustained yield units covered 43,615,875 acres, tree farms accounted for 515,224 acres and farm woodlots amounted to 12,633 acres. These figures demonstrate that progress in sustained yield has been rapid but they also show that the 50/50 intent expressed by Orchard was subsequently dropped and no real attempt has been made to reach this proportion of tree farm licences to sustained yield units.

The Commissioner next turned his attention to criticisms relating to public sustained yield units and he noted that the evidence before him relating to public working circles was controversial and ran the gamut. Some witnesses recommended their eventual absorption into tree farm licences, others felt that on the Coast all unalienated forest land and all temporary tenures, as they reverted to the Crown, should be incorporated into public working circles and no more tree farm licences should be granted. Sloan did not see much point in discussing the first question since he considered public sustained yield units to be an essential part of forest planning. On the south Coast, he saw the establishment of more public sustained yield units and the attainment of the 50/50 objective of the Forest Service as being most difficult. He felt that the balance must be toward more tree farm licences in this region when the approved and advertised tree farm licences were awarded. This left, for the establishment of additional public sustained yield units, chiefly the northern section of the Coast and the Interior. The northern areas of

the Coast would be attractive, by changes in stumpage employed as an instrument of policy, as public sustained yield units from which logs would move to Coastal conversion plants. However, it was in the vast areas of the Interior that the expanding industry must find its future. The Chief Forester of the Province had supported this view and it was also borne out by the tremendous increase in Interior production, from a cut of 577,000,000 board feet in 1944 to 2,177 millions^{of} board feet in 1955, making an increase of 377.3% over the decade. The Chief Forester had stated that the bulk of industry started in the Interior, and then shifted rapidly to the Coast which was now virtually fully occupied. Consequently, industry was "seeking outlets in the Interior because that is where the opportunities exist."

A criticism which had been made of public sustained yield units before the 1956 Royal Commission stressed the inadequate degree of management by the Forest Service over areas contained in the units. Management was limited to containing the cut within approved limits and to the inclusion of restrictive covenants concerning logging methods, in timber sale contracts. It was also said that inventories and surveys were inadequate for management purposes. Sloan did not disagree with these criticisms and pointed out that the administrative framework of the Forest Service was inadequately staffed to cope with the very heavy burden placed upon it.

"The astonishing fact is that so few men have, so far, accomplished so much." Past Governments ought to have supplied the Service with money and staff sufficient to permit proper surveys of the Forest Reserve areas."

In connection with Forest Service management of public sustained yield units, Sloan further remarked that the existing method of putting up timber sales in the units upon the request of an applicant, the applicant having selected the area, should be modified to a system of Forest Service selection of cutting areas a year prior to the time when the areas would be open for bidding.

The allowable cut of a public sustained yield unit did not take into strict account the factor of accessibility and the lack of access roads, especially into Coast units and this was a matter of much concern to a number of witnesses before Sloan. They included Forest Service officials. John S. Stokes,, forester in charge of the Management Division described the ribbon development of timber harvesting, following the Province's main transportation routes, under which areas close to these routes were being rapidly cut out. The smaller operator, of which many existed, could not finance roads into timber in the hinterland. This had led to demands for the sale of immature and thrifty stands of timber in the ribbon development areas, even though there were stands of overmature, decadent timber to be cut in more remote country. Stokes emphasized that reasonably satisfactory forest management would be impossible without an adequate system of access roads and, although there was reasonable assurance that tree farm licencees would solve this problem in their own interest, the responsibility for public sustained yield units rested with the Government. Stokes gave a number of reasons to justify the urgent need for an adequate system of access roads. Firstly, they would enable effective protection from fire, insects, and disease. They would facilitate salvage and keep losses to a minimum in such cases as fire, insect damage, and windthrow. Effective application of cutting plans, giving the necessary priority to mature and decadent stands, and the preservation of younger growth for maximum profit would be possible. They would

permit flexibility in cutting plans to take advantage of fluctuating market conditions. Finally, they would allow distribution of operation throughout the working circle (P.S.Y.U.) thereby keeping the evils, frustrations and business losses that inevitably arise out of concentrating several operations in too close quarters to a minimum. Stokes proposed that the roads should be of a reasonably high standard, with a cost varying from \$10,000.00 to \$50,000.00 per mile. Although the initial investment would be high, it could be recovered by increasing stumpage within a reasonable length of time. At the time, in 1956, the Provincial Government had a five-year forest access road programme in the public sustained yield units. It was proposed to build 1,460 miles of access roads throughout the Provincial forests at a total estimated cost of \$41,350,000.00, to be financed through the Forest Development Fund. This fund had been set up for access road development purposes. It was formed under the authority of the "Forest Development Fund Act, 1948" and borrowed money under that act or received advances authorized by the Legislature. It could make collections under the authority of Section 164 (4) of the Forest Act and make loan repayments. The evident intention was to have, eventually, a self-sustaining fund. However, the fund was abolished, along with others of its type at the end of 1956, in favour of placing all receipts to and making expenditures directly from the consolidated treasury funds. During its existence from the fiscal year 1950 - 51 to December 31, 1956, the fund made loans and advances of just over \$2,000,000.00 and net expenditures of just over \$2,000,000.00, leaving it with a credit balance on December 31, 1956, of somewhat in excess of \$34,000.00. The collections and repayments in that period had been \$352,758.03, primarily from stumpage payments. Sloan gave the opinion that Government efforts in the construction of forest access roads did no more than "scratch the surface." For the fiscal year 1956 - 57, the Legislature voted an appropriation of \$2,278,000.00 for the construction of development roads. Whilst this was a substantial increase over previous appropriations, it was far from the expenditure of \$8,000,000.00 a year for a five-year period, envisaged in the projected road programme. However, the disappointing feature, apart from the size of the appropriation measured in terms of need, was the fact that only \$900,000.00 of the Note was expended, not only for roads, but for bridges and maintenance as well. Out of the \$900,000.00, only the relatively small sum of \$773,588.00 was spent in the construction of 32.3 miles of road. The efforts of the Province toward building forest development roads were inadequate to meet the need and the Federal Government began to contribute to these roads, with the result that greatly increased expenditures have been made in recent years. These payments were made under the Federal-Provincial Forestry Agreements, now expired, and under the "Roads for Resources Programme" which are described in the chapter of this history relating the role of Canada in British Columbia's forest policy and administration. The Forest Service is now moving toward a policy of road construction by the forest industry with a Forest Service contribution, mostly in the form of bridges.

The Clayoquot working circle in the Coast forests had largely disappeared into tree farm licences #20, 21, and 22, the acreage left forming the Barkley public working circle. Because of this, a number of witnesses for the 1956 Royal Commission had expressed the view that the boundaries of public sustained yield units should be given more permanence. The evidence indicated that the boundaries were subject to change at any time, at the discretion of the Government. Sloan felt that this was not in the public interest and he recommended that the boundaries should be established

and published in the British Columbia Gazette and that no changes should be made except by order-in-council after due public notice and hearing of objections. The Commissioner also felt that any proposed alteration of a major character should be referred to the proposed Provincial Advisory Council for consideration. During 1970, the Forest Service began to have as many P.S.Y.U.s gazetted as forests as possible.

The method of disposing of timber in public sustained yield units was criticized by some of the witnesses appearing before Sloan. Koerner, an industry witness who was a senior executive of Alaska Pine and Cellulose Company Limited of Vancouver, stated

"The public working circle (P.S.Y.U.) shows these main characteristics:-

- "(a) Public ownership of the timber is preserved.
- (b) Conservation and protection of the forest are achieved by regulation as to volume and method of cut.
- (c) The forest may be utilized continuously, so long as log market prices are high enough to induce operation.
- (d) The logging operator has no assurance of a continuous market for his logs.
- (e) The conversion plant using logs from the public working circle has no assurance of a continuous supply of raw materials. Therefore, the tendency for plants dependent upon such logs must be to limit their investment.
- (f) Conversion plants with a limited assured supply of wood, and a low capital investment, do not, in general, produce a high-priced or readily marketable product. They cannot afford research for new developments and better wood utilization. In addition, neither they nor the logging operations are under any compulsion to operate continuously in times of poor markets. They can more readily afford to shut down as their depreciation and overhead are low.

"Thus, the public working circle may achieve the technical forestry objective. By its very nature, however, because of the short-term incentives offered, the public working circle does not contribute to the principle objective of insuring that the maximum contribution is made by the forests towards improving the general economic and social level of the Province.

"In actual fact, the so-called public working circle is in no way different from all other areas of public forests outside of management licences and the foregoing characteristics therefore apply to such other lands. In the areas reserved for public working circles the only apparent difference is that the Government has restricted the number of timber sales."

Sloan did not comment on these views except to say that the primary reason for creating sustained yield units was to ensure a form of management in these areas-- a "technical forestry objective." Marc W. Gormely, a forester and member of the Canadian Institute of Forestry (Vancouver Section) commended the introduction of public sustained yield units.

--"Since such units permit more specific and economic organization of forest land for sustained yield management and should also assist in stabilizing communities."

The British Columbia Forest Service's annual reports from 1957 to 1965 have reported the progressive increase in the area of Crown forest land organized into public sustained yield units. A new trend appeared in 1965 when fourteen public sustained yield units were re-organized into six larger units, three in the Kamloops Forest District and the rest in the Vancouver Forest District.

The Honourable R.G. Williston, Minister of Lands and Forests, during the Budget Debate of February 24, 1960, noted that sustained yield forestry demands more accurate cruises of the areas of Crown timber offered for sale and stated that additions

attention would be given to the matter. As information became more refined and more was known about such things as site conditions and proper rotation ages, changes would be made in the annual allowable cuts of all types of sustained yield units. The new inventory information, the standards of which have been described, was being compiled from twenty chains to one inch air photography instead of the forty to one inch air photography previously employed. Use was being made of tree species which timber cruisers had once ignored and these were being added into the new inventories. He also noted that new techniques and equipment had made areas previously classified as inaccessible, accessible.

The remarks of Williston in relation to a specific community are of interest and provide an illustration of the application of sustained yield in a central Interior community, Prince George. Addressing the Northern Interior Lumber Manufacturers Association in Prince George on May 24, 1961, he noted that there were, in the Prince George Forest District, eighteen public sustained yield units with a combined total annual cut of 105,000,000 cubic feet over 12,000,000 acres of productive forest land. In other words, the equivalent of the total district cut of five years previously (in 1955) was now secured ^{from} the public sustained yield unit system. To make the operation of the units practical and by way of "bringing these extra millions of cubic feet of timber into the economically accessible reserve", the Engineering Services Division of the Forest Service had to complete ^{the} construction of more than 109 miles of good standard forest development road in the area. The new Nechako sustained yield unit had ^{just} been formed with an annual allowable cut of 13.5 million cubic feet. Williston saw no reason to expect a reduction in the gross annual cut by the 254 established operators in this new public sustained yield unit. Nevertheless, the Minister continued, these operators would have available to them the degree of protection from ruinous bidding practices, as provided by the extension of the licensee priority system which we have previously described. The Nechako sustained yield unit qualified for this system because it was, at the outset, a fully committed unit, i.e. the demands upon it equaled or exceeded the sustained yield capacity. The licensee priority system gave the opportunity of sealed tender bidding to any established operator in the unit who had applied to purchase Crown timber. In addition, no one but an established operator could ask for a sale to be put up for bids. If an operator elected to employ the sealed bid system, he would be given the opportunity to meet the bid of any outside bidder—"a sort of second chance." If he met the outside bid, he was awarded the sale. If he did not choose to meet the outside bid, the sale went to the highest bidder. There were indications at the time that requests for sealed tender bidding were increasing. There were two features of significance about the new Nechako sustained yield unit, apart from the fact that it was fully committed and eligible for the licensee priority system. Firstly, the new unit would "close the circle" around Prince George and this could be looked upon as an economic bulwark against "boom and bust" and all its terrible economic and social consequences. The second feature was the total of 254 established operators, 61% of whom cut less than 20,000 cubic feet per year. The Prince George area was the scene of an innovation insofar as sustained yield units were concerned. A start had been made on the development of forest communities to provide living facilities for families whose men worked in the more remote areas. As an example, the Bear Lake

community had been established.

In 1961, Williston made an address in the Budget Debate of the Legislative Assembly and announced that six new public sustained yield units were formed during 1961, bringing the total to seventy-eight. An impetus had been provided to the forest road programme, as mentioned previously, when the Federal Government provided \$1,183,189.00 available on a basis of an equal sharing of costs with the Provincial Government between December 1st, 1960, and November 30th, 1961. A record mileage of 179.5 all-weather, graveled loghaul roads was constructed during 1961, raising the total since the start of the programme in 1960 to 529.1 miles. Practically all of the new roads led into previously inaccessible portions of sustained yield units.

On January 16, 1963, Williston talked to the Truck Loggers Association Convention in Vancouver. He was a member of a panel discussing the question "Can the small, or independent operator, survive midst the large integrated companies?", a question in which the Truck Loggers Association was vitally interested. Much along the same lines argued by Moss in 1956, the Minister pointed out that a "small" operator in the Prince George area would probably have a maximum investment of \$100,000.00, whereas "small" on the Coast implied a much larger operation. To re-enforce his point the Minister gave an example of a "small" Coast logging operation which had been sold for \$500,000.00. The introduction of the sustained yield policy, following the recommendation of the Royal Commission on Forestry in 1945, was outlined by Williston. With its introduction, free enterprise, in the classical economist's definition ceased to exist in the Province's forest industries, since the forest entrepreneur no longer had free choice of his logging chance and his annual production had to be balanced against the renewable volume of his timber sales. The logger, whether small, medium or large was no longer free to move where he wished, nor was he free to log in such volume as he saw fit, in keeping with market conditions. Having thus departed, by regulation, from free enterprise other regulations would soon follow. These were represented by such terms as "established operator," "quotas," and "sealed tender bidding." There was current pressure from some quarters for the "Forest Act" to be amended still further to restrict bidding on Crown timber in fully committed sustained yield units to established operators, even though such an amendment would mean that an operator on the Coast, for example, could not move from one managed unit to another unless he already had a timber sale in that unit. The Minister stated that he referred to this proposal for the Truck Loggers Association.

"To demonstrate how far we can go in our thinking in these matters in a few years and what was totally unacceptable at one time is common place and accepted as the current way of life a few years later."

The Minister noted that the Government had already gone a long way to protect the established operator and felt that they could not legislate for every eventuality. The policy was to have as much free enterprise as possible and, if this policy was to continue, further limiting legislation must be given careful study. It might well be that future revisions to the "Forest Act" should only be those which were required to guarantee forest management in the Province, with restrictions designed to ensure better utilization.

Williston also pointed out that the entrepreneur, however, had to contend with very potent pressures other than restrictions arising from forest management. The income tax and succession

duties in Canada are designed as a means of redistributing wealth. Succession duties could present a considerable problem to the private company, since the tax imposed would exceed normal cash reserves; consequently, there was the possibility of a forced sale to raise enough cash to pay the tax. Alternatively, a public company could be formed or the businessman might sell out to someone as he approached retirement age. The man who originally launched the enterprise must, in any event, realize enough cash or other negotiable assets for his heirs to pay the succession duties on his estate. Even if he had been only reasonably successful as an operator, the value of the business would represent a sum of money far beyond the resources of most people endeavouring to start business in the field. As a result of past experience in the development of British Columbia, a relatively new country, an image of the successful businessmen had been built up, as someone who started in the forest industry in a modest way and, in time, created an asset worth anything from \$250,000.00 to \$1,000,000.00. The average newcomer, in 1963, did not have the financial resources to take over such an operating unit and it was increasingly difficult for someone to establish an operation of modest size under conditions where raw material supplies were limited in the first place and by reason of tax commitments upon retiring operators.

Williston presented some figures derived from a Forest Service survey which were possibly not entirely accurate. However, if the figures were accepted, it appeared that 65.1 million cubic feet or 53.3% of the production from the public sustained yield units was controlled directly by the industrial manufacturers, whereas 57.1 million cubic feet or 46.7% of the current allowable cut was available to the open market. The Minister concluded from this that the indications were that a strong, independent group of operators was still established in the units and dependent on the sale of Crown timber for their timber supplies. It may be assumed that the Minister's emphasis upon the Vancouver District was influenced by the fact that the most strenuous objections to sustained yield policy and, particularly, to the granting of tree farm licences came from this district, where over-cutting had been allowed to proceed for many years. Also, the Truck Loggers Association which the Minister was addressing was amongst the strongest and most vocal objectors to tree farm licences.

Williston stated that the element of free enterprise must be retained and bureaucracy restricted to a minimum so that some freedom of choice was retained. The independent, smaller operation would represent, so far as the Crown was concerned, a kind of "check and balance" in the appraisal of Crown stumpage because through this source the appraisal officers would be able to get a measure of competitive operating costs.

The future size of logging operating units also received comment from Williston. Because of topographic conditions, there would always be logging operations that could only be profitably operated by a small crew of experienced men and where a large, integrated company or a large contractor might find difficulty in adjusting their activities to small areas or stands of low volumes per acre. It seemed to the Minister that, as the Province became involved in "second growth" forest management, the logging operating units would become smaller and smaller, thereby leading more and more to the establishment of a large body of logging contractors.

This body could also function in small units in thinning operations, a totally different situation from what was recognized as a logging operation.

As a result of these various considerations and policy aims, the Government action should consist of:

- (1) Ensure a sustained supply of timber for sale in the public sustained yield units and attend to those matters, eg. more accurate timber inventories, which might affect the allowable annual cut.
- (2) Implement fully the Government policy concerning the "Contractor Clause" which had been inserted in the contract documents for tree farm licences #13 - 38 inclusive, most of which were on the Coast. The tree farm licensee was required to provide the opportunity for contractors other than the licensee's own employees or shareholders to harvest a minimum portion of the allowable cut. Licences #14 - 23 inclusive required 30% as the contracting portion, whilst Licence #13 and Licences #24 - 39 inclusive required 50%.
- (3) Intensify, subject to limitations of available funds and trained personnel, the reforestation of cut-over lands. Williston stated that this was already in process at a quickening pace and included smaller areas which were unsuitable for the larger operations of the Forest Service Reforestation Division. The early reforestation of these logged areas together with the accelerated reversion of immature timber areas and logged areas from timber berths and licences to the Crown was all part of the management plan to maintain and increase the allowable cut available to established operators.
- (4) Consistent with efforts to increase the allowable cut, a gradual insistence on more complete utilization of wood on the ground. This might take the form of more stringent contract utilization conditions and continuation of the policy of charging salvage stumpage rates (lower than normal rates) for the utilization of wood waste on logged-over areas. It was quite possible that the integrated operator might have some advantages in relogging areas for waste wood but, on the other hand, the nature of the operations lent itself towards the small, independent operator.
- (5) In some cases where a high incidence of defective timber occurred, encourage improved utilization practice so as to remove all merchantable volume and prepare the ground for regeneration of a new forest.

Williston concluded that, without regard to Government action or policy, the role of the independent logging operator might change gradually from that of a "rugged individualist purchasing his own timber supplies and producing logs for sale" to that of "a contractor who will be hiring out his services and equipment." There was, however, no current strong trend in this direction.

In the following year, the Minister resumed his policy discussion at the point where he had ended in 1963 when he gave some remarks at the opening of the 1964 Convention of the Truck Loggers Association. This time he gave four basic rules which he felt should govern Provincial forestry. Firstly, the land should be kept productive at all times. This principle involved regeneration of a new crop by natural or artificial means. Secondly, the resource must be protected from fire, insects and disease. Thirdly, a cut control must be applied to keep the harvest in balance with the ability of the land to produce and, fourthly, the crop should be improved in quantity and quality through thinning, a genetics programme, the breeding of plus trees, and so on. It can be logically assumed that the Minister was stating key points of the Forest Service Management Policy and was endeavouring to have them introduced into subsequent discussion at the Convention. The Truck Loggers Association was and is, primarily interested in logging and forest

utilization. It is logical to assume that the Minister and the Forest Service would wish to direct the Association's attention and thought to the overall management policy, in which logging and forest utilization were only two factors. Nevertheless, another reason may have existed for the mention of reforestation, in that this subject as such could have been at the time and might be at the present, a cause of serious embarrassment to the Government.

The Minister then dealt, in layman's terms, with the "utilization of small wood." His remarks were to be the precursor of a major policy statement in the following year (1965), the objective being to improve forest utilization with its various apparent benefits. In 1964, the Minister stressed that the Truck Loggers Association panel should emphasize certain points. Firstly, utilization must be economic since complete utilization is not good if the material is uneconomic to handle. To be economic, suitable machinery with lower capital and depreciation costs would be required in keeping with the value of the product. The trees themselves, in a close utilization economy, might be of low quality. Markets for low-grade wood might be poor or even almost non-existent as they were at that time on the Coast. Secondly, it appeared that no logger knew the general limit of economic utilization. Such a limit would vary from logging show to logging show and the precise limit would depend on the choice of machinery, the material to be harvested, the market price, and local conditions such as topography or the state of development, eg. of the roads of the area itself. Thirdly, under close utilization, more people would be employed per acre cut over each year in the actual harvesting operation. In addition, there would be increased employment in the utilization plants. Fourthly, there were certain silvicultural aspects. The removal of the small material would greatly assist the mobility of planting crews and there would be less need for slash burning and less material for insects and fungi to attack. Fifthly, improvements in the existing methods of logging and extraction, for example, the cutting of lower stumps could increase the volume of wood to be taken out. These remarks perhaps stressed the obvious, but it appears probably that policy planning was already under way on the subject of closer utilization and that the Minister's remarks in a very general way were offering an opportunity for discussion on the subject of closer utilization by interested groups not directly connected with policy planning.

The Minister dealt also with two points of "general forest policy." The first dealt with the question of cut control in public sustained yield units. As a result of checking the scale returns from timber sales against the Forest Service cruises of those timber sales, it had become apparent that the cruises were generally conservative. This had meant that, on timber sales in the Coastal Region, too large an acreage was being cut over annually. It should be mentioned that, at this stage, if an operator purchased a timber sale for the cruise volume, he could cut the entire timber sale without having any excess volume "charged" against his annual quota although, of course, he paid stumpage and royalty for the excess. This situation meant, in turn, that Coast forests might be in a state of overcutting. The problem, in the public interest, was to find "a formula which will ensure adequate cut control and at the same time, provide an incentive for the operator to achieve as complete utilization as possible." A solution, involving control of individual operator annual cut by scaled volume instead of by cruise volume had been postponed for six months to allow for discussion by industry associations and by agencies.

Williston also defended the role of the Select Standing Committee on Forestry and Fisheries of the Legislative Assembly. The Committee is appointed annually from members of the Assembly and, after studying matters referred to them, report back to the Legislature. This Committee, the Minister stated, had a dual function.

"First to act as a sounding board for new legislation and second, to act as a Court of Appeal relative to policy already in effect."

The Select Standing Committee, in connection with bidding practices, had recommended the amendment to the "Forest Act" whereby an established operator in a fully committed public sustained yield unit should have the opportunity to match the highest bid submitted. Subsequently, the Committee had been urged that bidding should be restricted even further by providing that only established operators in a unit could submit bids. The Committee had not seen fit to accept this suggestion, although they were prepared to hear more submissions at the 1964 sitting of the Legislature. Williston was not prepared to make a general statement on the success of the restricted bidding legislation but was certain that it had had a salutatory effect upon industry by reducing indiscriminate bidding. In the case of sales in managed units where an applicant had been bid up to twice the upset stumpage and royalty or higher, the Minister had been exercising his authority under the "Forest Act" and disallowing the sale. It was then up to the original applicant when he would re-apply for the sale. However, in the case where a timber sale had been put up for sale by the Forest Service, usually in public sustained yield units which were not fully committed, but also in such cases as fire or insect-killed timber requiring rapid utilization, and where an operator's quota was not at stake, the Minister stated that he would not exercise his authority. Finally, the Select Standing Committee had spent much time reviewing the proposed pulpwood harvesting legislation which is described later in this history. The concept of superimposing a pulp economy on a sawlog economy was quite new to British Columbia and the policy carried with it certain inherent difficulties. As an example of these difficulties, the Minister outlined the problem of the diameters of material to be utilized by the respective uses (lumber and pulp), the Department having found that stud mills* were continually lowering the diameter of the logs being used by the sawmill industry. There was also the problem of the size of an area necessary for designation as a pulpwood harvesting area, when there was no experience to demonstrate just how much pulpwood could be harvested from a given forest type or area of forest land. We have seen that, in the Minister's previous addresses, he had stressed the insistence of the pulp industry upon guaranteed supplies of wood and his remarks on this occasion referred to the search for a method to guarantee the supplies and thereby encourage the establishment of new pulp mills.

As has been mentioned previously, the disposition of timber for cutting within public sustained yield units was conducted through the media of timber sales. Timber sales had been employed before the sustained yield policy came into effect and, over the years, have been progressively modified to conform to the changing requirements of the forestry situation in British Columbia. In 1965, Williston in the Second Session of the Legislative Assembly, during the Budget Debate,

* Mills producing 2" x 4" lumber, usually in 8 feet lengths, primarily for wall framing.

reviewed the progress that was being made in the granting of "pulpwood harvesting areas" but he pointed out that they were "not the answer in every case" for providing an adequate guaranteed supply of timber for a proposed pulp mill. In 1964, therefore, a new type of timber sale contract had been introduced as a result of a particular distribution of timber sizes in northern British Columbia. The conventional timber sale, under the current wording (1964) of the "Forest Act" (Section 27) was required to be confined to a specific area. However, under the provisions of Section 27 of the "Act," the Finlay sustained yield unit had been declared a "special sale area" by order-in-council and this action had made it possible to draw up the timber sale contracts that did not designate a specific area. These "timber sale harvesting areas" as they were designated gave the licensee the right to log a given volume per year within the boundaries of the Finlay sustained yield unit for a specified number of years. In order to control the logging, the licensee was required to submit a cutting plan to the Chief Forester and to apply for cutting permits in accordance with those plans. In effect, the cutting permit replaced the conventional timber sale contract which basically assured a certain level of annual cut. The cutting permit designated the area, the annual rental, the forest protection tax, the stumpage, the trees to be cut, the disposal of slash and so on. The Minister emphasized that this type of sale had many advantages over the normal one when used in the right area and under the right set of circumstances but it was not always desirable or possible to declare an area a special sale area under Section 27 of the "Act." Therefore, the Forest Service was requesting some changes of wording in the "Forest Act" to permit timber sale harvesting areas to be processed without special action having to be taken. Section 17 of the Act was subsequently amended and permitted the Forest Service, under authorization of the Minister, to do this.

The advertisement for the two timber sales of the new type called for sealed tenders and these were submitted by the applicants, Alexander Forest Products and Cattermole Timber Limited, each sale being conditional upon construction of a pulp mill by the successful bidder. In the case of the Alexander Forest Products bid, no competition occurred and the sale was awarded at upset stumpage and royalty price. The Cattermole Timber Limited bid was exceeded by a bid placed by Mr. Ben Ginter of Prince George by an amount approximating, over the term of years of the timber sale, to \$12,000,000.00. However, Cattermole exercised its rights to equal this bid and was awarded the sale. In 1967, Williston addressed the Interior Lumber Manufacturers Association at Penticton and mentioned briefly a change in "forest management policy." Timber sale stumpage prices in the past had been geared to market lumber prices, i.e. they moved up and down with fluctuations of lumber price by "the 15% sliding scale formula."* This formula was dropped in favour of a schedule or table of stumpage prices, providing for stumpage changes for each \$5.00 fluctuation up or down in the average market price of lumber or, on the Coast, in log selling prices. This was a more sensitive arrangement than the previous one.

The Minister also made a significant policy statement on forest management when he stated "we believe it is becoming necessary to require operators in public sustained yield units to accept more responsibility in forest management." Over

* When a timber sale was awarded, the selling price of lumber on which the stumpage appraisal was made, was noted in the T.S. contract. Should the average selling price of lumber, as determined by monthly survey, vary from the original price by more than 15% of the original price up or down, then the stumpage was recalculated using the new figure. No cost variations were taken into account in the reappraisal and any amount bid over the original upset stumpage was added on to the reappraised stumpage.

the years of development timber sale contracts had gradually expanded in their scope. Originally, they had simply dealt with logging and matters connected with logging, avoidance of unnecessary damage and methods of disposal of logging slash. The need for the regeneration of logged sites had gradually become recognised as a pressing problem, inadequately dealt with by existing timber sales. In the Interior, this had led to refinements in logging techniques, including clauses requiring certain silvicultural systems of felling. These were not enough in themselves to ensure natural regeneration and site preparation methods (such as scarification to bare the mineral soil) became important. It was recognized, however, that in a number of instances the inclusion of added costs in the stumpage appraisal would result in an inadequate reimbursement to the operator because of the rules surrounding the appraisals. Industry had not been slow to point this out to the Government, particularly in connection with mechanical site scarification and cedar-hemlock site rehabilitation (in which all unmerchantable trees down to eight inches diameter breast height were felled and the slash burned) in the Interior and planting costs on the Coast. As a result, Section 17 of the "Forest Act" was amended in 1964 to allow the Minister to compensate a licensee, in whole or in part, for the approved cost of carrying out silvicultural treatment or constructing a primary access road, either by "an offset against stumpage or by payment from funds appropriated by the Legislature for that purpose." In the case of Crown timber, other than that on tree farm licences, situated east of the Cascade Mountains and sold as a timber sale, the Consolidated Revenue Fund was required to make available a sum to pay the cost of reducing the hazard created by the removal of timber, or to ensure or to promote the growth of a second crop or of silvicultural treatment incident to removing the existing stand, the actual sum being 75¢ per cunit of the average annual cut for the preceding five calendar years for which information was available. These requirements were the subject of controversy with parts of the industry claiming that silvicultural rebates to operators were below the costs incurred. By December, 1966, only twelve timber sales in each forest district had the rebates clause included and this was done, according to the Chief Forester, to allow the Forest Service to assess the problems involved before expanding the system.

In his statement referring to the requirement for operators in public sustained yield units to accept more responsibility in forest management, however, the Minister proposed to go considerably further than responsibility for certain silvicultural, protective or road building operations. He pointed out that, in 1967, some large operators were occupying almost entire sustained yield units and that their operations could be compared in some degree with those of a tree farm licence. It was not the policy of the Government to build a tremendously large Forest Service to perform all the management functions required for public sustained yield units since the charge must eventually come from the operation of an economic industry. New policies might also be required to meet conditions created by technological advances within the forest industry. For example, economic "small wood plants" were expensive to construct and must be run at very high speeds to produce material at a competitive price. Log consumption, as a consequence, was very high. To maintain sustained yield, the number of such plants in any given area would have to be limited because there must be a direct relationship between plant capacity and availability.

of the timber resource. It was becoming apparent, particularly in the central Interior, that some drastic step would have to be taken such as the licencing of conversion plants, if operators were to continue on some basis of economic reality. Returning to the question of operator responsibility in forest management on public sustained yield units, the Minister announced that the Forest Service was introducing a new "cutting permit timber sale" in a streamlining of administrative techniques.

At the time public sustained yield units were introduced, the Province had a large number of individual operators, mainly due to the fact that there were no restrictions on the amount of timber which the Government could sell each year. The introduction of sustained yield, the affects of such measures as succession duties and the growing cost of modern forest industrial equipment resulted in a great reduction in the number of operators in any one unit. The Minister cited the Williams Lake public sustained yield unit as a "classic example." It had started out with forty-one operations and, by April of 1967, only ten remained. The Minister contended that the remaining operators in public sustained yield units, because they were more or less permanently established in their own areas, obviously had a much greater stake in the management of the units involved and ^{that} a number had indicated their desire to take a more active part in forest management. The cutting permit timber sale would offer this opportunity but could not be introduced in all units, ^{but} only in those where there had been a "general settling down" of operators.

The new type of contract would give authority to harvest a specific amount of timber each year from the entire public sustained yield unit if the licensee was prepared to allocate his entire annual allowable cut to the timber sale. He would be restricted to a part of the sustained yield unit if he was only prepared to contribute 50%. The actual development of the area would be left to the licensee and he would be required to submit a development plan, drafted by a registered professional forester, to the Forest Service for approval. The right to cut would be established by means of a cutting permit to be issued by the Forest Service for a maximum period of three years. Under the cutting permit, the operator would be required to contribute to the management of the unit. For example, silvicultural activities such as scarifying and planting would be a condition of the permit, with stumpage

" . . . adjusted to make due allowance for the additional operating costs involved."

The licensee would also be required to submit a fire protection pre-organization plan and a minimum standby force of two or three men would have to be available during the close fire season, whether or not operations were in progress. A major consideration would be the stipulation that, unless otherwise authorized, licensees in the Interior would have to maintain in operation, plants capable of utilizing all trees down to 7.1 inches diameter breast height and a six inch diameter top. This requirement would have to be satisfied within the specified time with due consideration being given to the financial ability of the operator. Although the cutting permit would be issued for a maximum period of three years, it was proposed that the timber sale itself should have a term of ten years with a maximum extension period of three years. For those operators wishing to continue operating under the old system, the timber sale term would be five years and the operator would have to conform to a Forest Service development plan, rather than submitting one of his own. The Minister stressed that

"Perhaps most important of all is the fact that the cutting permit timber

sale offers the opportunity of bringing increased order to logging operations in public sustained yield units at a time when orderly management of forest resources is essential to the forest industry's case for priorities in multiple land-use planning."

The reader will undoubtedly note that the "cutting permit timber sales" as described by the Minister were identical in principle to the "timber sale harvesting areas" which he described during his address to the Legislative Assembly in 1965, although they were to be issued for a purpose other than encouraging the establishment of pulp mills.

The British Columbia Forest Service subsequently issued their proposals as a basis for discussion with the industry associations. John S. Stokes, Assistant Chief Forester in charge of operations for the Forest Service, traced the history of timber sales from the inception in 1912, when they had been recommended by the Royal Commission on Forestry of 1911. The changes contemplated in the timber sale was outlined by the Minister and need not be reiterated. In addition, two proposed forms of the cutting permit timber sale contract were issued by the Forest Service. Form "A" was for use by operators who committed 100% of their annual allowable cut in a public sustained yield unit to the cutting permit sale and Form "B" for those committing more than 50% but less than 100% of their annual allowable cut to the cutting permit type sale.

This account of the introduction of tree farm licences and public sustained yield units, the first forms of tenure to be introduced under the new sustained yield policy, will give some idea of the extraordinary complexity of administrative rules and regulations which developed. Much of the complexity has centered around the disposal of timber within the limits permitted by annual allowable cuts and it is only recently that equally important aspects of forestry such as silviculture and increased forest protection have begun to receive attention. Undoubtedly, a very rapid increase in the emphasis on these other aspects will be necessary if the sustained yield policy is to be successful. In addition, more sophisticated forestry is necessary to meet the increasing social demands for recreational and other forest uses. It is only in the tree farm licence that the forest industry, through the medium of the working plan has been able, in the past, to propose an appropriate form of management compatible with the various uses of the forest land and the forest. In the public sustained yield working circles, the industry has simply been bound by the terms and provisions of the timber sale which, frequently, inadequately reflect the management needs of the locality. The new forms of timber sale which are developing, however, now permit the industry to make proposals to the Forest Service and, provided the regulatory requirements of the Forest Service are sufficiently flexible, this may lead to more enlightened forest management which will be able to achieve social, as well as economic, aims.

The latest form of timber sale tenure is the Timber Sale Harvesting Licence which is described at Annexure II and was forecast by the remarks of the Minister. Basically, these timber sale harvesting licences are large in size as compared to most timber sales and may even cover an entire P.S.Y.U. The licence is responsible for preparing a logging and development plan and a forest protection plan for Forest Service approval, covering all or part of the harvesting licence and conforming to an approved cutting budget. Once the plan is approved, the Forest Service issues a Cutting Permit, allowing operations to commence and containing any additional conditions which the Forest Service wish to apply. The maximum term of a cutting permit is three years. The timber sale harvesting licence has virtually replaced the preceding timber sale form of tenure.

CHAPTER ELEVEN

The Period From 1946 - 1970
The Introduction of Pulpwood Harvesting Areas

The development of a pulp industry in British Columbia has always been a major objective of the forest policy of the Provincial Government. In 1944, there were a number of tenures specifically issued for the cutting of pulpwood and these were pulp licences, pulp leases, and pulp timber sales. The statistics for these tenures were as follows:

PULP TENURES IN BRITISH COLUMBIA IN 1944

<u>Tenure</u>	<u>Number of Contracts</u>	<u>Acreage</u>	<u>Percentage of Total Provincial Productive Acreage</u>
Pulp Licences	252	155,778	0.21
Pulp Leases	33	355,611	0.44
Pulp Timber Sales	19	79,344	0.11

The pulp timber sales were a special class of timber sale specified in the "Forest Act" of 1912 and they had some of the characteristics of the pulpwood leases which were granted between the date of the 1901 "Land Act" and the 1907 Order-in-Council. They were subject to the general conditions relative to all timber sales but, in addition, the applicant had to prove that he had spent \$350,000.00 in construction of a pulp mill or post a bond of \$50,000.00 to guarantee the erection of a mill within three years. The contract was renewable from year to year during the period of the contract and it was made appurtenant to the pulp mill. Any pulp licences held by the pulp mill operator must not contain more than thirty year's supply of pulpwood at any one time. In the 1912 Act, rentals were set at one-half of those payable on ordinary timber sales, with a provision for full rental in the event of the pulpmill not operating six months in ^{any} one year and a provision for full rentals and full royalties in respect of saw timber cut in the pulp area but not manufactured into woodpulp or paper.

Noting the consistent feature of Government policy to promote the growth of a pulp industry, Sloan stated ^{in his 1956 report} that progress had not been disappointing. In 1916, for example, 108,997 cords of pulpwood had been cut. By 1935, the volume had risen to 421,386 cords; by 1945 to 590,598 cords and, in 1950, 703,768 cords were cut. These volumes included normal logs, salvaged wood from logging operations, and pulp chips manufactured from sawmill residues. In 1953, the volume rose to 863,113 cords and in 1954 it sharply increased to 1,179,896 cords. It appeared that in 1955, 18% of the annual cut in the Coastal Region was being processed by pulpmills. However, the growth was relative and there appeared to be opportunities to increase it very markedly. Sloan wrote:

"Total Canadian production of pulp and paper products in 1954 was approximately 17.5 million tons, to which total this Province (British Columbia) contributed less than two million tons. This amount from our twelve mills equals less than one-half the production from one Quebec company—International Paper Company.

"In the field of newsprint, the total Canadian production amounted to six million tons, about one-half of total world production, and British Columbia production was a little over a half of one million tons.

"When we look at these figures and at the steadily increasing volume of pulp production throughout the world, our production, in that frame of reference, shrinks to comparative insignificance.

"To us, however, our pulp and paper industry is a very important segment of our Provincial economy. It is being managed by intelligent and dedicated men who are engaged in a continuous effort to produce high-standard, quality products, saleable in distant markets at competitive prices.

"I am convinced that, given a favourable economic climate in which to operate and expand, our pulp and paper industry, with its integrated operations, will continue to contribute in a great measure to the financial stability of this Province."

The Government evidently concurred in these views. The Minister of Lands and Forests, the Honourable R.G. Williston, made an address in the British Columbia Legislative Assembly during the Budget Debate on February 24, 1960. He believed it to be imperative that waste utilization in the expanding Interior sawmill industry should be improved to achieve a more competitive position for the industry, to create better site conditions for the next rotation and to reduce forest fire danger. A start was being made in the Kamloops Region with the manufacture and shipment to Crown Zellerbach (Canada) Limited of chips made from sawmill waste. The pulp mill of Celgar Limited would be in operation shortly and this would provide a market for waste from the woods in the southern Interior. (Actually, ^{however,} the Celgar pulpmill and sawmill were based on production from the appurtenant tree farm licence #23 in the Arrow Lakes. This integrated industry has had the capability of producing most of its own chips and it has bought only a limited amount from neighbouring sawmills). Both the Kamloops and Arrow Lakes areas would have a competitive advantage in lumber sales because of the return they would obtain from waste material, costing the operators money to destroy by burning. The Department of Lands and Forests, in conjunction with the Department of Industrial Development, Trade and Commerce had published a brochure detailing areas in which interest had been shown in pulp operations and where the opportunity for such installations appeared to be good. The Prince George Region was mentioned as an area of leading potential and the ^{following} facts concerning it were brought out by the Minister. Firstly, the Region had areas under sustained yield management forming a circle of about 100 miles in radius with Prince George at its centre. Within this territory there were more than 300 logging operations and sawmills in existence. The sawmill waste in the Region varied between 36 and 54% of the total log volume. About 35% of this sawmill waste could be used for pulp and the percentage did not include the waste left in the woods in the form of tops, cull, logs, cull trees, and broken chunks. It appeared that the cost to produce and transport chips from waste within a 100 mile radius was approximately \$9.71 per unit, including the removal of bark from sawlogs before sawing. This figure compared with the corresponding value of chips at a pulp mill at Hinton, Alberta, of \$17.00 per unit. Seventeen percent of the forest inventory in the Prince George Region was alpine fir, but the percentage of the total cut removed was only about 1%. Much of this alpine fir was defective and it could only be used for pulp. If one were to use one-half of the available waste from the sawmills, approximately 310 tons of pulp could be produced daily. If one-half of the tree-top wastes left in the woods could be salvaged an extra 165 tons per day could be produced. Another 350 tons per day could be produced from cull trees and small trees being left in the forest. The removal of forest cover from lands suitable for agriculture could produce an additional 360 tons of pulp daily. Finally, if one-half of the small, stunted lodgepole pine in the Nazko and Nechako areas, trees which were unsuitable for sawmilling,

were used, an additional 1,272 tons of pulp could be produced.

As a result of all this, the Minister stated that the area being managed on a sustained yield basis could produce an additional amount of approximately 2,450 tons of pulp per day from one-half of the waste available and from species not being cut for lumber. This was equivalent to about 750,000 tons of pulp per year or about one-half of the total pulp produced by the Coastal mills in 1958.

The Food and Agriculture Organization of the United Nations had estimated that, from the actual world production in 1955 of 56 million metric tons, the indicated world demand for pulp would grow to 88 million metric tons by 1965 and 134 million metric tons by 1975. Much of this future pulp, the Minister held, would come from the forests of Northern Canada. Some of this supply might originate in the Prince George Region without disturbing the existing sawmill economy, other than to make it more profitable and more efficient. A major difficulty remained to be overcome.

"Those who invest in pulpmills have always had an assured backlog of timber which is made available prior to commitment for construction. The most of the south and central Interior today is organized into units of sustained yield production producing the rated capacity of logs for sawmill use. Such a condition is not common to any other region on the continent and this new concept of multi-use of the wood resource is most difficult to explain to those desiring to enter the pulp field."

In the following year, the Minister discussed the new "pulpwood harvesting area" legislation which had been evolved to solve the problem of guaranteeing the supply of pulpwood to projected pulpmills. He was addressing the Northern Interior Lumbermen's Association Convention at Prince George on May 24, 1961. The legislation had been passed at the previous Session of the Assembly and authorized the Government to enter into agreements with parties who would undertake to establish an integrated pulp industry for which the Government would give these parties the first priority to purchase the pulp timber from a given public sustained yield unit or group of such units. It was expected, according to Williston, that the pulpmill operator and the logging operators would enter into agreements whereby the latter would undertake to remove the pulpwood, tree-tops, species unsuitable for lumber, etc., for the pulpmill operator. In the event that the logger was uninterested in working out such an agreement, the pulpmill operator would have the legal right to remove the material in question by the use of his own crews or through his own contract logger. The Minister visualized that the entry of the pulpmill investor would have an important and excellent impact on the existing industry—larger sawmills would install barkers and chippers and sell chips and smaller sawmills would sell slabs, for which the pulpmill would install a slab barker. In addition, a new market for pulpwood, tops and species unsuitable for lumber would increase the value of a logger's timber sale and his profit. The Minister asserted that no new equipment would be required to handle the material currently left on the ground or standing. To date, it cannot be said that these trends have occurred to any marked extent. The supply of chips from sawmills has, in some cases, been adequate to supply the needs of pulpmills. In any event, chips from sawmills have, to date, been a cheaper source of wood than round logs. Where pulpmills are using round wood, it is usually logged by their own crews or contractors rather than by purchase from lumber industry timber sales.

A noticeable trend has occurred in which new pulpmills have consolidated their position by purchasing sawmills and, in consequence, they have acquired sawlog supplies and ensured their own sawmill chip supplies. It seems to be quite likely that, in those areas where pulpmills have been built, the lumber industry in the Interior will become subsidiary to the pulp industry in order that the latter may secure, along with the guaranteed volume of wood supply, an adequate control of the cost of that supply.

In 1963, the Minister informed the British Columbia Legislature that plant expansions in the pulp and paper industry were at an "all time high." The following figures indicated the growth/ ^{from} 1952 to 1962:

INCREASES IN PULP AND PAPER PRODUCTION IN BRITISH COLUMBIA FROM 1952 to 1962 (TONS)

	<u>1952</u>	<u>1962 (Estimated Figures)</u>
Newsprint	320,864	1,200,000
Other Papers	81,835	(Not Available)
Pulp	388,812	1,200,000

A pulpwood harvesting area had been granted at Prince George and another was proposed at Kamloops, both for new pulpmills to manufacture Kraft paper. A number of existing pulpmills were modernizing and increasing their capacities. At the time of the Minister's address, nine projects, excluding the proposed mill at Kamloops, were in progress, representing an increased capacity of pulp and paper production of 3,010 tons per day and a capital investment of \$192,000,000.00. The Kamloops project was proposed for 200 tons of Kraft per day with a capital investment of \$120,000,000.00. It was the beginning of the so-called "pulp explosion."

The British Columbia Hydro and Power Authority⁶² published, in 1966, a comprehensive account of the industry, its participants and its potential. It noted that the value of British Columbia's forest production exceeded \$1,000,000,000.00 in 1966 and the value of annual gross production of the pulp and paper industry exceeded \$300,000,000.00 in 1966. The total forest production was based upon vast timber lands only "one-third commercially utilized." This figure was presumably a comparison between the existing situation and what could be achieved by intensive forest management, including thinning practices. Such standards of management and practice lie in the future and have not yet been achieved. Pulp production in British Columbia, which had more than doubled in the decade ending in 1965, when it reached 3.2 million tons, was expected to double again in the succeeding five years. A tripling of pulp capacity was predicted for the succeeding five years, reaching a forecast annual total of 9,000,000 tons by the mid-1970's. Newsprint and paper production, which had more than doubled in the decade ending in 1965, when it reached 1.5 million tons, was expected to reach 3,000,000 tons annually by the mid-1970's.

Expansions of many of the seventeen existing pulp and paper mills, plus the construction and subsequent expansion of some fifteen to twenty mills within the ten-year period ending about 1975, would call for total planned capital and prepaid expenditures approaching \$1,500,000,000.00. Superimposed on a well-established sawmill economy, it was plain that British Columbia's pulpmills/enjoyed/unusually low wood costs by pulping previously wasted materials. A feature of the anticipated surge in

pulp capacity was the distinct shift in mill location from Coastal to inland sites.

The world demand for kraft (sulphate) pulp was growing at a rate of 8% annually, faster than that of any other chemical pulp. Most of British Columbia's existing pulp capacity and all of its proposed new capacity lay in the production of kraft pulp. Most of British Columbia's unique, high-quality, long-fibre pulps commanded assured markets throughout the world and, although the hydro authority did not say so, the slow grown wood of the Interior had been shown to make a superior quality of pulp. The hydro and power authority review gave other attractive information to the potential investor without deviating materially from fact. The survey did note

"Favourable Government Legislation, providing stability and maximum forest utilization under a sustained yield programme, is attractive to foreign investment."

The policy of providing pulpwood harvesting areas had aided the rather startling expansion of the pulp and paper industry in British Columbia. This is not to say that the process had occurred without adverse comment.

The Honourable J.V. Clyne,⁶³ Chairman of the Board of MacMillan, Bloedel and Powell River Limited, commented on the pulp and paper situation in 1965. The newsprint field, from the point of view of his company which was a major producer in British Columbia, was good. Expansion of markets, at a fair but reduced price in Canada, the United States, and countries bordering the Pacific Ocean was anticipated, along with maintenance of markets in other parts of the world. The long-term market for pulp was somewhat different, although the immediate future was good. The free-world sulphate capacity and consumption were about in balance at 36 million short tons and this had encouraged a number of companies, some new to the field, to embark on pulp manufacturing ventures.

The total sulphate manufacturing capacity of British Columbia was then some two million tons. Additions to existing mills would increase this total by about 100,000 tons by the end of 1967. New mills actually under construction would bring about 1,257,000 tons of new tonnage by 1968, making a total of about 3,300,000 tons. This represented an increase in British Columbia alone of about one and a quarter million tons of pulp per year. There were an unprecedented number of new mills in British Columbia to which timber had been allotted or was in the course of being allotted by the Government, which, if they proceeded, would bring the total sulphate capacity of the Province to about six and one-quarter million tons a year. In other words, Clyne stated, the sulphate capacity of British Columbia would have more than tripled in the short space of about five years and a large percentage of this would be market pulp.

If British Columbia was the only country increasing its pulp capacity there would be no problem, but it was not. The United States, Scandinavia, and Eastern Canada were probably not going to be left behind and, along with various other parts of the world, were planning new pulp production. Without going further into detail, Clyne believed that the total available supply of market sulphate pulp would reach about eleven million tons by the end of 1967, at which time demand would have reached only nine million tons, leaving a surplus of two million tons. The gap would increase since, taking into account only the planned increase in British Columbia between 1968 and the early 70's (3 million tons of market pulp) the supply

would increase to fourteen million tons and the demand to eleven million tons, leaving a world surplus of three million tons of sulphate pulp in the early 70's. In this latter estimate, Clyne did not take into account the expansion of manufacturers in other parts of the free world. He thought that some companies might decide not to proceed with construction.

"As always happens in such circumstances, we can only expect prices to be reduced. There is nothing new in this situation. It appears a cyclical phenomenon. But, nevertheless, some of us, perhaps all of us, are going to be hurt."

It should, of course, be borne in mind that a number of interests involved in new pulp mills--Danish, West German, British, Scandinavian, and Japanese as well as United States--are users of pulp and are not placing their whole British Columbia production on the market but are using at least a percentage of the increased output themselves.

In 1964, the Minister of Lands, Forests and Water Resources commented on the growth of the pulp industry before the Legislative Assembly and referred again to "pulp harvesting licences.". He explained that this form of tenure was an attempt to superimpose a pulp economy on a sawlog economy for the first time in North America. It had been developed as a direct outgrowth of hearings of the Select Committee on Fisheries and Forestry. The public sustained yield units had been established to provide a permanent supply of raw materials for existing sawmills and their allowable annual cuts were based on saw timber utilization. At the same time, it was realized that, with more complete use, the forests being logged could supply raw material for additional industries such as the manufacture of pulp and paper. It was definitely in the public interest, therefore, to have more pulp plants located in the Province and particularly in the Interior. The pulpwood harvesting licence gave assurance of wood supply to the pulp investor by granting, to the licensee, a first refusal for the purchase of pulpwood from one or more public sustained yield units for the life of the contract.

The objective, the Minister stated, was to have the sawlog and pulp industries develop side by side, not one at the expense of the other. He admitted that there would have to be "give and take" and that problems would occur such as dual occupancy of the same area for logging the different products. The suggestion of dual occupancy was a new thought and placed a different emphasis on the Minister's remarks on the proposed logging process which he had made at Prince George in 1961. Naturally, there would have to be changes in thinking as, for example, in the idea that a log of a given size was a pulp log, while one a little bigger was a sawlog. Standards were changing so rapidly in the milling business that quality, rather than size was the criteria which determined whether a given log was a sawlog or a pulp log. As an aside, it is interesting that ^{while} the Interior Lumber Associations sought reassurance from the Government that the pulpwood harvesting licences would not reduce the sawlog cut available to them but this assurance was not given in a direct manner. Up to the present time, a theoretical definition of a pulplog or a sawlog has not been made and it is clear that some logs suitable for sawmilling will be and are going into pulpmills.

The Minister stressed that a pulpwood harvesting licence did not give the licensee the privilege of growing a crop of trees, nor the title to any land for forest growth. Title was retained by the Government and the task of actual forest

management was left with the Forest Service. However, this management was a tremendous undertaking and the ultimate success that could be achieved would call for the cooperation of all interests involved. The job could not be left solely with the Forest Service. In subsequent speeches, the Minister continued to stress that the pulp economy was to be superimposed on the lumber economy, without harm to the latter.

In 1965, addressing the Legislative Assembly, he referred to the availability of raw material to support the "explosion" in the pulp industry. Some doubts had been expressed on this point and he wished to reassure the Legislative Assembly. The Provincial harvest of wood in 1964 was 1,514,595,176 cubic feet. This was the largest volume cut in the Province's history, being 2.8% greater than that for 1963 and more than 50% greater than the 1954 scale of 939,276,535 cubic feet. However, the ultimate capacity of the forests, assuming proper management of the entire resource and full utilization, was estimated to be 3,000,000,000 cubic feet per year. The increase in wood production figures due to the remarkable increases in pulp capacity did not represent an increased rate of depletion from an inelastic supply. To the contrary, most of the additional wood being used came from material that was being wasted in the days of the "pioneer wood economy." This trend had been most marked in the Interior, where a developing market for pulp chips had provided the impetus for the installation of debarking and chipping facilities in many sawmills. However, up to the time of his address, the Minister noted, the improvement had been related only to mill waste and, except for a few large operations in the Coastal Region where logging was conducted carefully, there was a large field for improvement. The demand for pulp chips in the Coastal Region was reaching the point of exceeding the supply. With added pulping capacity, operators were turning to roundwood resulting in more complete use of the forests.

In an apparent reference to the remarks of the Honourable J.V. Clyne and others, the Minister referred to the expressions of concern about the sudden upsurge in pulp production having an adverse affect on the world market. He could not believe that a very real problem existed. Whereas the established mills in the Province had long since established their markets, the new ones were tending to associate themselves with foreign companies which would be able to use, or sell, most of the new produce. For example, Reed Paper Company, the largest distributor of paper products in the United Kingdom, had associated with Canadian Forest Products in the Prince George Pulp and Paper company. The Kamloops Pulp and Paper Company was an association of local operators and the Neyerhauser Company of Tacoma in the United States. Northwood Pulp of Prince George was a joint venture of Noranda Mines Limited (a Canadian company) and the Mead Corporation of Ohio, U.S.A. The Mead Corporation was also associated with British Columbia Forest Products Limited and Argus Corporation (U.S.A.) in Alexandra Forest Products Limited. The Canadian International Paper Company, an experienced paper company, had associated with the Tahsis Company Limited. In Skeena Kraft Limited at Prince Rupert, Columbia Cellulose had joined forces with Svenska Cellulosa A.B. The Intercontinental Pulp Company at Prince George was formed as a joint subsidiary of Prince George Pulp and Paper Limited and Feldmuhle A.G. of Dusseldorf. United Pulp Company also had an experienced Canadian associate, Price Brothers and Company Limited.

These companies had world-wide marketing organizations and their ability and judgment were such that the Minister could not believe they would invest many millions of dollars in costly ventures if they were not convinced that they could dispose of the product.

Section 17A of the "Forest Act" of 1966 defined a "pulpwood harvesting area" and the ministerial powers connected with it. The name means an area of Crown land situated east of the Cascade Mountains and within an area or areas established as a unit or units administered by the Forest Service for the purpose of growing and sustaining crops continuously on the area, for periodic harvesting. There must also be, of course, pulpwood within the area. The definition of pulpwood in Section 60 of the 1966 Act meant timber cut into lengths not exceeding four feet or declared by the Minister to be pulpwood, upon it being shown to his satisfaction that the timber was below the standard of utilization for sawmilling purposes in the district in which it was cut. The pulpwood or the pulpwood harvesting area, according to the legislation, could not be disposed of except under the provisions of Section 17 or Section 17A of the Act. The Minister was authorized by public advertisement to invite proposals from persons interested in establishing a utilization plant to utilize pulpwood on a pulpwood harvesting area. Subsequent to advertising, the Minister was required to arrange for and publish the time and place for^a public hearing of interested parties to consider proposals, counter-proposals, and objections in accordance with whatever regulations might be made for the hearing. Where there was more than one proposal, the Minister was required to specify the terms and conditions with which the applicants for pulpwood utilization must comply and to sell by public auction, on the basis of a bonus paid over and above stumpage rates, an option to purchase the pulpwood "in whatever form and having whatever content that he (the Minister) may prescribe." If there was only one proposal the Minister might grant an option to the applicant and, in any event, he was also authorized to reject any or all proposals.

An option to purchase pulpwood sold or granted in a pulpwood harvesting area has to have an expiration date not later than twenty-one years from the date of sale or grant of the option. Whilst the option will be renewable at the expiry date, the renewal will be subject to re-negotiation of the terms and conditions of the option, according to the provisions of the "Forest Act" and regulations in force at the time of application for renewal.

The Minister was also empowered, subject to the terms and conditions of the option, to increase or decrease the size of any pulpwood harvesting area or to cancel the designation. The Crown must be paid on pulpwood cut from a pulpwood harvesting area, stumpage, inclusive of royalty, as appraised and assessed by an authorized officer of the Forest Service.

Some of the comments made by the Minister during public hearings on pulpwood harvesting area and tree farm licence applications on April 20th and 24th, 1964, are of interest. The Minister had stated that his job was to get mill waste, logging waste, small (diameter and/or height) stagnated stands and decadent stands utilized. However, in connection with the definition of pulpwood, a pulpwood harvesting area agreement would be made only for timber not being used as saw timber by local manufacturing practice and the available saw timber supply would increase rather than decrease.

On another occasion, the Minister had commented that sawmills would have to bark and chip and make residues available to pulpmills if they wished to survive. The rights of access of miners, trappers, guides, livestock men, and recreationists would not be jeopardized by the award of either pulpwood harvesting areas or tree farm licences. Commencing with the hearings on pulpwood harvesting area #2, (Kamloops Pulp and Paper Limited), the Minister stated that he was now demanding proof of financial responsibility from pulpwood harvesting area applicants and proof that no capital gain would be made by the granting of a pulpwood harvesting area. He also noted that, in areas subjected to contention, he would consider making a pulpwood sustained yield unit under much the same conditions as existing public sustained yield units (for sawlogs) with the establishment of pulpwood quotas.

Not all of the new pulpmills have been or are to be based on pulpwood harvesting areas. Some in the Coastal Region have been built following the grant of a tree farm licence. In one case, that of a pulpmill built in the Kootenay Region by a consortium of Crestbrook Timber Limited and two Japanese companies, the investors decided to proceed without any assured timber supply, presumably relying on the purchase of sawmill chips and the purchase of pulpwood from the existing sustained yield units.

CHAPTER TWELVE

The Period from 1946 - 1970 The Close Utilization Policy

The major new forms of tenure—tree farm licences, public sustained yield units, and pulpwood harvesting areas, and changes in timber sale contracts—which have resulted from the introduction of the sustained yield policy into British Columbia have been discussed. The Government has been aware of the several influences which affect the potential level of cutting under sustained yield and have emphasised "close utilization" of the mature stands being cut. The pulpwood harvesting area, quite apart from the effect highly desired by Government, of accelerating the industrialization of the Province, has intensified to an increasing extent closer utilization of the mature stand in several ways, not only in the forest but in the utilization plants. This closer utilization will increase the current sustained yield annual cut from the forest. The potential of the pulpwood harvesting areas issued, in terms of the Provincial resource does not, however, provide the desirable standard of forest utilization throughout the Province and cannot be expected to allow a cut equal to the potential sustained yield capacity to be reached at least for many years. The Government, therefore, introduced its "close utilization" or "small wood" policy, aimed at providing an incentive to all logging operators to improve their standards of utilization. Chief Justice Sloan⁴⁰ had commented on the utilization of wasted wood in 1956. He defined "logging waste" as that portion of the tree left in the woods which, when and if salvaged, had a merchantable value. "Mill waste" meant sawmill residues for which a profitable use could be found. In accepting as part of the definition of waste the factor of its economic utilization, however, a variable was present dependent on the circumstances prevailing at any one place at any one time. Thus, what was "waste" in 1956 could be debris or refuse at a later date. The Commissioner noted that there were areas in the Province from which, by reason of distances involved, difficulty of terrain, type of stand, and other inhibiting factors, logging residuals could not be moved to utilization plants except at a cost greater than the recoverable values. In the Commissioner's view this material was not salvageable and, in that sense, was not an asset that was wasted.

The compulsion to recover material which could be utilized would be generated only by one incentive and that was the chance of making a profit on the operation. Closer utilization was in the public interest and it had several beneficial aspects. For example, it retarded depletion of the forest resource, left less slash as a fire hazard and left a cleaner forest floor for regeneration. As economic factors limited or expanded geographic areas of waste utilization and utilization of certain species of trees, the Commissioner recommended, the Forest Service should encourage and assist this programme by a more sympathetic and liberal attitude in relation to stumpage and royalty charges on salvage material.

G.R.W. Nixon⁶⁴ before 1948 and 1950, had studied two typical coastal areas, covering nineteen high-lead clear logging settings. The total volume of logging residuals suitable for small sawlogs and pulp left on the two areas amounted to approximately 18,000 board feet per logged acre. Sloan noted that, whilst this material was suitable for utilization in a physical sense, the amount that was

economically salvageable had not been determined. The losses recorded by Nixon expressed as a percentage of gross merchantable volume of the original stand, showed that on the first area, 33.7% of the original stand was wasted, whereas the second area figure was 25.4%. Treating stump, waste, and defects in logs as non-recoverable volume, the figures became 24.8% for the first area and 15.2% for the second area. If the volume wasted were related to net, rather than gross volume scale, the percentage losses would be appreciably higher.

Sloan also referred to a study by the Forest Service relating to percentages of decay, waste and breakage in terms of gross merchantable volume measured in cubic feet and he found that the end results were reasonably parallel to those of Nixon's. It could not be assumed, however, that after applying the economic factors of cost and value, it would be practical to salvage the entire volume left on the logged areas and Sloan accepted, in a general sense, the evidence of some witnesses before him that recoverable waste amounted to between 10% and 16% of the gross merchantable volume of the stand.

Following consideration of the practicability of achieving higher recovery by pre-logging* as well as re-logging, the Minister recommended that salvage, stumpage and royalty rates should apply to the former as well as to the latter. Under the then existing authority of Section 56 of the "Forest Act," salvage rates on re-logging operations were 25% of royalty plus 10¢ per cunit on the material recovered. Three Coastal pulp mills who had salvaged wood to the extent that the salvage represented 12% to 23.5% of their individual total wood intakes were mentioned by the Commissioner.

In 1956, a permit issued by the Forest Service to conduct a salvage operation on the Coast, by re-logging an area already logged, partially defined salvage as follows:

"Salvage material, comprising material which would be normally left on the ground following primary logging, being of too low a grade to be removed at that time, shall be defined as:-

- "(a) logs and chunks less than 16 feet in length, any diameter, not suitable for the manufacture of lumber; or
- (b) logs, which if cut in 16-foot lengths, would not exceed 12 inches in top diameter.

"All material produced over a 12 inch top diameter and 16 feet or over in length will be graded and scaled as sawlogs, and royalty charged without the reduction referred to above. Full royalty will also be charged on any portion of a log 16 feet or over in length with a top diameter exceeding 12 inches."

In the Interior, salvage rates were applied on a stand basis regardless of the size of the individual tree. The Commissioner felt that the Forest Service definition of salvage should be amended to conform to his recommendation that salvage rates should apply to both pre-logging and re-logging. Finally, Sloan stated emphatically that young, under-storey trees should not be pre-logged as salvage material in every instance. There were many stands where young and immature trees should be left to grow. If thinnings were a silvicultural requirement in a young stand, Sloan could see no reason why salvage rates should not apply, where the economics of the operation demanded it.

*The removal of small diameter trees before the main logging operation, in order to avoid, as far as possible, their being torn down and broken into pieces when the big trees are felled and yarded.

In the Interior, there was no existing market for logging residuals but there had been a decided improvement in logging methods employed by the larger operators, leading to cleaner logging and better utilization. Stump heights had become lower, tops were often cut to six inches instead of the legal minimum of eight inches, and poorer grades of logs were being utilized by sawmills. Mechanized logging had replaced horse logging in the larger operations, although residual stands were probably suffering greater damage than formerly due to power skidding. Sloan felt that logging waste in the Interior would continue to be a problem without any real solution, until integrated conversion plants were established in key localities or until some means was found to chip the waste from logging and milling residues and to transport the material so recovered to Coastal customers at an economic price.

Sloan also considered sawmill recoveries and residues on the basis of various studies by Guernsey, Jenkins, and McBride. When sawing lumber on the Coast, the amount of sawdust, slabs, edgings, and trim produced amounted to 33.1% of the volume of the log. In the northern Interior, the figure was 40.4% and in the southern Interior 35.7%. It took approximately ten to twelve logs in the Interior, as compared to three on the Coast, to produce 1,000 board feet of lumber. Whilst the percentage of sawdust produced remained relatively constant, the proportion of solid residue is higher for small logs than for larger logs. Consequently, the percentages of lumber recovery experienced in the Interior will normally be lower than those of the Coast, assuming similar standards of utilization. In addition to this factor, however, Sloan attributed some of the higher waste in the Interior to the larger number of portable and semi-portable mills then operating, many with unskilled labour, resulting in inaccurate sawing and edging.

McBride had found that, in the southern Interior mills, 41.5 cubic feet of lumber was produced from a gross log volume of 100 cubic feet, a production that was close to the experience of other lumber-producing countries. Whilst, because of larger size logs, generally better technical equipment and a high degree of waste utilization, between 80% and 90% of the volume of the Coastal logs were utilized in some form or another, only 40% to 50% of the volume of the Interior log was so utilized because of a lack of a profitable outlet. Sloan felt that the advent of pulpmills and integrated operations into the Interior would bring the answer to this problem. As we have seen, a number of pulpmills have been built in the Interior following the introduction of pulpwood harvesting areas. Sloan had said, in 1945, that he thought that portable mills should be licenced to compel the operators to conform to a reasonable standard of efficiency when cutting Crown timber and, he recorded in 1956, he still felt so. The Government has not acted on this recommendation.

In referring to the shingle mill industry, the Commissioner recorded that losses from sawdust, ~~tops~~, trims, slabs, and other deductions from volume, due to manufacturing processes, amounted to about 63%. From one cunit of cedar processed, 37 cubic feet emerged in the form of shingles and the rest, or 63 cubic feet, was waste. In 1955 alone, 189 million board feet or about 560,000 tons of cedar were wasted to produce 2,500,000 squares of shingle. Whilst cedar waste could be used for pulp, it yielded only about 30% pulp compared to an equivalent volume of Douglas fir. It also produced digester corrosion caused by the thujaplicins and water soluble-

phenols in its composition. Sloan felt that every channel was being explored to reduce the appalling waste. The corrosion problem could be overcome by lining the pulp digestors with carbon brick or stainless steel or by extracting the corrosion-causing chemicals from the chips before they were fed into the digestors. It might be possible that the end value of the extracted chemicals would make up the extra cost occasioned by the relatively low yield or that new and cheaper pulping processes could be developed.

On the subject of chips, one of the most striking developments in British Columbia during the decade preceding the 1956 Royal Commission Report had been the tremendous expansion in the utilization, by pulp and paper producers, of chips made from sawmill residuals and small, salvaged logs previously regarded as waste. The increase in the use of chipped sawmill residuals had been particularly spectacular. An approximate calculation placed total chip production in the Province at a figure in excess of 1,200,000 units per year, the equivalent of 480,000,000 board feet, valued at about \$20,000,000.00 per year. American pulpmills had been interested in chip supply from the Province and had extended financial encouragement to sawmills of the Province. As a result, a surplus of chips was being produced in the Province and about 36,000 units per month were being shipped to American pulpmills, mostly from sawmill hemlock residues. This export was, Sloan considered, of economic benefit to the Province under the circumstances prevailing at that time. The utilization of vast quantities of previously unused wood as chips was bringing substantial benefit to British Columbia's economy. It was creating important sources of new income for sawmill and plywood mills operators. It was developing new jobs for British Columbia labour in the operation of chipping plant equipment and the transport of chips. New pulpmill construction and the expansion of existing pulp manufacturing facilities was being stimulated. Finally, it was substantially reducing the ratio of pulpwood cut in proportion to the increasing pulp and paper production of the Province. In order to monitor this flow, a Chip Export Advisory Committee (water-borne export only) was appointed in 1969 to advise the Minister of Lands, Forests and Water Resources on the subject.

The problem of utilizing sawmill or plywood waste is considerably less difficult to solve, because of costs and prices, than is the problem of logging waste. More recently, Csizmazia⁶⁵ has made a preliminary survey of logging waste in the East Kootenay Region. On six logged areas, there was left behind a volume of sound wood material, in pieces of three inches and over, top diameter, and four feet and over in length, ranging from approximately 1,400 to 5,700 cubic feet per acre for the areas sampled. An average of 44% of the volume was alpine fir, 40% was spruce, 12% lodgepole pine, and 4% other species. Eighty-one percent of the material was "downwood" and 19% was in the form of standing, dead and live trees. The six inch top diameter class contained the largest volume comprising 29% of the downwood material. The classification of "downwood" into saw timber and pulpwood showed that 10.8% of the pieces, 34.3% of the volume, or 1,035 cubic feet per acre, fell into the sawlog category.

The small wood policy of the Government is aimed primarily at improving utilization of stands currently being logged. The policy applies to all timber sales in public sustained yield units whether included in a pulpwood harvesting area or not and, by inference, to tree farm licences. The effects of closer utilization would, of course, be to reduce the amount of logging residue. It is of

interest to speculate if the policy proves to be successful, what effect it will have on the expectation that pulp companies will salvage logging residues in pulp-wood harvesting areas, since the salvage operation would presumably be less economic with a lesser amount of logging residue.

The Minister first enunciated the small wood policy, without any great degree of detail, in 1965. The subject had received much attention in previous years, particularly in 1964, and had been the subject of much discussion between Forest Service officers, logging and conversion plant operators, and combinations of the two. One of the basic principles in the formulation of a small wood policy was that the allowable cut calculations for a managed unit had to be based on utilization to a given standard, without any attempt at directing the end use to which the wood should be used. In the Interior, allowable cuts would be calculated to two standards, eleven inches diameter breast height and larger, and seven inches diameter breast height and larger and, on the Coast, the standards would be thirteen inches diameter breast height and larger and nine inches diameter breast height and larger. The higher figure in each case represented the smallest trees suitable for sawlogs, figures which the Government had accepted for the allocation of the sawlog quotas in public sustained yield units. Using the Coastal Region as an example, the volume of timber between nine inches and thirteen inches diameter breast height which was not committed to sawlog quotas, would then be allocated in two different ways.

Williston used the Kyuquot public sustained yield unit as an example. Forty percent of the timber between nine inches and thirteen inches diameter breast height would be set aside for established quota holders and allotted to these operators on the same basis as their existing sawlog quotas. Any existing quota holder who was prepared to cut down to nine inches diameter breast height could thus have his allowable cut increased in proportion to his thirteen inches diameter breast height and larger quota. The remaining 60% of the allowable cut attributable to trees between nine inches and thirteen inches diameter breast height would be sold to one or more pulp manufacturers in the form of competitive "pulp timber cutting permit sales." It might be that new pulp mills which did not have an assured timber supply would be given the advantage of being able to match any bonus bids made by others, who would also have to build or expand capacity. On the other hand, some such sales might be made on the basis that wood was offered to a particular mill on a first refusal basis at market price. At the time, however, these were ideas which still had to be made a part of forest management regulations. The 40% - 60% proportion might vary from unit to unit depending on the "forest types that are prevalent" and it was pointed out that the trees between nine inches and thirteen inches/^{diameter} breast height which had been referred to, were mature trees of poor growth and not healthy, growing trees in a growing forest.

Having considered the allotment of the available small wood, the next problem the Minister foresaw was to devise rules covering operating areas. The first rule would cover normal sawlog operators cutting down to thirteen inches diameter breast height. They would have to confine their logging operations to timber stands in which at least 60% of the volume was in trees of thirteen inches or more and they would not get an increase in quota. The second rule would be for operators who would

contract to utilize everything down to nine inches diameter breast height. They would get an increase in quota but to get this they would have to operate in areas where a designated proportion of the volume was in trees between nine inches and thirteen inches diameter breast height. The third rule would cover pulpwood timber sales. These would be confined to forest types and areas that had not, in the past, been used at all for sawlogs. Because economics, in the long run, was always the deciding factor in small wood logging, the Minister felt that the Forest Service definition of suitable forest types for pulp timber sales would change from time to time but they would be Forest Service sales and the Forest Service would control where they would be located.

Williston then turned to the subject of forest depletion noting that as progress was made towards intensive forest management and regulation of cut, the small reserve which the Forest Service used~~x~~ to maintain against over-cutting, was gradually being abandoned. The reserve was a volume of timber which was not allocated in the form of operator quotas. There had been a tendency to base allowable cuts on stands that were reasonably dense and reasonably accessible. In order to respond to the demands for more timber and, at the same time, avoid cutting more than the soil could produce, it was known that allowable cuts must be based on all mature trees available even if they were difficult to harvest. Consequently, wasted wood must be taken into consideration as part of the allowable cut. Whilst the scaling or weighing of extracted wood was an important part of forest regulation, the key problem in the new era of utilization would be the measure of wood wasted.

In future, the volumes which were shown as having been utilized in the Forest Service stumpage and royalty accounts would constitute the first part of the depletion record. But an equally important part would come from the Forest Service fieldmen's estimates of wood volumes left on the ground. It was proposed to make that volume of wasted wood a part of the operator's allotted quota, based on the utilization standard/^{to}which he was working. Thus the performance of an operator would, to some extent, determine how much of his quota he actually recovered. The Minister claimed that a concession was made in that the volume of wasted wood was not to be charged for on the basis of appraised stumpage. Implementing this aspect of the new policy, it was recognized, Williston said, that there would have to be a distinction made between generally poor utilization and deliberate waste of much of the timber on a given area. The proposal was not to bill an operator for generally poor utilization but was designed to penalize the licensee by making the wasted volume a charge against his allotted quota. It was well known that the wood could be salvaged and that was what must be encouraged.

There was in existence an incentive in the form of a salvage rate of 20% per cunit for the salvage of wood left behind after logging. This rate, payable to the Government, would continue to apply on salvage operations on those Coastal areas that had previously been logged to a thirteen inch diameter breast height and larger standard. However, where the logging operator was ~~engaged in~~ logging on a one-pass type of operation and obtaining the benefit of an increased quota by logging down to nine inches diameter breast height, his stumpage would be less than the normal sawlog stumpage due to the fact that the rate would be based pro rata on the sawlog volume at normal rates plus the small wood volume at a rate of 55%

per cunit. The policy would also include a provision that any quota holder then operating could apply to change his contract conditions so that he could cut down to nine inches diameter breast height. In such cases, the assumption would be that areas previously logged had been inspected and certified by a field officer as having been satisfactorily logged to the previous contract conditions and the 20% rate would then be applied to these logged areas for salvage operations.

It will be recognized that these proposals, whilst simple in principle, would be complex to apply in practice. Williston said that he had endeavoured to explain the thinking of the Department on an involved subject as briefly and simply as he could. He felt that the proposal was a necessary one and it was regretted if it created difficulties for the operators. When the whole Province was under sustained yield and reforestation was up-to-date, the annual allowable cut would approximate to 3,100,000,000 cubic feet per year. The current cut in 1965 was 1,560,000,000 cubic feet, less than one-half of the ultimate potential.

A short time later, the Minister made a statement to the Legislative Assembly and referred to waste. He said that the forest industries had made considerable strides in the field of wood utilization, particularly in the Interior where a developing market for pulp chips had provided the impetus for the installation of debarking and chipping facilities in many sawmills. The improvements had been related only to mill waste, however, and except for a few large Coastal operations there existed a wide field for improvement. The pulp chip demand on the Coast was beginning to exceed the supply and, with added pulping capacity, operators must turn to round wood.

As examples of the room for improvement, Williston said that, on the Coast, the allowable annual cuts of public sustained yield units were calculated on the basis of rough utilization to a minimum tree size of thirteen inches diameter breast height. A typical hemlock-cedar stand, 140 feet in height and utilized to this standard, would be logged with a stump height of two feet to a top diameter of twelve inches and would be expected to yield 6,708 cubic feet per acre. If logged to a close utilization standard, the logger could expect to harvest 10,605 cubic feet, or an increase of 60%. Another example could be found in the poor quality cedar-hemlock sites in the Coastal Region. A typical stand logged to the maximum stump height of two feet and the top diameter of twelve inches from trees of thirteen inches diameter breast height and larger would yield 2,245 cubic feet. By logging to a one foot stump height and four inch top, there would be a yield of 4,216 cubic feet or almost double the volume. Thus, by more complete utilization of the trees currently being logged, a tremendously increased amount of wood fibre would become available. In addition, it was probable that an additional 5% of volume would become available by cutting trees down to a size of nine inches diameter breast height on the Coast, instead of the existing thirteen inch diameter breast height standard, and down to seven inches in the Interior, instead of the usual eleven inches.

The increasing use of chips, as well as other aspects of the pulp economy, had resulted in some significant changes in the industry. Barkers and chippers were expensive items and their installation had resulted in a further advance in the trend towards centralization of the sawmilling industry. A boom had occurred, particularly in the Central Interior, in the trucking business as a result of chip use and the Pacific Great Eastern Railway was sharing in the transportation revenue, having

acquired some special pulp chip railway cars. For the sawmills themselves, the sale of chips had provided much-needed, increased revenue. Another result was that Grade Four lumber (economy grade) was largely disappearing from the lumber market where it had been difficult to sell because the poor quality logs, as well as slabs and edgings, were being chipped. The pulp development had been the cause of other changes in the woods and in the mills themselves. Crown Zellerbach had devised a method of using sawdust, previously burned as waste, for pulp. The resulting pulp was of a short fibre length and could not be used alone but, when blended with pulp made from normal chips, it made a sheet of paper with some improved characteristics. The mills' consumption of waste sawdust would be the equivalent of 40,000,000 board feet of standing timber per year. The same Crown Zellerbach mill had installed a new wood room that would handle salvage wood/^{ranging} from small roundwood to a five inch diameter top to full-size logs and broken chunks unsuitable for lumber.

Continuing his review of methods of using waste, the Minister referred to the "chip and saw" process of making lumber from small logs with a minimum small end diameter of four and one-half inches and a maximum large end diameter of seventeen inches. The designer had adapted a series of chipping knives to the production of a profiled cant which was then, in the same pass, split into boards by a gang saw. One man could operate the machine and produce up to 24,000 board feet of lumber per hour, as well as 6.5 units of chips. In another direction, a new logging device, known as the "easy-way logger" was mentioned. This was a crane mounted on a truck for yarding out broken chunks of wood too small to be handled by standard Coastal logging gear and it was in reasonably general use in the Coastal operations. The industry was testing the feasibility of transporting chips directly from the woods to the mill in a continuous flow by way of a pipe line. The Marathon Corporation of Canada Limited had experimented with a ten inch diameter pipe, 2,000 feet long, on behalf of a group of pulp and paper companies, pipeline and rail groups, at a cost of \$750,000.00. The sponsoring companies had received the results which had not, however, been announced. The Minister understood that the pipeline itself was feasible but work had to be done on problems of getting chips into the pipeline at the woods terminal, the joining on of trunk lines, and the removal of chips from the transporting water at the pulpmill. In the meantime, experimental work was continuing on the development of a portable chipper, a machine that could move about in the woods for chipping waste at the logging site.

With the use of smaller diameter logs and the advent of speedier logging and milling machinery, the Minister stated that it had become obvious that some method of wood measurement, faster than individual log-scaling, had become necessary. Consequently, the Forest Service had been encouraging the measurement of logs by weight as a basis for billing for Crown revenue and for allowable cut control in the public sustained yield units. The first approval to use this method had been given in 1963 to two stud mills in the Cariboo which were using large quantities of small diameter timber. Whilst there had been a growing interest in this form of measurement during 1964, there would be many situations not suited to it. For example, there had been relatively little interest in the Coastal areas due, in part, to the difficulties presented by the fact that logs were placed in the water before scaling.

The system of weighing to which the Minister referred, is actually a system of weight-scaling and ratio-sampling, consisting of 100% weighing of logs with a sample of the weighed loads being scaled by the usual British Columbia log scale.

In March of 1965, the Chief Forester, ^{F.}S.S. McKinnon, addressed a memorandum to the Forest Industry Associations of the Province. Over the previous eighteen months, he noted, meetings had been held between various representatives of the industry and the Forest Service dealing with the matter of standards of utilization, calculation of allowable cuts on public sustained yield units and control of cutting. Industry representations had centred on two points, the first dealing with the calculation of allowable cuts to utilization standards improved over those on which the then existing cuts were based. Secondly, the industry wanted considerably lower stumpage rates to encourage the use of smaller diameter material. A draft statement of Forest Service policy issued with the memorandum reflected important policy changes. In the first place, provision was made for lower stumpage rates to encourage close utilization and, in addition to these flat rates, it was anticipated that future appraisals for timber sales would be based on the logging costs associated with closer utilization. The draft policy statement also proposed that applications for reduced stumpage and increased quota would have to be accompanied by a proof of contract for the sale of roundwood harvested or for the sale of pulp chips. This provision would ensure full utilization of the material harvested under the close utilization policy. Thirdly, it was proposed that, out of the various defects found in logs, only decay would be taken into account as a reduction of the cubic foot scale. The scaling practice at the time allowed for a variety of deductions for other forms of defect than decay. For example, in the case of a ring check or a cross check, the scaler would deduct a volume corresponding to one inch of wood on each side of the check. The method allowed for losses in lumber recovery. It may be assumed that, with chipping, the Forest Service concluded that these deducted volumes could be utilized. Also, the form of the Provincial Inventory was such that deductions from gross stand volumes only included decay, waste, and breakage, the latter two items referring to logging losses. It may also be assumed that the Forest Service was reluctant, since the control of the allowable cut was accomplished from the scale of logs produced, to have defect deductions made which were not reflected in the Inventory. Presumably, they did not possess sufficient reliable information to accurately reduce the allowable cuts to allow for other forms of defect than decay and were concerned that the inclusion of these deductions in the scale would lead to a form of overcutting.

Another point in the draft policy dealt with control of cutting and proposed that the operator's quota would be balanced against the scale of logs cut plus a measure of the wood wasted on the ground. In this case, the Forest Service had available to them, in the Provincial Inventory, factors of deduction, by zones, for waste and breakage in logging. However, it may be assumed that variations in utilization standards within zones were a source of concern to the Service. The poor logger could still remove his full quota of logs in spite of wasting more wood than another logger. The change in policy would provide an incentive for the logger to practice maximum utilization and to avoid waste so as to preserve his quota as much as possible.

In order to simplify administration and with a view to reducing all production

costs to a common denominator, the Forest Service proposed to pro-rate stumpage prices rather than attempt to cope with segregations between classes of timber. The intention was to have a weighted average stumpage price for each species, small wood at 55¢ per cunit and the balance of the trees at the appraised stumpage and royalty value. There was no intention to pro-rate species together.

The statement of policy accompanying the memorandum added certain other points. In the Interior, allowable cuts would be calculated at a seven inch diameter breast height minimum cutting diameter, to a close utilization standard. The difference between the cut determined in this way and the existing quotas would be allocated between existing quota holders, new quota holders, and a Forest Service reserve for contingencies and sale of minor products such as cedar poles and piling. The general current allocation of the increase in cut between major users would be 50% to sawlog operators who contracted to utilize to the seven inch close utilization standard. Forty percent would be allocated to pulp utilization, bearing in mind the commitments under the pulpwood harvesting area agreements, in which the Crown undertook to provide the licensee with a given volume of wood. Ten percent of the increase would go to the Forest Service reserve, to be used for pole sales, piling, and emergency sales such as those of fire or insect-killed timber. These proportions could be varied in the interests of sound forest management of each public sustained yield unit, depending on the the Inventory, forest cover types, and the established industry. The "normal sawlog operator" who wished to continue logging to the existing standards rather than to seven inches diameter breast height close utilization, would not have his quota increased and would be required to confine his activities to stands of timber that did not contain "a significant volume in small trees." ¹, on the other hand, he contracted to utilize to a seven inch close utilization standard, his quota would be increased and he would be required to confine his activities to stands containing a significant volume in small trees.

The draft statement of policy ~~went on~~ ^{to state} that a pulp operator, such as a pulpwood harvesting area licensee, was entitled under his contract to the volume wasted by the sawlog operator cutting to sawlog standards; to the volume in the stands of timber that had been classified as pulp stands by the Forest Service and to the sound volume of wood in stands of timber that had been classified as decadent by the Forest Service.

The draft policy proposed to permit existing timber sale holders to apply for amendment to their contracts to permit them to cut to the seven inch diameter breast height close utilization standard, with the quantity of small wood which was cut being charged for at the 55¢ per cunit rate. On the question of the "low" stumpage rate, past Forest Service policy in the matter of stumpage appraisals had followed the practice of a standard appraisal, subject to a minimum stumpage and royalty price below which the Government would not sell timber. However, with the advent of pulp utilization in timber, the Government, in the pulpwood harvesting areas, had given that industry a concession at a low rate. This rate was 55¢ per cunit for primary logging until 1978 and 20¢ per cunit for salvage logging until 1983. In the implementation of these rates in existing timber sales, the 20¢ rate would apply only to material which was lying on the ground. Any standing trees would be at the 55¢ rate. It was actually only equitable, therefore, that

the timber sale holders should have to pay the same rate for small wood produced by close utilization.

In the Coastal forests, as has been mentioned previously, allowable cuts would be calculated to nine inches diameter breast height close utilization standard, instead of thirteen inches diameter breast height. The general provisions of the draft policy for the Coast were similar in most respects to those for the Interior. However, since there was very little volume in trees from nine inches diameter breast height to thirteen inches diameter breast height in most of the Coastal stands, no attempt would be made by the Forest Service to confine the activity of the sawlog operator to specific stands. However, an attempt would be made to select areas which were predominantly pulp stands, even though such stands would contain some sawlogs and could even qualify for sawlog operations. As with Interior timber sale holders who wished to amend their existing contracts so as to cut down to the lower cutting diameter, an amendment could be issued to Coastal operators but could not extend quota increases or the lower stumpage rates beyond 1978.

It is evident that the low rates were regarded as a temporary measure by the Forest Service to encourage close utilization and that they would be reviewed on their expiry dates with the strong possibility that another method of appraisal or pricing would be employed at that time.

The Chief Forester's memorandum requested the views of the forest industry associations on the proposed close utilization policy. Industry reaction was not entirely favourable. For example, the Interior Lumber Manufacturers Association disagreed with four of the five major policy points in the Chief Forester's memorandum. The points supported by this Association was the provision for lower stumpage to encourage close utilization and the future intent to appraise timber sales on the basis of logging costs associated with close utilization. The objections, however, had little visible effect on the ensuing policy.

In another 1965 memorandum, the Deputy Minister of Forests re-emphasized the five important changes in policy and stated that the policy would take effect on January 1, 1966. The Deputy Minister noted that the industry associations had expressed widely divergent view points on the proposed policy, although there appeared to be a common desire to "get the greatest volume of merchantable wood from the forests and that every citizen of the Province would benefit thereby." Under such conditions it naturally fell to the Government to enunciate a policy that aimed to achieve the major objective but, in detail, did not follow individual lines of thought. In the revision of the draft policy statement which accompanied the memorandum, certain changes of minor policy were made. For the Interior forests, the new utilization standard of seven inches diameter breast height was specifically defined as meaning the one foot maximum stump height and a six inch top diameter inside bark. The Provincial Inventory⁶⁶ defined "close utilization" as meaning a four inch top diameter with a one foot maximum stump height and the change to six inches was presumably made to meet industry representations concerning the economics of utilization.

The previous statement of policy had stated that applications for timber sales to cut to the new close utilization standard must be accompanied by proof of a contract of more than one year's duration for the sale of roundwood or chips. The new statement added:

"If such applications are within pulpwood harvesting areas number 1, number

2, number 3, and number 4, the holders of the P.H.A. agreements must be offered on a first refusal basis a volume of wood either in the form of roundwood or chips equivalent to the estimated volume at the fixed low stumpage values, ie. 20¢ or 55¢."

This particular addition is of considerable interest. In spite of the proposal to allocate approximately 40% of the small wood in a public sustained yield unit to the existing industry the Government had, in effect, allocated^{to} the pulpwood harvesting area licencees in question, first refusal on all of the small wood, subject to providing sufficient wood to maintain the particular pulpmill in question. It may be construed that the Government felt obliged to specify that existing operators wishing to cut small wood would have to offer it, or an equivalent volume of chips, to the pulpmill. Nevertheless, the existing industry had not been party to the pulpwood harvesting area agreements and might oppose a retroactive option of the kind introduced. This could particularly apply to a sawmill selling chips to and perhaps owned by, another pulpmill. In any event, a possible involvement of Government in commercial transactions appears. It has been argued in some quarters that only a first refusal is involved. Whatever view is taken, reasonable doubts emerge that operators in the pulpwood harvesting areas concerned will have the same incentive to practice close utilization as unencumbered operators who are free to make their own arrangements for the disposal of small wood and/or chips.

The previous draft policy statement of March, 1965, had emphasized that cut control of quotas would be affected on the basis of the scale of logs cut plus a fieldman's estimate of the wood volume left on the ground. However, the revision also stated that, for an initial five-year period, where the waste was scattered and a reasonable attempt had been made to attain the required standard of utilization, no change would be made on the basis of the appraised stumpage. As in the past, however, flagrant cases of waste would be charged stumpage and, also, operations might be suspended pending the re-logging of previously logged areas. Although the draft policy statement did not say so, presumably quotas could be reduced by the amount of waste, whether large or not, as the Minister had indicated in his previous remarks to the Truck Loggers Association when introducing the policy. There also appears to be a practical limitation to the implementation of this policy. The determination of waste left on the ground following logging by a hand scaling or ocular estimating process is time consuming and there is some doubt whether existing Forest Service field strength, in terms of available man hours, could possibly carry out surveys of this type to a suitable degree of accuracy, treating all cases on an equitable basis. Some research has been conducted into faster methods such as fixed wing or helicopter photography of logged areas.

Apart from these few changes, the close utilization policy remained substantially the same. The Deputy Minister had, however, stated in his memorandum that the effective date of January 1, 1966, for the introduction of the policy would give all concerned an opportunity to analyse their particular situation and that the Forest Service staff would meet with committees of industry associations, should the latter desire it.

As an example of the kind of comments made by industry on the policy, some of those made at a meeting of Forest Service officials and the Interior Lumber Manufacturers Association Forestry Committee in Victoria during November, 1965, are of interest.

The Forest Service at this meeting, did not wish to comment on the proposal to scale logs with an allowance for defect only, since the proposal was under review. The question was raised by the industry association as to how dead and fallen trees would be treated under the proposed small wood policy. They had in mind the determination of whether or not it would be required that these trees be harvested and, if possible, to ensure that they would not be included in the volume of waste estimated to be left behind following logging. The gist of the Forest Service's intention was that these trees would be dealt with on their merits area by area. The association then expressed particular concern about having to recover logs from dead and downed trees, which, although still sound, were so badly checked by drying as to make them useless for sawmilling purposes. It would be uneconomic to recover these logs for use only as chips, since handling and chipping costs were double the resulting chip revenue. Whilst timber sales which were not to be logged on a close utilization basis would not have sound, dead or downed trees included in the ^{cruise} ~~crew's~~ estimate, it was apparently the intention to have them recovered under close utilization. In this connection it was held by the Forest Service that the stumpage rate of 55¢ per cunit would compensate, at least in part, for the added costs and, in any event, recognizing that every piece of wood would not be thrown away, they claimed that the approach must be based on the overall, average costs and revenues rather than on individual stands. The Forest Service also noted that the policy was permissive on the sawmilling industry, in that close utilization could be tried in a gradual manner. Initially, for example, a company could practice close utilization on one timber sale only.

Concerning the question of the practicability of cutting one foot high stumps in areas of heavy snowfall depths, the Forest Service stated that they recognized that a one foot stump was impractical in some winter logging operations. Also, at the time, the Workmen's Compensation Board, for safety reasons, would not allow the Forest Service to demand such a stump height in deep snow areas. The extra volume of wood contained in high stumps would be deducted from the operator's quota since it must be counted in the calculation of the annual allowable cut. In the calculation of the new allowable cuts associated with close utilization, the question of whether or not the timber was accessible for logging was being disregarded and all of the wood down to close utilization standards was being included in the calculation. If, in the future, a new inventory was taken the new allowable cuts would be calculated on the same basis and the allocation of the cut to operators would be decided at that time on the basis of performance. The Association pointed out that, in the past, quotas had been reduced particularly at the time when public sustained yield units were organized, and asked if it was logical to assume that operators would have their quotas returned to the original volume before allocations of the increased allowable cuts were made to anyone else. The Forest Service replied that circumstances had changed and that many of the original quota holders had disappeared from the scene due to the consolidation of their operations with others. An increase in quota would be given to those operators who opted for close utilization but those remaining on the existing intermediate utilization would receive no increase.

A meeting of all the forest industry associations was held at Harrison Hot Springs in 1965. Those present at this meeting were referred to as "the Harrison

Group." They had requested, amongst other things, that existing quota holders should receive the first priority in the allocation of increased allowable cuts and they wished to know why this request had not been accepted. The Deputy Minister indicated that this was a political matter on which there were two thoughts. One was that any increase should be left open for new operators to enter the business and the other that existing operators should be protected. Actually, existing operators were being protected by the offer of up to one third increase in quota if they opted to cut small wood. The associations asked if their operators could negotiate with the Forest Service for more timber where areas under close utilization showed a 100% increase in the amount of timber available for cutting. The Deputy Minister indicated that this would not be considered until perhaps five years had elapsed and the effects of the policy were better understood. Dealing with the question that a mill opting for close utilization cutting must have a barker and chipper, the Forest Service stated that these installations were basic to full utilization of the products of the forest. They would, however, investigate those cases where, for example, a sawmill was cutting too small a volume of wood to be able to install a barker and chipper economically, but which had installed a slab barker to supply a pulpmill company with clean slabs.

It has been mentioned that the licencees of pulpwood harvesting areas Numbers One, Two, ^{Three, and Four} ~~Three, and Four~~ would be given first refusal on small wood volumes or equivalent volumes of chips. The Forest Service stated that the pulpwood harvesting area agreements made this obligatory and that the Minister was endeavouring to have the clause containing this requirement removed from the agreements in question. The sawlog quotas in existence were guaranteed and the requirement that an operator contracting to utilize to a seven inch close utilization standard must confine his activities to stands that contain a significant volume in small trees had been canceled by the Forest Service, as being impractical. In addition, the new close utilization policy was going to be administered on a regional, local or in some cases, on an individual timber sale basis, based on any special circumstances involved. The question of the scaling of a cull log, one containing no lumber values, would be solved later. In a memorandum of December, 1965, issued to the forest industry and pulpwood harvesting area licencees in the Province, the Deputy Minister referred to the problem of allowing for physical defects, other than decay, in scaling where an operator had not elected to log to a close utilization standard. It was recognized that, on a gross scale basis, the volume of logs available to that operator on a lumber recovery basis would be reduced by the amount of the deductions for physical defects. Originally, the Forest Service had intended that this loss could be adjusted by applying a factor to the sawlog quota but it had been found that the available information at this level of utilization was not entirely satisfactory and that further data was required. In order to allow the Forest Service staff time to conduct further detailed defect studies it was proposed to scale under two systems until December 31, 1968. Firstly, where an operator had elected close utilization, the wood which was scaled and removed, plus the waste in the woods, would be measured as full cubic scale and deductions allowed only for decay. Secondly, where an operator had not elected to practice close utilization, the scale would continue on the basis of existing cubic scaling practice, with allowance for physical defects, including decay.

A relatively recent development in the introduction of close utilization has been the introduction of allocation of "third band wood." This is the portion of the allowable annual cut of close utilization wood within a P.S.Y.U. which is uncommitted to operators or which is not in the Forest Service reserved portion of the allowable annual cut. The normal sawlog operator may, as previously described, obtain a one-third increase of his normal sawlog quota if he has elected to practice close utilization. But the amount of close utilization wood available for cutting in a P.S.Y.U. may exceed this increase. An example would be a P.S.Y.U. with large areas of lodgepole pine stands in which 40% of the volume is sawlogs and 60% close utilization wood. The Forest Service may allocate the surplus of close utilization wood within a P.S.Y.U. amongst the existing quota holders where the operators request it and where the Forest Service is satisfied that a mill needs the wood and can use it efficiently. In effect, qualified operators can gain an increase in close utilization quota over and above the one-third they are normally granted. The application of distribution of "third band wood" varies very widely between P.S.Y.U.s. The situation varies between P.S.Y.U.s where there is a considerable volume of "third band wood" and those where there is not. If a pulpwood harvesting area overlies a P.S.Y.U. it can materially reduce or eliminate the availability of "third band wood" to sawmills. The wide variation of situation and procedure has led to some misunderstanding of "third band wood" policy.

It is convenient to conclude the review of the close utilization policy at this point. It is in process of gradual introduction into practice and, undoubtedly, it will need revision as this proceeds.

CHAPTER THIRTEEN

The Period From 1946 - 1970 Tree Farms

In his 1956 report, Sloan⁵⁹ noted that in effect a new form of forest land tenure was created in 1951 by amendments to the "Taxation Act." This was the classification known as "tree farm land," with provisions for special taxation of Crown-granted forest land, intended to encourage the dedication of suitable private land to forestry.

The lands qualifying for tree farms were either timber lands or wild lands which were normally subject, in addition to school taxes, to an annual tax of 1 $\frac{1}{2}$ % and 3% respectively of their assessed value. The changes to the "Taxation Act" defined the land which might qualify for the less onerous tree farm taxation, as follows:-

" 'Tree-farm land' means any land which will find its best economic use under forest crops on which -

"(a) There is a stock of young growth in numbers of trees per acre not less than the minimum standards established by the Forest Service; or

"(b) An approved working plan provides a reforestation programme which is designed to establish a growing stock in numbers of trees per acre not less than the minimum standards established by the Forest Service; or

"(c) There is a stock of mature timber which, according to an approved working plan, will be harvested on a sustained yield basis, or

"(d) There is any combination of the foregoing."

If an application by a Crown-granted land owner was certified by the Forest Service, the assessed evaluation was, and is, determined by the taxation branch. The "Taxation Act" provides that

"The assessed value of tree-farm land, exclusive of any improvements thereon, shall be ascertained only by giving consideration to the present use, revenue, or rental value of the land from the sustained annual growth and annual or periodic cut of the forest trees."

The value is based on the anticipated annual or periodic income, less the anticipated costs of operation, and the resulting net income is capitalized at the rate of 12%. This rate is intended to include 4% representing a return on a safe investment such as Government bonds, 6% for the additional risk factor in the Forest industry and 2% to cover annual property taxes. Forest protection taxes are treated as a cost of operation in determining the net income. On evaluation, as determined in the above manner, the tax rate is 1% to which is added the school rate of the district in which the tree farm is situated. In 1956, the school tax rate averaged from 1 $\frac{1}{4}$ % to 1 $\frac{1}{2}$ % of the assessed value of the land and improvements, making a tax of 2 $\frac{1}{4}$ % to 2 $\frac{1}{2}$ % on the land and improvements of the tree farm.

By the 1st of March, 1957, there were nineteen tree farms, all located in the Coastal Region with a total area of 535,596 acres; 224,739 acres of immature timber, 163,655 acres and 4,560,549,000 of board feet of mature timber and a total annual allowable cut of 151,841,000 board feet. By the end of 1966, the number of tree farms had increased to forty-six, fourteen of them being within tree farm licences. The total acreage of the forty-six licences was 1,015,684 acres and they had an estimated annual productive capacity of 55,725,000 cubic feet.

The Legislation as it stood in 1956 was inducing large companies to apply for tree farm status in order to avoid the onerous and, perhaps, confiscatory, annual "wild land" tax of about $4\frac{1}{2}\%$ (3% plus school tax). This effect applied whether or not the Crown-granted lands were incorporated into tree farm licences. The tree farm legislation was also, in effect, an attempt to compel other owners of forest land, even small parcels, to practice forestry on a sustained yield basis under Government controls equally rigid to those on tree farm licences. The legislation, Sloan wrote in 1956, should provide reasonable taxation for smaller properties, since public policy should regard such forestry as more closely related to farming than to industry engaged in development of natural resources and virgin timber. The then existing legislation was unsuitable for this purpose and its detailed requirements were unnecessary.

The Canadian Institute of Forestry had recommended to Chief Justice Sloan, Royal Commissioner in 1944 and, again in 1955, that the "Taxation Act" should define tree-farm land as:

"Any land which is used for the continuous production of trees of commercial value and on which the owner undertakes to provide reforestation of understocked lands, to cut no immature timber except in such a manner as will affect silvicultural improvement and to maintain a definite programme of forest protection."

The Institute also recommended that

"The assessor shall provide an application by an owner to have his land classified as 'tree-farm land' upon receipt of a certificate from a British Columbia registered forester to the effect that the lands fulfill the requirements of the Act."

The assessment of tree farms should be regarded as a capital investment similar to other farm lands and be subject to the farm tax rate. Finally, it was suggested that reassessment of values should only be made in accordance with changes in general, economic conditions affecting all farm land assessment and taxation.

The Commissioner suggested a series of amendments to the legislation including an even simpler form of definition of tree-farm land than that proposed by the Canadian Institute of Forestry. The definition of a tree farm should be

"Any land which (a) has been included in a forest management licence (tree farm licence) or (b) is being used by the owner for the continuous growth of trees of commercial value."

Sloan felt that the certification procedures should be simplified. Some owners of suitable Crown-granted land had not applied for tree farm certification because of the extraordinarily detailed information and paper work that was required, even for small areas, both for certificates and for annual returns after certification. Where the tree farm was to be included in a tree farm licence or where the owner was also a tree farm licensee, Sloan believed that the additional requirements should be imposed that the land should be managed on a sustained yield basis. The annual returns made for a tree farm should be limited to a statement certified by a registered forester that the tree farm was being maintained in accordance with the Act and including the scale of timber on which royalty was payable, cut during the year.

The Canadian Forestry Association had a voluntary tree farm certification programme at the time, a tree farm being

"An area of privately-owned forest land devoted to the continuous growth of merchantable forest products under good management."

The owner was required to harvest his timber crops in a manner that would ensure future crops in perpetuity and to provide reasonable protection from destructive agencies. In 1955, there were 195,563 acres of tree farms certified by the Canadian Forestry Association in British Columbia. The C.F.A. programme was subsequently discontinued because the Government programme, with its financial incentives, rendered the programme superfluous.

The Commissioner also dealt with the question of whether suitable Crown land should be made available by sale to tree farmers. The interest of small land owners in forestry was only of recent origin because the tax rate on logged and reforested land did not encourage investment for profit, was apparently intended to recover the land to Crown ownership by a form of confiscation or, alternatively, forced owners to develop logged-off lands for other purposes, ignoring the / ^{circumstance} that little of the land was unsuitable for anything other than growing trees and, ^{that} if, reverted to Crown ownership, it would be unlikely to produce any revenue for a generation.

Lack of markets for produce was another reason for lack of interest in tree farming but this situation was changing with increasing industrialization. Some social implications existed in that owners would develop a much better understanding of forestry and related subjects. Sloan recommended that a judicious extension of the tree farm programme, by sale of Crown lands, should be carried out with modification of the existing methods of assessment and taxation of tree farms.

Concerning assessment and taxation, the Taxation Department had expressed the opinion that tree farm lands from which no cut was anticipated for thirty or more years were not a realistic investment based on reasonably anticipated income for private capital but, ^{nevertheless} illogically, the Department had assigned an assessed value of land, by quality, accessibility and topography at amounts varying from 50¢ to \$5.00 per acre. These values were assigned to land where there was no possibility of income for thirty or more years. In addition, a value was assigned to immature stands over five years of age varying from 10¢ per acre up to ten years, to \$55.00 per acre for forty-one to fifty years old on the best sites. However, where the land was certified as a tree farm, the immature forests were assessed at half of this value, where an assessment could not be made on the basis of capitalized productive capacity because of the length of time that must elapse before actual production could be realized.

Sloan recommended the replacement of the existing tax by an annual tax equivalent to 1¢ per acre of the total area of the tree farm and a form of yield tax of 10% of the prevailing stumpage value in the district on timber actually cut during the past year. Half of the total tax would be allocated as school tax. As tree farms became more profitable and numerous and as reliable information on forest site qualities became available, it might be possible to increase and vary the annual rate of 1¢ per acre, according to site quality, but the greater part of the tax should be in the form of a yield tax. In addition, Sloan considered that small tree farms not larger than 2,000 acres should be classed with other farm land for taxation purposes.

Lowell Besley, Dean of the Faculty of Forestry at the University of British Columbia, had reviewed and discussed, in 1951, the taxation of Crown-granted lands in British Columbia⁶⁷. He had pointed out that high annual taxes created

"a tremendous pressure on the owner to liquidate his timber holdings as rapidly as possible."

Conservative cutting practices, intended to encourage/^asecond crop were discouraged by the annual taxes. It was quite possible that in the long run the Government would receive more income from private timber lands were the owners encouraged, through moderate taxes, to keep their timber on the Tax Rolls. By 1966, the definition of "Tree-farm land" contained in the "Taxation Act" remained unchanged, in spite of the recommendation of Chief Justice Sloan and the Canadian Institute of Forestry. The certification and annual return procedures were also substantially unchanged in their requirements.

CHAPTER FOURTEEN

The Period From 1946 - 1970 The Forest Inventory and Sustained Yield

The significance of, and problems connected with, the application of the Provincial Inventory to public sustained yield units have been mentioned. Also, the history of the forest inventory in the Province up to 1945 has been reviewed, including the important early contributions. The comments of Chief Justice Sloan in 1945 about the inventory have been noted. The role of the Government of Canada in the taking of a provincial forest inventory are described in a later chapter. Chief Justice Sloan again discussed the Provincial Forest Inventory in 1956. The primary need, he felt, for a reasonably accurate knowledge of the forest resource lay in the evaluation of forest policy and administration relating to conditions of tenure, incidence of taxation, protection from fire, insects, and diseases, improved standards of utilization and forest management in general, designed to assure a continuity of production and sustained yield.

British Columbia's comparative inaccessibility during its early history as a colony and province had protected its stored forest capital from too early and too rapid exploitation even after transcontinental railways and the Panama Canal made its products available to the world. This retarded exploitation, deplored by early Governments, as well as natural reforestation on the Coast after liquidation of comparatively small parts of the virgin forest had, in Sloan's view, been most fortunate for present and future generations. The overall capacity of the forest to supply permanent industrial development had been diminished only locally.

"The very real danger of exhausting our forest resource by unregulated liquidation without thought for the future has passed. The sustained yield principle of forest management recommended in the 1945 report has been introduced during the last ten years and is being actively pursued by Government and industry. There are no tenures of forest land in the province which cannot be saved from destructive liquidation by owners and operators acting in cooperation with the Government under the general provisions of the forest, land, and taxation legislation already in effect, complicated though it may be."

Whilst the Commissioner's statement was correct, there were exceptions. For example, the Government has pursued a policy of endeavouring to enforce the liquidation of timber berths, leases, and licences not included within tree farm licences so as to recover the lands for the Crown, following logging. Some approaches by industry to make arrangements for sustained yield or long-term forest management of these tenures, including reforestation, have been rejected.

Sloan considered that a shared and disseminated knowledge of the forests, their condition, capabilities, ownership and management was essential to a "mutuality of purpose" designed to put the objectives quoted above into effect and to stimulate public support and concurrence in the programme. Public ignorance of the nature of the forest resources and the type of management most suitable for them and most profitable for the public would greatly hinder attainment of the objectives.

The Commissioner gave an outline history of the British Columbia forest inventory and a description of the most recent methods, including aerial survey and mechanical tabulation techniques. As the ^{data of the} forest inventory had been accumulated, increased accuracy in estimates for areas previously recorded by reconnaissance only would affect the provincial and regional forest inventories. These changes, added to

the effects of logging, fires, insects and decay on the one hand and of growth increment on the other made the accuracy of any inventory summary subject to a time limit. The reported timber inventories throughout the years are shown in millions of board feet in the following table:

<u>Year</u>	<u>Province</u>	<u>Coast</u>
1910	240,000	—
1917	366,300	299,700
1937	254,500	155,100
1945	303,300	200,000
1951	431,500	254,100
1952	662,800	—
1953	757,000	—
1955	760,050	330,200

Three main phases were employed in taking the provincial inventory and these were forest classification, forest sampling, and compilation. A complete 1:31687 air photographic coverage of the Province facilitated the stratification of all forest areas into forest types. The typing was carried out by ground and air observation of a high percentage of forest areas, followed by the delineation of all forest types on air photographs. Subsequent to forest typing and the transference of forest cover detail to base maps by radial line plotting, all forested, non-forested, and fresh water areas were measured for their area by planimeter. Acreages and descriptive data concerning ownership, forest type, accessibility, and numerous other variables were then recorded on electronic punch cards for later sorting and collection of data into appropriate groups and for the final integration of areas with average values per acre, derived from sampling.

Stratified random sampling was employed, the sampling strata consisting of groups of forest types recognized in the forest classification. Most of the field work expended in sampling was to establish sample plots to provide estimates of gross wood volume and recoverable sound wood volume. The sampling was planned independently in each of seven forest inventory zones ranging in size from 4,000,000 to 40,000,000 acres and the planning aimed at achieving an acceptable reliability of estimates in the Province and in each zone. All of the trees and tree sections measured on standard sample plots or in volume, decay, waste and breakage studies were recorded on electronic punch cards and average values per acre were derived for application to the forest types recognized in forest classification.

The accuracy objectives which have been mentioned previously in connection with public sustained yield units, were to produce estimates of gross cubic foot volume by species in the entire Province by zones with a sampling error not exceeding 10% at a probability of .95. Each inventory zone contained a number of sub-zones of approximately one to two million acres in size. In each sub-zone the ultimate accuracy objective was similar to that used in inventory zones, except that the accuracy applied to the estimates of gross volume of all species collectively.

The actual sampling errors for each zone were worked out from an analysis of gross volumes derived from sampling. They were all 10% or less. However, no assumptions could be made from these sampling errors in connection with the reliability of estimates within more localized units of area. No estimate was made, by the Forest Service, of non-sampling errors such as those related to the taking of tree measurements or to the applicability of volume tables. These errors were difficult to define or measure and were assumed to be compensating in an extensive inventory.

The forest inventory was compiled between 1951 and 1957, the Province paying \$5,000,000.00 and the Government of Canada \$3,000,000.00 to cover the total cost of \$8,000,000.00. The unit costs varied from 2¢ to 20¢ per forested acre and averaged 7¢. On the total area, including non-forested acres, the cost per acre averaged 3 $\frac{1}{2}$ ¢.

The forest inventory was a major undertaking of enormous benefit to the forest resource. Without it and its accuracy, it would be virtually impossible to implement a sustained yield policy and to arrive^{at}/reasonable annual allowable cuts. It is perhaps appropriate, at this point, to comment further on the sustained yield policy. Sloan had commented that the history of the German and French forest schools, their offshoots and their implications have established the principles involved in sustained yield and allowable cuts for many centuries. For a province of the nature and history of British Columbia however, they were currently a lodestone, a vaulting of a major obstacle, and a definite turn towards prudence in which the history of the United States, which itself had endeavoured toward these goals, and of Canada had not lent encouragement.

In 1956 Sloan was moved to discuss the terms because he felt they were not generally understood in British Columbia. It was desirable to deal at some length with the implications of British Columbia's sustained yield policy, the prospects it had, and the progress that had been made so that the matter might be more intelligible to the reader without training in forestry. In his 1945 report, Sloan had defined "sustained yield" as "a perpetual yield of wood of commercially usable quality from regional areas in yearly or periodic quantities of equal or increasing volume." His intent in the words "regional areas" was to name "the sustained yield unit capable of being managed under one and the same working plan." It was technically impractical in an economic and social sense to assume as a hypothesis that any area of any size could be "put on sustained yield." It should not be so large that objectives having social implications could not be achieved, nor so small that it did not include the necessary range of growing stock to provide an annual yield large enough for profitable operation.

"It may, or may not, coincide with an administrative forest unit. It may include more than one type of forest and be managed to apply to more than one type of conversion plant, but to satisfy the essential criteria of a sustained yield unit, it must be organized regionally to produce a sustained annual yield under a single working plan."

In spite of the use of the word "periodic" as an alternative to a strictly determined and inflexible yield, it was the object of sustained yield management to bring irregularities into balance over relatively short periods, so as to minimize interference with the establishment of a regular series of age classes in the next rotation. In the Commissioner's opinion it was a negation of the principle of sustained yield and the social aspects implicit in it to manage a forest intensively in order to harvest large areas of it at infrequent intervals, even up to a whole rotation, with long intervening periods of no production.

There had been a considerable amount of discussion before the Royal Commission on the question of overcutting. Had logging reached a volume which endangered the future supply of wood for the industries of the Province or regions of it, in particular the Vancouver Forest District? The Interior and Prince Rupert Coast Districts were obviously not being overcut. The question of whether or not

the Vancouver Forest District was being overcut was a subject which caused considerable controversy before the Commission. The Forest Service took the position that the District was being overcut, a position that was strongly challenged by several prominent industrial foresters. In particular, the latter emphasized the volume per acre actually recovered in logging. The Commissioner, in an exhaustive consideration of the reasoning advanced, felt that the District should not be treated as one sustained yield unit, that excessive safety factors had been applied to the inventory volumes when used for management plans and that, if the average production of any forest district not yet organized into sustained yield units was approaching the limits that could be maintained continuously, the general policy, before hoarding the existing deteriorating stock for anticipated lean years ahead, should be to seek first to improve the supply by better silviculture, thinnings, prompt reforestation, reduction of waste and development of less accessible and scrub areas.

We have seen that, during the period of these Sloan reports and in subsequent years, the Government had pursued the sustained yield policy in forestry. We have also seen that while there were objections to the method of implementation of the sustained yield policy from the forest industry, few of these objections were antagonistic to the policy itself. There were objections from other quarters. J. Walters,⁶⁸ Professional Forester, observed in 1965,

"As foresters in a new country we look to European forestry practice for guidance in reaching towards fully managed forests. We defend our pioneer practice by declaring that because we have not yet reached European utilization standards we cannot therefore reach European management standards. Our goal, in lecture and field, has been towards European forestry practice. We revere the Swiss selection forests and the Black Forest of Bavaria. These forests emerged from the Golden Age of Forestry--the culmination of generations of forest culture in an economy where trees were sometimes more sacred than those they served. The standard of forestry practice to which we aspire was developed when time was immobilized by lack of change. ---Today, forests grow at traditional rates to mature in a strange market under non-traditional conditions of continuous and accelerating change and the forester rightly questions the reality of a future market assured by tradition alone. Change is now measured in geometric progressives. New principles, techniques, and materials give birth to new industries which become giants before tree seedlings become saplings. In all industries, constant change is now inevitable and normal. To state that forestry with its long time-span is no exception is an exercise in restraint."

Walters submitted that Canadian foresters should make a formal appraisal of the probable impact of technological change on forestry practice, to try to obtain the best information possible on which to establish long-term forest policy. Without reviewing other writings, it is pertinent to note that Walters was not alone in his qualified approach to "traditional forestry." Others, such as Dr. P.H. Pearse in 1967 and Dr. J.H.G. Smith, both of the University of British Columbia, opposed the sustained yield policy and proposed instead an economic approach to forest management based on the maximization of long-term benefits through the criterion of maximum net present worth (or net discounted revenue, or discounted cash flow). Their views have been opposed by supporters of the sustained yield policy. In point of fact, the sustained yield policy is still being vigorously pursued by the Government of British Columbia. There has also developed in the Province during the more recent period under discussion, a number of special interest groups, such as natural history associations and groups aiming at the preservation of the natural environment and recreational groups who have expressed opposition to the economic use of forests, demanding the reservation of very large areas of forest in

in its natural state for the particular use or uses in which they are interested. The mere presence of these groups indicates that the social aspects of forest policy cannot be overlooked and indeed, are assuming increased importance in the minds of the public. The trend is likely to cause modification of a number of forest practices which are based on purely economic considerations.

CHAPTER FIFTEEN

The Period From 1946 - 1970 Fire Protection and Firefighting

In 1945, Chief Justice Sloan in his Royal Commission Report, had remarked "Fire-protection in relation to both personnel and equipment is grossly inadequate. The reason is the usual one: lack of sufficient funds."

By 1956 he observed that there had been a "very marked improvement." But fire protection was still inadequate, for the same reasons as he had expressed in 1945: lack of sufficient funds. After making appropriate adjustments or changes in accounting procedures, the total voted expenditure for the year 1956 - 57 on fire protection was \$3,805,000.00, compared to \$784,512.00 for the fiscal year 1944 - 45. Because of increased labour and material costs this apparent increase of over 400% was probably reduced by about one-half. Sloan also noted the appalling losses from fire as disclosed by the Forest Service records for the twenty-five year period from 1930 - 1954. During that period 6,426,475 acres had burned over in the Interior (about 257,000 acres per year) and 737,692 acres on the Coast (about 29,500 acres per year). On the assumption that the productive forest area of the Province was on a sustained yield basis and on a rotation of one hundred years, the Province was suffering a fire loss equal to 20.5% of the productive area in each rotation. Moreover, the foregoing figures did not include the holocaustic and unfought fires which raged from time to time over the sixty-eight million acres in northern areas of the Province, in unoccupied territory—a great majority of them caused by lightning. These vast northern areas had, by 1956, been added to the Prince George Forest District. There had been an apparent improvement for the six years 1950 - 1955, during which a total of 1,063,611 acres had been burned, the annual average for the Coast being 20,800 acres and for the Interior 156,000 acres.

During the decade from 1956 - 1965, according to the Forest Service records, 28.15% of the fires had been classified as caused by lightning, the majority being in the Kamloops and Nelson Forest Districts. Sloan noted that science had not yet devised any method of eliminating this continuing source of destruction. In the case of man-caused fires, the method of prevention seemed to Sloan to be twofold—regulation and education. Regulation consisted of, for example, laws governing forest closures, slash burning, requiring permits before setting fires, safety appliances on engines and similar provisions. Sloan doubted the effectiveness of regulatory provisions of this nature in the absence of a police agency to see to their enforcement. Even so, it was impractical, if not impossible to police the vast forested areas of the Province. Sloan did not place heavy blame on responsible logging operators since industrial operations were, on the average, responsible for only 5% of fires occurring during the decade. By contrast, campers caused about 14% and smokers about 18% of the fires during that same period, totalling between them, in the ten years, 5,700 fires. In 1955, alone, campers and smokers caused 400 fires, accounting for 29% of the firefighting costs of that year and burning an area of 14,000 acres. However, fire losses from human causes had remained fairly constant during the decade in spite of a great increase in the number of recreational users. Sloan attributed this proportionate reduction of risk to an increase in the "forest conscious" attitude of the general public and concluded that the programme of public education should be continued and expanded.

The Commissioner pointed out that penalties for breach of regulatory provisions should not be "a licence fee for carrying out unauthorized and dangerous practices, but a sharp reminder that defiance of the law results in a decidedly unprofitable and unpleasant experience." It was also noted that while the Forest Service could exercise only a limited control over the numbers and locations of anticipated forest fires, they could and did perform a function in controlling fires once they occurred. Efficiency in suppression could only be achieved if a fire was detected when incipient and crews were at its location in time to contain, control and subdue within a narrow area. In 1944, there had been only sixty-four lookouts in the Province and, in 1956, there were one hundred and forty. Sloan found there was an indicated need for two hundred and sixty-six more, or a total of four hundred and six.

In 1956, the Forest Service was maintaining sixteen forest fire suppression crews, distributed in the Vancouver, Nelson, and Kamloops Forests Districts. These crews averaged ten men each and were organized expressly for firefighting. They had achieved valuable results and, over the previous decade, they had extinguished 92% of the fires which they attacked before they had spread over five acres. But the proportion of fires that they had been able to attack was small--in 1955 they attacked only 158 fires out of 1,384 occurring in the Province, a situation caused by a lack of access roads and trails.

The trail and road building programme, since 1949, had resulted in construction of 827 miles of new roads and 776 miles of new trails, and the Province still required an additional 1,307 miles of new roads and 1,476 miles of new trails. In 1955, there were a total of about 2,000 miles of existing roads and trails and with the additional construction, there would be about 5,000 miles outside tree farm licences. This mileage would still not permit suppression crews to reach every reported fire within twenty-four hours, let alone meet the Forest Service objective of controlling every fire within twenty-four hours. In the Spallumcheen Working Circle (an area of average hazard) the Forest Service had drawn up a fire protection plan incorporating a twenty-four hour attack time and featuring the construction of roads along the tops of ridges. These roads, as nearly as possible, crossed the contours at right angles and then followed ridges. They were built as cheaply as possible with a maximum gradient of 35% for dry weather use and they aimed at low maintenance cost. This type of road permitted fire crews to approach a fire from above. According to Sloan, the entire cost of this project for lookouts, roads, personnel and so on was 4.58¢ per acre per year on a total area of 1,080,000 acres, or an annual total of \$49,434.00. But Sloan added that British Columbia is a vast, rugged, mountainous country and he doubted if the twenty-four hour objective of the Forest Service could be achieved by the use of roads and trails alone.

In 1945, he had visualized air craft, preferably helicopters, flying from strategically located air strips with crews of fire fighters equipped with parachute. These were the "smoke jumpers" used in the United States. In 1956, he remarked that he was perhaps "overly optimistic" about dropping smoke jumpers from fixed wing aircraft but he still felt that helicopters would play an increasingly valuable part in fire suppression. One of the problems of smoke jumpers was their recovery from inaccessible areas. The recovery of their equipment, worth about \$700.00 per man in 1956, was also a problem. Fixed wing aircraft already played an important part in

fire detection and the Forest Service, in the twelve-year period 1944 - 1955, had carried out ^{14,252 hours of} protection flying by aircraft under contract.

Sloan concluded that more expenditures were required to strengthen the fire protection and suppression agencies of the Forest Service. These should be provided by the Crown through an increase of its existing contribution of \$4,000,000.00 per year. The Fire Protection Tax should not be increased since industry was spending considerably more on fire prevention and protection than its tax of \$450,000.00. During 1955, for example, agencies other than the British Columbia Forest Service and particularly the forest industry, had spent approximately \$677,048.00 on forest protection. The ten year average expenditure for 1946 - 1955 had been approximately \$531,985.00. In addition to these prevention and protection costs, industry had spent over the decade 1946 - 1955 an annual average of \$256,416.00 in fighting fires, as against \$282,791.00 by the Forest Service.

In 1956 after making no contributions for eleven years, the Government of Canada had agreed to make annual grants in aid of fire protection and these are discussed in another chapter. Sloan noted, however, that total Federal revenue receipts from the forest industries of British Columbia in 1954 - 55 amounted to an estimated \$112,800,000.00. Total Federal expenditures on forestry in British Columbia during the same year amounted to \$1,133,000.00. The Dominion Government had expended on forest conservation, surveys and research in the Province less than 1% of the yearly direct revenue received and the additional grants in aid of fire protection would not appreciably affect this percentage, provided that forest industry profits and, hence, Federal tax receipts did not drop.

The Royal Commission of 1945 had heard the exponents and opponents of slash burning, both in its use for the abatement of fire hazard and concerning its effects upon regeneration. Sloan had concluded that it was impossible to formulate any policy of general application and had recommended that slash burning should not be compulsory on the Coast except as directed by the Deputy Minister of Forests. This recommendation had been implemented in subsequent legislative amendments in 1948. Since these amendments had been made, however, the attitude of the Forest Service had changed partly as a result of changed logging methods including changing from clear cutting in very large continuous blocks to patch logging, closer utilization and improved access resulting from increased truck logging with its network of logging roads. The logging industry had also demonstrated increasing "fire consciousness". Between 1950 and 1955, there had been an apparent trend from broadcast burning towards spot burning in the Vancouver Forest District. Spot burning had increased from 22.4% of the acres logged in 1950 to 37.7% in 1955. The total acreage burned had dropped from 63.3% of the acres logged in 1950 to 45.6% in 1955.

Sloan still felt in 1956 that the policy of discretionary burning should be continued even though it was still a contentious subject. The Forest Service clearly needed more slash disposal officers

" . . . who should be qualified by experience and a more extensive training in evaluating the silvicultural factors involved in the discharge of their duties."

There was also a need for further research in relation to rating fire danger and behaviour.

There was a genuine desire at this time on the part of industry as a whole to cooperate fully with the Forest Service in matters of fire protection. A number of the larger forest industrial companies who had the most to lose and the money to spend, had assumed obligations in excess of personnel and equipment requirements imposed by the Forest Service. Also, a number of informal committees, composed of those financially interested in fire protection, had been formed and correlated some protection efforts of the Forest Service and the industry. Sloan suggested that serious thought should be given to the possibility of the training and compulsory employment by industry of "certified fire wardens" in selected hazardous areas, regardless of tenure, where large scale logging justified the added cost. If adopted, this requirement would be in addition to the existing system of appointing honorary fire wardens. At the time the industry was not generally complaining of the existing legislative provisions relative to fire protection except in one particular. As we have noted when describing the history of tree farm licences, some of the industry argued that "an area of occupation" within the statutory intent of the "Forest Act" had, as an essential ingredient, some sort of physical occupation by, for example, a working crew or camp and it could not be extended to include areas in a tree farm licence not being worked and perhaps remote from any immediate woods activity of the licensee. The Forest Service had ruled that, in tree farm licences,

"The area of occupation is deemed to be all lands within the boundaries of the forest management licence."

Sloan found that this policy of the Forest Service operated to the detriment of the tree farm licensee and he could see no reason for this discrimination, recommending that fire fighting obligations should be imposed without distinction upon all class of tenure. The recommendation was not implemented and perhaps rightly so since there are far more striking examples of "discrimination" between different forms of tenure than the one being considered.

The Peace River area, a part of the Prince George Forest District, posed a problem. It included that portion of British Columbia east of the height of land on the east side of the Rocky Mountain Trench plus the watersheds of the Katchika and Dease Rivers. The area covers 52,000,000 acres, 9,200,000 being classed as productive forest land. The opening of the Alaska Highway and the postwar boom in the timber market had resulted in a substantial increase in the amount of logging in the area. From 1945 to 1956, inclusive, the cut had totalled about 465,000,000 board feet from which the Crown received \$2,112,000.00 in revenue. During the same period, fire fighting costs in the area had been \$154,606.00. After the Dominion Government relinquished its administration of the Peace River Block in 1930, persons in the more settled portions were exempted from needing permits to burn for the simple reason that the Forest Service could not afford the expense of keeping more than one ranger in that vast area. Farmers starting fires each spring for land clearing purposes caused deplorable losses of timber, with fires up to 150 miles wide occurring. In 1945, Sloan had noted that a total lack of fire protection had resulted in the denudation of many thousands of acres in the Peace River area. In 1956, there were still only two rangers, seven assistant rangers, two lookout men, and two dispatchers. This gave a coverage for each ranger of 26,000,000 acres or, taking the entire staff of thirteen, one man to each 4,000,000 acres. Sloan described the fire fighting policy in this area in 1956, as follows:

- "(1) Major fires will only be fought when merchantable timber values are involved; and even where such values are involved, major fires in remote areas where costs would be prohibitive would not be fought.
- "(2) In the 'no permit' area, fighting fires is the exception and only carried on when timber values are involved. The farming population is responsible for its own protection. The Forest Service does not feel justified in spending money on the protection of private property, and does not consider itself a rural fire brigade, although assistance is given.
- "(3) Elsewhere, in the enormous areas north of latitude 57 degrees, as a general rule, fires are fought only when they can be controlled by a ten-man crew."

The area north of the 57th parallel (considered to be the southern boundary of the "perma-frost" zone) contains approximately one-sixth of the Peace River area's total productive forest area but about two-thirds of the total area. The area south of the 57th parallel, containing five-sixths of the productive forest area is primarily agricultural land and in 1956, it was being rapidly developed for that purpose. The timber was usually confined to valleys or river bottoms with vast areas of unproductive land inbetween. From all this, Sloan concluded that the Peace River area did not justify the same treatment or the same intensity of coverage as the less remote sections of the Province. However, he recommended the employment of an additional fifty-two men to bring the staff to one-quarter of normal staff requirements in other parts of the Province. Helicopters should be used to modify access difficulties and the requirement to obtain a permit before starting a fire should be reinstituted.

Finally, Sloan felt it to be reasonable for the Government to initiate studies to determine the feasibility of designing a Government-operated or assisted insurance undertaking, covering fire losses in mature and young growth forests. Such an undertaking has not been formed, although industry is able to insure equipment and cut logs against destruction by fire.

One of the most striking developments in fire protection and firefighting activities of the Forest Service since the Sloan report of 1956 has been the increased use of aircraft. In 1956, for example, six contract float planes flew 2,478 flying hours on protection flying. In 1966, contract flying for protection totalled 8,480 hours, 4,653 hours by fixed wing aircraft, 2,838 hours by helicopter, and 989 hours by air-water tankers. Non-contract flying occupied a total of 790 hours, 664 hours by fixed wing aircraft and 126 hours by helicopter. The grand total was thus 9,270 hours, a very marked increase. Considerable variations of flying time occur in relation to the severity of the annual fire hazard but the reliance upon aircraft has definitely increased, particularly in the use of helicopters and air-water tankers. In addition, the Coastal industry has cooperatively formed a company, Forest Industries Flying Tankers Limited, operating two very large Martin Mars tankers.

The status of access roads to the various users has long been a controversial subject, relating to the dangers of fire caused by hunters and the public generally, the danger of road accidents, destruction of equipment by vandalism, and road deterioration caused by persons driving over them when they were soft with moisture. The legislation was conflicting in a number of instances and the Commissioner recommended resolution of the problem.

A special legislative committee, upon request of the Minister of Lands, Forests and Water Resources, considered the question of the status of roads giving

access to the forest in relation to the user, and it heard evidence from industrial organizations, sportsmen's associations, grazing associations, mining associations and so on. In its report of March 18, 1964, the Special Committee on Public Access to Privately Administered Roads gave a number of opinions. Firstly, the committee believed that the Private Roads Act, 1963, represented a definite forward step towards the solution of the public access problem. It had increased the awareness of industry of the need to provide for public access over privately administered roads. ^{the committee} and felt that cooperation by industry in this direction would "continue and expand." One of the major provisions of the Private Road Act relieved the industrial operator of the responsibility for fires caused by the general public using the privately administered roads. The year 1963 had been a season of exceptionally low fire hazard and the committee did not feel that it should be taken as a reliable yardstick of the overall effect of the Private Roads Act. Because of this, the committee recommended that draft legislation should be delayed for at least one more year, when a similar special committee of the legislature should be instituted to review the situation. In a previous report of March 22, 1962, the committee had made a recommendation about the functioning of a Interdepartmental Committee on Public Access to serve on a temporary basis as a processing group for immediate and pressing access problems. These problems might be referred to such committee for study and to receive advice by the Deputy Ministers of the various departments of Government. This committee had been formed under the chairmanship of an officer of the Department of the Attorney-General. With its recommendations for a further delay in implementation of any legislation, the special committee felt it to be important that the Interdepartmental Committee should continue to function in the interim period.

The special committee also recommended that the Interdepartmental Committee should consider certain questions and report back to the special committee at the next session of the Legislature. Firstly, on some of the privately administered roads on Vancouver Island, a rigid multiplicity of permit systems, check point stops or variable closure policies did not appear to be in the public interest. The resource users concerned should unify their permit procedures and file them with the Interdepartmental Committee for study by the special access committee at the 1965 session. Secondly, the Interdepartmental Committee should develop an arbitration procedure to settle access disputes and report on them to the Special Access Committee. Thirdly, several forest companies had developed a programme of setting up picnic and camping sites for use by the general public within their areas of occupation. The Special Committee stated that it would welcome an extension of these programmes to all suitable forest areas. The main resource user should be jointly responsible with the Department of Recreation and Conservation for the designation of the areas and the access committee should study, in 1965, a possible formula for assessing the costs of developing these sites between the various resource users in the areas concerned. This latter suggestion is an example of the fairly common attitude in some quarters, that the resource user should finance public recreational activities as well as accepting considerable potential liabilities in connection with them. Another problem which the Interdepartmental Committee should consider was that of the guide pamphlets produced by industry and submitted to the committee, which serve as excellent models for all multiple-use road systems. The Special Committee recommended that the Interdepartmental

Committee should draw up an educational multiple-use pamphlet to be examined by the Special Access Committee with a view to recommending a complementary standard Crown pamphlet. The Interdepartmental Committee should also make recommendations to the Special Access Committee to bring policing standards, by the Royal Canadian Mounted Police within multiple-use areas more in keeping with those in force on the public highway system. There was also the problem, which needed to be considered, of access to areas that had been used and accepted as recreational areas or to which access could only be gained through the use of private road, private trail, or over private property.

The Special Access Committee had received some representations asking for an Access Act separate from the Industrial Transportation Act and asked that the Interdepartmental Committee consider the problem. It can be seen from all of this that the Special Access Committee was not so concerned with the prevention of forest fires caused by man as it was to ensure virtually unrestricted public access into the forest, with the exception of those periods when the forest was closed to access because of high fire hazard. Forest closures, however, of the kind that have been exercised in the past cannot be expected to prevent the occurrence of man-made fires. Whilst the Private Roads Act of 1963 transferred responsibility for fires caused by the public from industry to Government the whole access policy as developed at this time is a questionable one and can only be expected to continue to contribute to the heavy destruction caused by forest fires.

The apparent trend in slash disposal in the Vancouver Forest District, from broadcast burning to spot burning, was not maintained and the former eventually assumed more importance. In 1955, for example, 19,551 acres of slash were treated, of which 2,520 acres were burned broadcast and 17,031 acres were spot burned.⁶⁹ But in 1966, out of a total of 66,358 acres, 61,858 acres were broadcast burned and only 4,500 acres were spot burned.⁷⁰ For the decade 1957 - 1966, it has been reported in the Forest Service Annual Reports that 478,899 acres have been broadcast or spot burned in the Vancouver Forest District. One of the drawbacks of slash burning from a forest protection point of view is the damage which is caused when slash fires escape control. During the same decade, 26,004 acres of forest cover were burned by escaping slash fires at an estimated net damage (consisting of net damage to forest cover, net damage to cut products, and net damage to equipment and property) of \$778,124.40.

In 1967, the Forest Service moved toward the implementation of Section 116 of the "Forest Act" in the Interior. W.C. Phillips, the forester in charge of the Forest Protection Division of the Forest Service noted that, as a result of an alarming number of uncontrollable fires in logging slash, culminating in the 75,000 acre fire at Campbell River in 1938, a section had been included in the Forest Act to provide for compulsory burning of slash in the Coastal Region. Initially, compulsory burning was only required in a portion of the Coast and there were relatively few objectors to the principle. Since then, the Coastal Regions in which slash burning was compulsory had been increased. By contrast, in the Interior, logging had, until a few years previously, principally involved some form of partial or selective logging. Since the 2nd World War log production and areas of contiguous slash created by clear felling had increased. A number of costly fires/^{had occurred} that had been almost uncontrollable because they involved some of these slash areas, . Slash

burning, Phillips stated, was not designed to eliminate all of the wood debris but to reduce the "slash hazard" to a relatively safe condition. Natural reproduction then had a chance to establish and be relatively free from later destructive burning. If natural reseeding did not occur, it was possible to plant such areas. It is perhaps pertinent to point out that a number of practicing Interior forest managers disagreed with this general view, believing that the silvicultural aspects of broadcast slash burning, at least on many Interior sites, are insufficiently understood. A start had been made in slash burning on a variety of sites in the Interior and, in 1966, the Forest Service and cooperating timber sale operators had burned 26,000 acres of slash. During the same year, about 250,000 acres had been logged in the four Interior districts but, of this, only slightly more than one-half was clear cut and only slightly more than one-half of the clear cut areas, ie. about 75,000 acres, were suitable for burning. However, Phillips held that the slash burning of this acreage each year was not feasible because of the shortage of sufficiently trained Forest Service staff to assist the many logging operators that would be involved, and because of the extensive existing areas of older slash that the Forest Service burn, in part, to create fire breaks in some of the areas of contiguous slash.

The burning would require pre-planning (when logging was laid out to accommodate subsequent burning, the total burning costs were said to be greatly reduced) and the use of appropriate ignition procedures. The meteorological department of the Federal Government could supply very reliable weather forecasts and the Forest Service anticipated supplying sufficient technical advice for safe burning. Should a fire escape, in spite of these adequate precautions, the fire would be taken over by the Forest Service with the exception that the operator concerned would be required to supply the manpower specified in the burning permit for fire-fighting. Eventually, Phillips stated the Forest Service would list all clear cut areas for burning. The Service anticipated that an adequate burning programme would reduce fire-fighting costs and reduce periods of non-production due to employees being required to fight forest fires.

Certain other pertinent points were made by Phillips. It was noted that the falling of "snags"* after logging had created "more objectors" than had slash burning. In the Interior districts, it was proposed to issue annual blanket exemptions from snag falling unless otherwise specified by the District Forester. It may be observed that this permissive intention was based purely on forest protection reasons and ignored, as did certain other proposals, silvicultural reality. In a great many instances in the Interior, the leaving of snags would certainly be of detriment to the succeeding regeneration. Residual trees that would become snags after a burn were considered by the Forest Service to be a different problem. Unless "adequate arrangements" could be made for felling these trees then the Forest Service would tend to avoid slash burning operations on those areas, at least in the initial programme. Phillips believed that logging plans should take cognizance of the ultimate burning requirements. Each proposed burning area would be examined by a capable forest officer who would assist in preparing burning prescriptions. For areas designated to be burned, instructions would be issued by the Forest District Office. Prior to the actual burning, the operator would need to obtain a burning permit from the

* standing dead, standing broken, or standing trees with dead tops which were considered to be a fire hazard either from fires in slash and/or as a lightning hazard.

forest ranger in charge. This permit would specify the number of men and equipment required for safe burning with an additional requirement of men needed in the event of a fire escaping. The instructions would also include a requirement for the retention of "one or more patrolmen as long as small fires persist." The Coast procedures for slash burning were designed to accomplish the burning of slash as soon as possible after logging and failure to do so might invoke a penalty assessment of \$12.00 per acre at the time of Phillips' comments. Where burning was carried out later refunds could be considered. For the initial year in the Interior, the Forest Service did not propose to invoke any penalties but would follow the Coast procedure when concrete cost figures were available. The explanation concluded:

"There may be feelings that our stumpage allowance for slash burning is inadequate or incorrect. However, the small scale programme should not have serious effects on any one operator. We must make a start rather than wait until we have all the answers."

The data for forest fires including the damage which they have caused and the costs of fighting them are given in a series of tables annexed to this history. They reveal the appalling level of destruction and cost to the public of forest fires. Efforts have continued to increase fire fighting capability in the form of extensive use of water tankers and other modern technological devices, as well as increased publicity. If there has been a lack of purpose in recent years it has lain in the field of forest fire prevention. An obvious area in which the occurrence of fires could be reduced is that of man-caused fires. Eventually, with increasing population and increasing pressures on the forest, it may well be that a more enlightened form of forest access control will be recognized as a prime need.

It is now appropriate to turn to the question of forest insect pests and forest diseases. The subject is also discussed in a later chapter dealing with the role of the Canadian Government in Provincial forestry, particularly in relation to the research role of the Canadian Government. Sloan⁴⁰ noted the difficulties involved in the compilation of accurate and meaningful estimates of annual or periodic losses due to the depredations of insects and the incidence of decay caused by diseases. The huge forested area of the Province, he felt, made an accurate appraisal virtually impossible. Also, no one unit of measurement could properly accommodate all of the various kinds of losses. In the decade from 1944 - 1954, the losses from known specific infestations of insects were well in excess of 800,000,000 board feet, excluding any losses in the Kamloops Forest District, losses of increment following non-fatal defoliation and losses in value in beetle infested sawlogs and plywood logs. Even so, the figure was very conservative.

On the question of decay, more extensive information was available. The average annual sawlog scale for the decade 1944 - 1953 on the Coast was 2,854,775,000 board feet, and there was an estimated 374,671,000 board feet of cull material brought out of the woods. This latter volume was decay which, during the scaling of the sawlogs, was deducted from the gross scale and, consequently, was not included in the annual sawlog scale figure quoted. In the Interior the corresponding figures were 778,229,000 board feet with 119,115,000 board feet of cull. The Interior figures only refer to Douglas fir, western red cedar, western hemlock and spruce. The 1956 Sloan Report also included an estimate, for the same species, of the accumulated decay volume in mature and overmature stands. The net (sound)

volume of wood in these species was estimated at 96,305,000,000 cubic feet and the accumulated volume of decay at 24,482,000,000 cubic feet. Very little can be done about these existing volumes of decay, other than to recognize that the sooner they are removed the better in order to make way for healthy young stands of good growth.

CHAPTER SIXTEEN

The Period From 1946 - 1970
Reforestation

It is obvious that forest utilization by industry and the large-scale destruction by forest fires demands large-scale reforestation programmes in British Columbia if the forest is to be treated as a renewable resource. Sloan dealt with the question of reforestation in his 1956 Report. Whether regeneration was accomplished by natural or artificial means, its objective was clear and beyond dispute:

"So far as economically feasible new crops must be established as soon as possible and maintained on our cut-over or burned-over productive forest land. Maintenance includes, in this context, the protection of our regenerated juvenile forests from destruction by fire."

In evidence before the Commissioner, H.G. McWilliams, Forester in charge of Reforestation for the Forest Service, had said that in 1945 the opinion had been held that there were one million denuded acres in the lower Coastal Region of which 400,000 acres would require planting. By 1956, the area to be planted was estimated as less than 100,000 acres. Some of the land had restocked naturally, some "lost" to alder growth and other deciduous species and 80,000 acres had been planted. Also, improved survey data was available. The (then) recent introduction of patch logging had increased the natural regeneration of the currently logged and burned areas and, in many instances, no artificial regeneration would be necessary. More adequate fire protection had also helped to improve the situation and large, devastating burns and reburns were occurring with less frequency.

It seemed to Sloan that this did not tell the entire story. He compared the 1945 average of the forest land not satisfactorily restocked with the same land classification for 1955, as shown in the following table:

ESTIMATES OF AREAS OF FOREST LAND IN BRITISH COLUMBIA WHICH WERE NOT SATISFACTORILY RESTOCKED

<u>Year</u>	<u>Coast</u>	<u>Interior</u>	<u>Total</u>
1945	918,000	19,134,000	20,052,000
1955	1,723,168	10,140,951	11,864,119

Logging in the Coastal Region was proceeding at an average rate of about 80,000 acres per year. Planting was only carried out in areas in which Douglas fir predominated and these fir areas were being logged, in 1956, at an average rate of 40,000 acres a year. Based on the assumption that satisfactory natural regeneration would occur on 75% of this area, then 25% or 10,000 acres a year would not restock adequately unless planted. The remaining 40,000 acres a year logged on the Coast were areas on which species other than Douglas fir predominated and no planting at all was being undertaken on these areas. Assuming that 75% of these areas would restock by natural regeneration, then there were another 10,000 acres a year not restocking and this acreage would in most part also be "lost" to deciduous growth. It seemed to Sloan/^{that} to say that these areas were not economically practical to plant ignored the fact that they were composed of sites sufficiently good to produce trees of a size, quality, and species for which there was a demand, otherwise the area would not have been logged. The Forest Service should re-examine the position of this estimated 10,000 acres per year in "non-fir" areas/^{that were} being added to the steadily growing accumulation of forest land which was not satisfactorily restocked and/^{were being} covered by

growth of no commercial value. It appeared to Sloan from this process of reasoning that 20,000 acres a year were being added to the Coast total of forest land which was not satisfactorily restocked.

In addition, growing stock was being destroyed by fire. For the ten year period 1946 - 1955, immature timber had been killed by fire on an average of 30,448 acres each year. In the Vancouver and Prince Rupert Forest Districts, the average fire loss during the same period was 7,000 acres a year. The Prince Rupert District occupies both Coastal and Interior areas and Sloan assumed that the average annual loss of immature forest by fire in the entire Coastal Region had been about 5,000 acres. On the assumption that, after a second burn, not more than 30% of the area would be expected to regenerate naturally, there would be about 3,500 acres to plant from this cause. Economic factors aside, Sloan concluded that there was a requirement to plant a total of 235,000 acres in the Coastal Region in ten years. In the decade from 1946 - 1955, the Forest Service had planted about 60,000 acres and private companies about 30,000, or about 40% of the total of 235,000 acres.

Sloan gave the ownership of the areas of productive forest land which were not satisfactorily restocked in the Coastal Region as follows:

SLOAN'S ESTIMATE OF PRODUCTIVE FOREST LAND
NOT SATISFACTORILY RESTOCKED IN THE COASTAL
REGION BY OWNERSHIP (1956 REPORT⁴⁰)

<u>Ownership</u>	<u>Acres</u>	<u>Percentage of Total Coast NSR Acreage</u>
Province	896,994	52.1
Timber Lease & Licences	309,290	17.9
Crown Grants	487,439	28.3
Canada	29,445	1.7
Totals	1,723,168	100.0

Assuming that current (1956) losses in acreage were occurring at the same percentage as the ownership of accumulated acreages not satisfactorily restocked it followed, according to Sloan, that in addition to the accumulation of 900,000 acres of unalienated Crown land, one-half of 23,500 acres or, say 12,000 acres a year as a round figure must be added, less the acreage planted by the Crown. Thus, the Crown should be planting (economics apart) 12,000 acres a year to prevent the situation from worsening, plus 36,000 acres a year to reclaim the 900,000 acres in twenty-five years. This would mean a yearly planting programme of 48,000 acres with 38,400,000 seedlings/at a cost of \$1,920,000.00 a year (based on \$40.00 per acre) and Sloan expected that at least part of this cost would be borne by the Canadian Government.

Chief Justice Sloan continued that Dr. Orchard (Deputy Minister of Forests and Chief Forester) and Mr. McWilliams (Forester in charge of Reforestation) did not agree with this reasoning and they had stated that it was only possible to economically plant 100,000 acres on the Coast. McWilliams had added that a nursery production of 10,000,000 seedlings a year on the Coast would be sufficient "to catch up on the backlog of understocked areas within ten years" and "by then it will be possible to estimate a comparatively modest annual planting programme" Dr. Orchard in evidence, had divided the 100,000 acres referred to by Mr. McWilliams into ownership categories—66,500 acres in private and 33,500 acres in Crown ownership.

Sloan, referring back to his figures, stated that areas of Crown land which were not satisfactorily restocked on the coast had actually doubled in area in ten years from 900,000 acres in 1945 to approximately 1,800,000 acres in 1955 and were expanding at a rate of about 22,500 acres a year. The Forest Service asserted that only 33,500 acres of this could be economically planted. The Forest Service had further asserted that the planting of 10,000,000 seedlings or 12,500 acres a year would not only take care of areas denuded by logging and fire and not expected to restock fully, but would catch up in ten years with the entire backlog of the Crown acreage which was not satisfactorily restocked and that could be economically planted. Sloan was unable to accept the assertions, either as a correct explanation of the situation or as a sound foundation for a future reforestation policy. After making all due allowances for the exclusion of certain poor site areas from a reforestation program, Sloan's opinion was that the Forest Service was placing too much stress on the economics involved and that its estimates of areas to be planted were far too conservative and required drastic upward revision.

There was common ground between the Forest Service and Sloan, in that about 75% of the areas classified as not satisfactorily restocked on the coast, had been occupied by brush and non-commercial cover. The loss of Crown land was thus 675,000 acres (75% of 900,000 acres) and of an annual volume of growth of 283.5 million board feet. This growth estimate was based on an average growth rate of 420 board feet per acre per year. Sloan believed that a survey and study should be made to determine when and where it will be economically feasible to justify an expenditure necessary to reclaim the lost acres to production. In addition, he considered that the Forest Service should speed up planting on logged areas of Crown land before brush growth developed and the good growing sites were lost. Sloan pointed out that tree farm licences were required, under their agreement with the Government, to ensure the regeneration of cut-over or otherwise denuded forest land within the licensed area. It did not seem unrealistic to Sloan to insist that the Forest Service come within a reasonable degree of fulfilling the same primary obligation on Crown land. He was not unmindful of the fact that someday deciduous trees might be a more valuable source of cellulose than conifers but he did not think that the Province could afford to take that chance.

In the Interior, the areas classified as not satisfactorily restocking had seemingly been reduced from 19,000,000 to 10,000,000 acres, as shown in the table above. No planting of any consequence had been undertaken in the Interior and Sloan assumed that the difference was chiefly accounted for by natural regeneration and, in part, by improved surveys. There was no information available to Sloan on the site qualities of Interior areas which were not satisfactorily restocked and he was unable to formulate any specific recommendations relating to them. However, it seemed that the future needs of industries would necessitate, in time, revision of the prevailing attitudes towards Interior regeneration. Sloan was not unmindful of the economics involved and recognized that in many areas the return from poorer quality sites producing small timber at low stumpage prices did not equal the cost of planting. The existing counterbalancing aspects must not be overlooked, however. These were the indirect effects and benefits that could be derived from the maintenance of forest cover, including watershed protection, game sanctuaries and aesthetic values.

Sloan quoted Orchard as being of the opinion that planting was not economically sound in the Prince George area of the Province. The result of this was that

"areas that prior to logging contained 90% spruce--the valuable species--and 10% balsam (alpine fir), after logging and perhaps fire, regenerate naturally but in reverse proportions; ie. to 10% spruce and 90% balsam. In areas where cutting has been too severe, jack-pine (lodgepole pine) takes over, especially if fires have occurred."

In the view of Sloan, a wider discretion should be exercised in the determination of whether to plant or not plant selected areas in the Interior, as well as on the coast, than that guided solely by the recoverable values measured by the demands of the immediate timber economy. He recommended the establishment of an experimental spruce nursery in the northern Interior, as an initial step. The present generation were trustees of the Province's forest wealth and, if the Government continued to be unduly influenced by the profit motive, it seemed to be inevitable that future generations would inherit an impaired and diminished forest resource.

Planting in the Interior had indeed been minor. Planting in the southern Interior commenced in 1950 and up to the end of 1953 the Forest Service had carried out experimental plantings totalling 148 acres and plantings on Crown land totalling 576 acres. One tree farm licensee, by the same date, had planted 47 acres. Private planting and farm woodlots accounted for further 22 acres. A total of 793 acres had thus been planted, involving 614,700 plants, mostly grown at the Forest Service nursery at Cranbrook. In relation to the amount of work to be done, the total acreages planted in the Interior were very small indeed and increased effort was necessary if the Province was to make proper use of the land.

Since 1953 (up to 1955) large operators on the Coast had shown interest in planting and private planting had been almost on a parity with Government planting. The cost of private planting on the Coast varied from \$6.79 to \$20.00 per acre, with the Forest Service supplying the plants free of charge. The variation is attributable to different site conditions and different densities of planting. For example, the company with the cost of \$6.79 per acre was Canadian Forest Products Company Limited which planted at a density of about 350 plants per acre. Most densities were higher than this.

By 1966, considerable progress was being made and nursery expansion was proceeding. Preliminary tests of a new nursery at Rayleigh (Kamloops) resulted in an increase in production. In the Chilliwack Valley on the mainland Coast, a new nursery development, consolidating existing nursery facilities, cleared a considerable area sufficient for the sowing of 600 beds in the spring of 1967. The first stock was produced at the Coastal Alouette Nursery which was expanding in area at the same time. At the nearby Haney Nursery, expansion was in progress. The entire area of the Snowdon transplant nursery near Campbell River on Vancouver Island was ready for use. Much of the work was being carried out by inmates of penal institutions. The final acquisition of the Redrock Nursery site near Prince George was completed and sufficient land cleared and prepared for 222 seed beds and 700,000 transplants. Simultaneously, the Aleza Lake Nursery, also near Prince George, was closed down almost completely. The major coast nurseries at Koksilah, Duncan and Green Timbersall expanded in area. The various seedbeds sown in the autumn of 1955 and the spring of 1966 had a planned production of more than 27,000,000 seedlings. In 1966 itself, a record of 19,070,700 trees were shipped out from Forest Service nurseries, 3,636,700 of which were transplants. The production of transplants was

expected to continue to increase because of increases in the production of Interior species and the enlarged capacity of cooperative transplant nurseries. Apart from personnel, limitations of seed supply have slowed down expansion. In 1966, the combined total of collections by industry and Government approximated to 50,000 bushels of cones.

Actual planting by all agencies in the Province had reached a record 19,070,700 trees, as mentioned, which reforested 46,935 acres. This compares to the estimate by Sloan of a required planting program of 48,000 acres with 38,400,000 seedlings, at a density of 800 seedlings per acre, on the Coast and a program of un-stated size in the Interior. The Coastal plantings were of 16,088,800 trees on 39,877 acres and the Interior plantings were 2,981,900 trees over 7,058 acres. These figures show an extraordinary large increase over the position ten years previously, when 297,100 trees were planted on 422 acres in the Interior and 3,343,000 trees on 7,931 acres on the coast.

The Coastal forest industry made a number of comments on the reforestation situation. Hoffmeister⁷¹ noted that statistics reported by the Forest Service showed that 26,000,000 acres of productive land were not supporting usable growth. He also noted that the British Columbia Government had written that the Forest Service must confine planting to only the high site potential brush areas. The Chief Forester had estimated that 30% of the acreage cut over in the Province would need some form of artificial regeneration. Based on the annual acreage being cut over at the time, this would mean that some 100,000 acres must be planted annually. Hoffmeister stated that lack of funds appeared to be the reason for restrictions on planting. In 1964, 42,000 acres were planted of which industry had been responsible for 36,000 and the Provincial Government for 6,000.

The Vancouver Section of the Canadian Institute of Forestry presented a brief to the British Columbia Government dealing with reforestation of the Coastal public sustained yield units.⁷² The Section was composed almost entirely of professional foresters employed by industry, government, and university, representing all facets of the forestry profession in the Coastal region, excluding Vancouver Island. There were six public sustained yield units in the Vancouver Forest District in 1967. In these six units, the estimated annual allowable cut amounted to a hundred and fifty million cubic feet annually, representing a direct stumpage revenue to the Government of \$10,500,000.00 annually, assuming an average stumpage rate of \$7.00 per hundred cubic feet. Although the areas of forest land not satisfactorily restocked for public sustained yield units were not published in the Forest Service Annual Report, it was the finding of the Vancouver Section that there were in excess of a hundred and sixty thousand acres of productive forest land "lying idle" in the six units in the Vancouver Forest District. Most of this land, denuded by logging and fire, was covered with brush and weeds and required treatment before planting. Two main categories were identified, as follows:

- (a) land ready for planting 25,000 acres.
 - (b) land requiring brush removal or treatment before planting could be undertaken 135,000 acres.
- TOTAL: 160,000 acres.

Approximately 50,000 acres were cut over annually in the Vancouver Forest District on areas where the responsibility for reforestation remained with the Forest Service. Of this, 50,000 acres, about 25,000 would restock naturally within five years. Of the 25,000 acres per year requiring reforestation, 15,000 acres

required immediate restocking to avoid loss of the area to brush species. In 1966, the Vancouver Section of the Institute noted, the British Columbia Forest Service had planted approximately 8,000 acres in the Vancouver Forest District. The program for 1967 would be approximately 12,000 acres. At this projected rate, the unplanted area was adding at least 13,000 acres every year to the existing backlog of 160,000 acres. The Institute pointed out the implications, which were a reduction of allowable cuts or, if the areas not satisfactorily restocked were all planted, an additional 16,000,000 cubic feet which could be added to the allowable cuts. The increased volume would represent a direct stumpage revenue to the Crown of \$1,120,000.00 per year. Most private companies, realizing the value of the immediate restocking on areas that would not restock naturally, were planting that portion of their current private land logging areas immediately.

Planting costs were given as approximately \$30.00 per acre and at an average growth rate of 100 cubic feet per acre, the payback period, on the basis of a stumpage of about \$7.00 per hundred cubic feet stumpage, would be about four years. In addition, the Institute said, the indirect financial and social benefits to the Government from taxes and the increased employment were far more important than the direct stumpage returns.

As its solution, the Vancouver Section urged that the Forest Service should be provided with adequate funds to carry out the following minimum measures:

1. All areas currently being cut and requiring artificial regeneration should be planted as soon as possible with the minimum objective being 25,000 acres per year.
2. The rehabilitation of the plantable backlog areas should proceed at a rate of not less than 5,000 acres per year.
3. Adequate research should be commenced to solve the problem of rehabilitation of the 135,000 acres, which had a timber growth capacity of nearly twice the average growing site, of lands covered with brush or impediments to planting. Currently, it was estimated that 1,000 acres per year should be rehabilitated as an initial measure.

The Forest Service should also publish annually a detailed report showing the areas that were naturally restocked, planted, denuded, and the remaining areas that were not satisfactorily restocked for each of the Coastal public sustained yield units. The section stated that they recognize that funds were required for highways, education and welfare, but a healthy and strong forest industry based on maximum yields from the forest lands would assist in generating these funds. R.G. Williston, Minister of Lands, Forests and Water Resources took the brief to ask for wider Provincial Government support for reforestation on lands situated in the Coast Public Sustained Yield Units. He believed, firstly, that the Government must take cognizance of the entire forest estate and not just one region. In the past few years, the Interior forest harvest had grown to one-half of the total estimated harvest for the Province. It appeared that foresters practicing in the Interior were changing their thinking to the extent that they were now prepared to endorse immediate planting after logging to reduce the regeneration waiting period. Secondly, the Minister pointed out that the Forest Service supplied all of the planting stock used in the Province, with certain minor exceptions. The Government forest nursery facilities were fully occupied and new land was progressively being brought into use. The objective of the expanding program was to have nursery production reach 75,000,000 million trees annually by 1975. Williston could not predict what proportion would be available for Coast or Interior, nor the proportion of company to

Government planting. For the past four years, the Government had given priority of supply to industry and, as a result, a large proportion of the trees had been used to reduce the coastal backlog of planting. Thirdly, Williston noted that for a number of years prior to 1966, seed shortages from suitable sites had seriously handicapped nursery expansion. The situation had been rectified except in such species as white spruce. The recommendation of the Vancouver Section that research should be commenced to solve the problem of rehabilitating the 135,000 acres of land covered with brush or impediments to planting and an immediate program to rehabilitate 1,000 acres per year was felt by Williston to be quite impractical. The Provincial inventory program which was based on a survey of each sustained yield unit every ten years, was ambitious and, when this period was combined with the factor of periodicity of seed crops the inventory program appeared to be as practical a program as could be maintained for many years. Finally, Williston noted that attention had been largely directed, over the preceeding few years, to more complete utilization of the forest crop but the Government had not overlooked the necessity of more planting. The increased program of reforestation and plant production was fully supported and the funds available for 1967 - 1968 had been increased by approximately \$200,000.00.

It is interesting to note that Williston, addressing the third session of the Legislative Assembly in 1966, had discussed the close utilization policy and said in part

"Once the close utilization techniques have been mastered increased attention can be given to such matters as fertilization, tree and species selection, and more intensive methods of protection against fire, insects and disease."

Whilst the levels of reforestation remained inadequate during the period under discussion, it is clear that much progress had been made.

L.F. Swannell, Chief Forester of British Columbia, has notified* the planting figures for 1970, as follows:-

PLANTING IN BRITISH COLUMBIA - 1970
(Trees in Thousands)

Region	Forest Service Planting on Crown Land		Forest Service Planting on Crown Grants Under Section 15L of the Forest Act		Company Planting on Tree Farm Licences		Other Private Planting		Totals	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Coast	7,202	17,448	118	270	10,616	30,512	7,915	20,065	25,851	68,295
Interior	7,201	14,672	-	-	673	1,934	206	435	8,080	17,041
Province	14,403	32,120	118	270	11,289	32,446	8,121	20,500	33,931	85,336

Thus, 34 million trees were planted in 1970 in the drive towards 75 million trees by 1975. The Forest Service programme has involved the raising of a wider variety of species than was formerly the case, as well as providing increased numbers of plants. The following figures, supplied by L.F. Swannell, Chief Forester, show the anticipated nursery sowings in 1970 indicating two-year seedlings which will be

* Private communication to the author

available for planting in 1972.

ANTICIPATED FOREST SERVICE NURSERY SOWINGS - 1970

<u>Species</u>	<u>No. of Trees in Thousands</u>	<u>%</u>
Coastal Douglas fir	33,477	49.9
Interior spruces	14,487	21.6
Lodgepole pine	9,695	14.4
Interior Douglas fir	4,535	6.7
Sitka spruce	4,055	6.1
Western hemlock	840	1.2
Red and Yellow cedars	70	0.1
Ponderosa pine	<u>10</u>	<u>-</u>
TOTALS:	67,169	100.0

The Interior species and provenances account for about 45% of the anticipated sowings, in pursuance of the Forest Service policy of maintaining balanced planting programmes in the various regions of the Province. The indications are, providing the current impetus is maintained, that the 1975 target will be met.

CHAPTER SEVENTEEN

The Period From 1946 - 1970
Timber Berths, Leases and Licences

The fundamental importance of the adoption by the British Columbia Government of a policy of public ownership of forest land, has been emphasized. This led to a policy of licensing the industry to cut timber, rather than the leasing of land and timber.

Chief Justice Sloan⁴⁰ recorded the numbers and acreages of berths, leases and licences existing in February, 1944, as follows:

TIMBER BERTHS, LEASES AND LICENCES
BRITISH COLUMBIA - FEBRUARY, 1944
(according to the 1945 Royal Commission Inquiry⁴⁰ into
the forest resources of British Columbia)

	<u>No.</u>	<u>Acres</u>
Timber Licences	2,850	1,795,500
Timber Berths	205	424,760
Timber Leases	152	197,900
Pulp Licences	252	155,736
Pulp Leases	<u>33</u>	<u>335,610</u>
Totals:	3,492	2,909,506

The reader will remember that Sloan⁴⁰ had recommended that a sustained yield policy should be introduced so that the forests could be perpetuated:

"Our forest land must be regarded as a source of renewable crops and not as a mine to be exploited and abandoned."

As a means of encouraging the expansion of the forest industry, whilst at the same time providing an incentive for the private owner (mostly forest industry companies) he proposed the formation of what subsequently became tree farm licences. In return for the licensing of an appropriate area of vacant Crown forest land, the private owner's lands would be subject to regulation and in the second rotation he would be limited in his cut to the sustained yield production of the two areas. Quite apart from the policy of encouraging industry, a policy of placing "private" forest tenures under sustained yield was introduced. At the same time, the requirement that logged-off lands should be returned to the Crown was continued.

By 7th January, 1964, the total number of berths, leases, and licences had been reduced and about 45% of those remaining had been included within tree farm licences, as follows:

TIMBER BERTHS, LEASES, AND LICENCES IN BRITISH COLUMBIA - 7 JANUARY, 1964
(Source - British Columbia Forest Service)

	Number Within Tree Farm Licences	Acres Within Tree Farm Licences	Number Outside Tree Farm Licences	Acres Outside Tree Farm Licences	Totals	Total Acreage
Timber Licences	1,152	728,433	1,319	827,774	2,471	1,556,207
Timber Berths	3	8,416	165	363,473	168	371,809
Timber Leases	74	98,662	40	49,650	114	148,460
Pulp Licences	116	69,273	116	72,188	226	140,460
Pulp Leases	18	224,776	15	109,037	33	333,812
Totals:	1,363	1,129,560	1,655	1,422,122	3,012	2,550,748

The Forest Service, at this time, tended to treat these tenures as if they were private land and forest. However, its attitude changed and the Service began to insist that those tenures not included within a tree farm licence should be treated as if they were timber sales. Amongst some of the measures taken was the issuance of instructions to survey the tenure boundaries and a requirement that the timber on the tenures be cut according to a cutting plan, within a certain period of years. The administration of the returns of logged land to the Crown was more closely enforced and fees and rentals increased.

In 1965, Parts IV and V of the Forest Act were revised and much more comprehensive renewal documents were issued for timber leases and licences, designed to bring the tenures more closely under the administrative control of the Forest Service. As a result of all of these measures, the position in January, 1971, was as follows:-

TIMBER BERTHS, LEASES AND LICENCES IN BRITISH COLUMBIA - JANUARY, 1971
(Source - British Columbia Forest Service)

	Number Within Tree Farm Licences	Acres Within Tree Farm Licences	Number Outside Tree Farm Licences	Acres Outside Tree Farm Licences	Totals	Total Acreage
Timber Licences	1,159	598,119	1,137	664,933	2,296	1,263,053
Timber Berths	5	4,042	122	223,572	127	227,614
Timber Leases	74	89,224	25	27,022	99	116,246
Pulp Licences	110	53,789	113	68,154	223	121,943
Pulp Leases	18	206,226	15	106,006	33	312,231
Totals:	1,366	951,400	1,412	1,089,687	2,778	2,041,086

CHAPTER EIGHTEEN

The Period From 1946 - 1970 Forest Utilization

The development of the pulp and paper industry has been described in Chapter Eleven, along with pulpwood harvesting areas. Some reference can usefully be made to other aspects of utilization although, because of the very large amount of published material which is extant, the reference is selective rather than comprehensive.

In 1956, Sloan⁴⁰ noted that logging was British Columbia's leading primary industry. At that time, logs were continuing to flow from the forest in ever-increasing volume. The increase was largely attributable to the greater cut which had occurred in the Interior where volumes had risen from 577,166,000 board feet in 1944 to 2,416,866,000 board feet in 1956. The data for forest production in British Columbia are contained in four tables at Annexure IV.

In the forest, the drive toward more complete mechanization of logging continued and is still continuing. In the Coastal and Kootenay Regions, for example, the traditional spar tree employed in high lead logging has been replaced by steel towers mounted on modified tracked vehicles (such as military armoured fighting vehicle recovery units) so as to be rapidly portable from one location to another. Pre-loading of logging trailers with logs has been introduced in some areas so that the tractor portion of the logging truck may be operated continuously by simply changing trailers at the loading point. A relatively recent development has been the introduction of tractor mounted shears or rotary cutters which can cut down trees very rapidly by comparison with the feller using a power saw. Pilot operations and research continue in the Coastal Region into balloon logging, in which an aerodynamic, helium-filled balloon is employed to support the mainline cable for the extraction of logs. Crown Zellerbach (Canada) Limited have for some years been associated with experiments aimed at developing an economic mobile wood chipper, which would make pulp chips out of waste normally left in the woods. Experiments have shown the feasibility of moving pulp chips in a liquid carrier through a pipeline, although no practical application has occurred and a number of problems remain for the proposal. Experiments in other parts of Canada have tested machines which are designed to cut down trees, remove the limbs and buck the tree into logs although, again, machines of this type have not found application in British Columbia. In the Interior of the Province, rubber tired skidders have become common where formerly only tracked machines were used.

This drive for mechanization of logging in the mature and overmature stands has had desirable results in terms of costs and has enabled the industry to support the rapidly escalating costs of labour. It has also enabled the development of forest access and logging operations in areas which were previously inaccessible at a relatively rapid rate. Perhaps inevitably, however, it has raised objections from silviculturists, foresters of biological and ecological orientation and training, from biologists, ecologists, fisheries experts, and clubs and associations with an interest in the forest. The complaints usually relate to the undesirability of clear felling and related operations, a method of logging which is well adapted to the degree of mechanization which has been advanced in logging. The more complex systems of logging, such as selection felling and shelterwood felling are more difficult to carry out satisfactorily with mechanical equipment than is clear felling.

However, large areas of virgin stands such as the overmature and mature Interior Engelmann spruce-alpine fir--lodgepole pine forest cover type are so susceptible to windblow and sun scald when partially logged that some form of clear felling appears to be the only practical approach to their utilization at the present day. It is essential, of course, that the clearcut stands are replaced by young, vigorous forest and, if this is done, possibly the clear-cutting process is acceptable as a means of conversion of old forest into new.

The use (or misuse) of heavy mechanical equipment may, however, have serious consequences in terms of soil damage which can, in turn, produce a series of other undesirable effects. A growing recognition of this problem by Government, industry and University foresters is leading to an increased effort to overcome it.

Mechanization, automation and integration of operations was also occurring in the log yards and plants fed by the produce of the forest. There are very many examples of this trend and only one is mentioned herein. In the Interior, the smaller tree diameters which prevail over most of the land area as compared to the Coastal Region posed problems of profitable conversion of small diameter logs into lumber and, in some respects, into pulp chips. Studies in the Interior had shown that relatively high recoveries of lumber from small logs could be obtained from three types of mills. These were the circular headsaw and line-bar band resaw mill; the circular headsaw, oscillating cant gang and circular resaw mill; and the circular headsaw and circular resaw (both of narrow kerf) mill. The most profitable approach to small log conversion appeared to be to make lumber from the logs and to chip the balance of the log, rather than to chip the whole log. By 1963, new machines had been introduced which chipped the logs into a profiled cant which was then sawn in one pass to split the cant into lumber. This kind of development led to a great increase in the utilization of small size logs, particularly lodgepole pine.

The emphasis on product quality within the industry has increased very greatly over the past two decades and to some extent, previously. British Columbia plywood unlike, for example, plywood produced in the United States has for years been made with waterproof gloss, giving it a high use for exterior purpose. Today, the rough lumber market has been greatly reduced and most lumber is planed. Whereas, in the early 1950's a considerable number of portable sawmills were to be found in the Interior, very few now exist and the accuracy with which lumber is sawn has greatly improved both because of this and because stationary mills have improved their practices. The disappearance of the portables and the construction of pulp mills in several areas have much reduced the quantity of waste wood produced in sawlog lumber. Whereas, prior to 1955, a significant number of sawmills sold their lumber in a green state or relied upon air drying the great majority now dry their lumber in kilns. Although the kiln drying process is relatively costly, it greatly facilitates the sale of lumber. Pulp and paper products have been subjected increasingly to quality controls which demand a high product standard. Whereas, as recently as 1950, British Columbia had a significantly large wooden box industry, this industry has largely disappeared (although not entirely) because of the high labour content of manufacture and the successful introduction of corrugated cardboard and moulded pulp containers, and plywood bulk packaging bins. These are only a few examples of the changing scene in industry under the influence of a dynamic technology.

Behind these developments in the forest and in the manufacturing plants there has been a concentrated research effort. It is outside the scope of this history to delve into this effort but it is appropriate to mention the agencies involved. Quite apart from development research conducted by the forest industry and the machinery companies selling equipment to it, forest products research has been conducted by the Federal Government at the Forest Products Research Laboratory at Vancouver. For a number of years the only Government Agency conducting forest research was the Forest Service Research Division which is now important for its work in the fields of tree breeding, reforestation and related aspects of forestry. It is an interesting, if lamentable fact, that Federal Government forest research, apart from important contributions in the fields of forest entomology and pathology, was for many years excluded from British Columbia for political reasons. In recent years, however, Federal forest research has been conducted in British Columbia with mutually agreed fields of research allocated to them and to the British Columbia Forest Service Research Division. The previous constraint placed on the conducting of Federal Forest Research in British Columbia has probably influenced their research programme, almost to the present day and could explain why Federal financial support and staffing in this field, up until 1970, was disproportionately less in British Columbia than in other Canadian provinces. In addition to all of these sources of research, valuable contributions to forest and forest products research have been made by the University of British Columbia and by the British Columbia Research Council.

The importance of the forests and the forest industry to British Columbia's economy is beyond question. The Government* has pointed out that the industry has progressed to the point where the Province has become a major world supplier of forest products. The United States, in 1969, was the best customer, followed by the European Economic Community, Japan and Great Britain. In 1969, these four areas accounted for over 92% of the forest product exports. In the same year, it was estimated the forest industries were harvesting only 56% of the annual allowable cut which is available in the Province. Despite the remarkable increase in pulp and paper production, lumber has remained the prime export commodity, accounting for 47% of the value of all British Columbia forest product exports through Canadian customs ports.

In relation to Canada as a whole, the Province produced 68% of the softwood lumber, 27% of the pulp, 16% of the paper and 93% of the softwood plywood in 1969. To accomplish this, the industry is estimated to have given 75,900 men a full year of direct employment. Without taking into account the indirect employment supported by the industry, this amounts to 9.6% of the total Provincial employment.

Returning to the question of forest exports, the estimated value of them in 1969 was \$1,237,017,000 or 42.5% of the value of all Canadian forest products exports.

The relative importance of species logged has changed since the 1956 Sloan Royal Commission Report and, in 1969, was as follows:-

* Government of British Columbia, Department of Industrial Development, Trade and Commerce (1970). Selected forest industry statistics of British Columbia.

<u>Species</u>	<u>Percent Harvested</u>
Western Hemlock	22.4
Spruces	22.3
Douglas fir	20.0
Western Red Cedar	13.0
Alpine and Amabilis firs	11.1
Lodgepole pine	7.5
Others	3.7
	<u>100.0</u>

A recent phenomenon of industrial growth has been the development of the North-Central portion of the Province. The Vancouver Board of Trade, through its primary resources committee has reported on northern British Columbia resource development.⁷⁴ Amongst its recommendations were a series favouring improved road and railway access into the Region and other recommendations stressed that restraint should be exercised to avoid committing marginal lands to agriculture in these northern latitudes, in conditions where forestry might be a higher economic land use. The average age of the population at the time of the Board of Trade study was surprisingly low and 83% of the population was below 45 years of age. This population needed advanced education to provide technically efficient workers for the anticipated growth in mining, pulp and paper manufacture and forest management. There was an immediate need for improved forest fire protection and an additional need to develop improved silvicultural methods for the northern conditions so as to ensure prompt and effective reforestation. The increasing complexity of northern forest management and administration caused the Board of Trade to recommend the establishment of additional forest districts, thereby reducing the size of the existing very large districts.

Virtually all industry has to rely upon good markets for its prosperity or existence. The British Columbia forest industry relies very heavily upon export markets, the health and demands of which are beyond the industry's control. Almost all of the markets for the Province's forest products have experienced difficulties in recent years, beyond those to be expected from such phenomena as seasonal business fluctuations. For example, the instability of the pound sterling in 1966 and the measures taken to stabilize it affected British Columbia's forest products exports to Great Britain to a significant degree. The expected entry of Great Britain and other countries into the European Common Market may also affect the British market adversely from the Province's point of view.

Difficulties have been experienced in the marketing of lumber in the United States. Norman R. Dusing of the Council of British Columbia Forest Industries reviewed some of the problems of United States trade relations in 1967, in an address to the annual meeting of the Interior Lumber Manufacturers' Association. The United States, at the time, was buying 60% of the annual lumber out of 7,000 million board feet of western Canada. As in all foreign relations, the Canadian Government was playing a major role in establishing and helping to maintain a healthy climate for foreign trade but it had to rely on the forest industry to identify issues. A serious threat to the Canadian position in the United States lumber market had arisen at the United States tariff hearings in 1962. A segment of the American lumber industry which was having difficulty in selling its product on the home market, claimed that its problems arose from the growing imports of Canadian lumber. The Alberta

Forest Products Association, the Saskatchewan Timber Board, the British Columbia Wholesalers and the four British Columbia Lumber Associations formed a consortium known as the "United States Policy Committee" and, in a presentation to the United States Tariff Commission, successfully resisted the placing of restrictions on Canadian lumber imports. The Committee remained in being with the objectives of defining issues and recommending action to its members on matters of trade relations with the United States, particularly concerning direct and indirect barriers to trade. The foregoing is only one example amongst many of the great effort continuously being made by the forest products industry to preserve and expand its various markets and to enter into new ones.

CHAPTER NINETEEN

The Period from 1945 - 1970 The Uses of British Columbia's Forests

We have seen how the vast forest domain of British Columbia gradually came into use for the products which it supplied and to improve the economic and social standards of life of its people. As the process continued, certain dangers of misuse became evident and have been progressively constrained by legislation and regulation, by the intensification of fire protection (although more in the direction of fire control than of prevention) by the introduction of a sustained yield policy, by the introduction of silvicultural practices of a simple nature, by intensified research and by an increasing emphasis on the need for the complete regeneration of forests which have been logged or burned. More recently, the forest products industry, particularly the pulp and paper industry, has been placed under the direction of the Pollution Control Board and is being progressively required to reduce the pollution caused by its effluents.

As the population of the forest has grown, larger and larger cities and urban communities have arisen, the great majority of whose inhabitants have only a passing familiarity with the forest. In the early days, the hunter and fisherman, the cattleman, the irrigationist and many others who used the forest had large areas of land in which to practice their sport or expand their husbandry. The early pioneer lived either in or in close contact with the forest.

In common with conservationist movements in North America as a whole a consciousness has developed toward the forest amongst the public and amongst activist groups concerned with the natural environment. Although all too frequently misinformed and given to premature alarm and foreboding, these individuals and groups have had a marked effect upon public policy. The fundamental reasons for the change lie in the increasing pressures placed on the forest by an expanding industry, an expanding population and expanding education. Education, amongst its effects, has produced a very high degree of professional specialization which has inevitably complicated the integrated management of forests at the local level. Also, the rapidly increasing technological demands upon specialists and managers of all types has tended to downgrade or, at least, overpower the necessary biological, silvicultural and ecological knowledge demanded by sound forestry. Be all this as it may, it would be incorrect to regard the increased public concern, which sometimes manifests itself in messianic forms, as an unusual phenomenon. It is rather a natural outgrowth of the changing circumstances of life in the Province.

Undoubtedly, the narrowness of attitude of many of the existing single-use demands has been and is causing great difficulty in terms of revising policies and management practices into a form which will achieve the optimum, economic and social benefits for the population as a whole. The process of attacking other uses for the advancement of one's own has created antagonisms which may prevail longer than is necessary.

Viewed in a historical sense, the pressures may be regarded as unsuitable and they are not new. The indications are that the forester will be called upon to adopt, at least in part and with the advantages of the technological tools which he may now employ, his traditional role. The management of forests will need to take into account the needs and desires of the local population and forest practices, indications are, will need to be modified so as to work more closely within the

natural environment, rather than in isolation from it.

The ^{GRAZING} grazing industry in the Interior of the Province, as mentioned previously, has long used Crown forests for upland grazing and there has been a constant pressure to increase the number of head per acre. In some areas, the natural lowland ranges have been ruined or degraded for grazing by overgrazing and migration deeper into the forest has resulted. Range practice is sometimes of a poor standard, particularly where riders are not employed and cattle tend to bunch round waterholes and along logging roads. The effects of cattle grazing in a forest are imperfectly understood and there is a possibility that forest regeneration is adversely effected and that soil compaction occurs. The cattle are occasionally charged with polluting the water supply to lowland areas by introducing high foecal coliform counts into stream water. Ranchers, for their part, have complained of damage caused to fences, cattle crossings and other improvements by logging operations and have claimed that the presence of logging trucks adversely affects the fattening of cattle. At the present time, these conflicts are not generally regarded as serious ones but research is being conducted into the effects of cattle on regeneration. Cattlemen have demanded that roads and skid trails in the forest should be seeded to forage grasses and this is done in some areas, probably to the detriment of forest regeneration.

There is some conflict between the fisheries and forestry interests. Road construction along streams can result in the washing of excessive quantities of silt into the streams. In salmon and trout spawning areas, the spawning beds may become silted and unsuitable for spawning. Problems of this kind can be largely avoided by proper road layout and adequate road drainage arrangements. The blocking of streams by logging debris, the introduction substances toxic to fish, such as some insect sprays and other abuses are contrary to Federal legislation and are regulated by the Forest Service, by the inclusion of appropriate conditions in the Cutting Permits, by the requirement for the operator to submit a logging plan for approval and by logging inspections. Under certain conditions, logging along margins of streams may lead to a change of water temperature, adverse to fish life and there may be occasions when the reserving of timber along streams from cutting may be justified.

In some areas, such as the Okanagan Valley, agriculture is practised by irrigation and the forest is an important factor in the preservation of water quality. Indeed, many domestic water systems must rely on good forestry to avoid water deterioration. A number of regulatory provisions are employed in relation to logging operations to curb pollution of the water supply including those relating to logging camp, latrine and garbage dump locations. The avoidance of erosion, large scale forest fires and soil damage are of importance to the water supply in many locations and are the subject of regulation or fire protection measures.

In the virgin forest, food for wildlife may be relatively scarce, providing a natural limiting factor to the numbers of animals and birds which can populate a forest. Following a forest fire, the amount of browse available for clear usually increases and permits much larger populations to develop. This has led some game biologists and sportsmen to support the idea of burning forest to create greater game populations. Fortunately, such concepts have never been accepted as a policy aim in British Columbia. The practice of sustained yield forestry contributes to a satisfactory game population level and there is a considerable degree of compatibility between forestry and game management provided that the game population is

not maximised to the detriment of the forest. The areas of game and forestry are a prime example of areas where compatibility, in the sense of a desirable ecological balance, can be achieved by good management. The policies of Government provide for unrestricted public access but, as mentioned previously, the increasing pressures of population may well render this policy inadequate. At the present time, forest closure is employed to bar entry to the forest but the Government has some reluctance to employ the measure and closure is frequently applied too late to avoid man-caused fires. Hunters and fishermen are keenly conscious of their rights of entry and have strongly resisted attempts to close access, except under special conditions.

The recreation field as a whole probably poses the greatest of the use problems at the present day. There is a great pressure from the public for the creation of parks and wilderness areas, some of the latter being of very large size. The problem has led the Forest Service to enter into the field of forest recreation to ensure that at least some of the recreational demands of the public are not without undue jeopardy to the other forest values.

As mentioned previously in this history, some earlier conflicts between lumber and mining interests were resolved by legislating that a mining claim did not include rights to hold or cut Crown timber. There are more recent problems caused by modern prospecting methods. In areas suspected of containing ore bodies, prospectors will sometimes enter forest and grid an area by survey and blazing trees, the latter being a damaging practice in forestry. Also, extensive ditching by bulldozer to remove sections of overburden and reveal underlying strata may be very damaging to forests. Generally, mining is regarded as a higher economic use and, in Crown forests, a mining development will usually take priority over forests. However, widespread prospecting, much of which may not lead to actual mine development is clearly damaging to forest and better policy and administrative decisions may be needed in this area.

Almost all of the forest uses involve the use of roads and, under the "Forest Act," where a road is defined as a private road, the Minister may direct it be opened to use by another commercial user, subject to payment of appropriate compensation, as defined by the Minister, to the owner. The "Industrial Transportation Act" regulates the use of roads for industrial purposes and the "Private Roads Act" designates certain conditions, such as fire-fighting responsibilities for private roads open to public use.

It is not the purpose of this chapter to describe in full detail the problems and conflicts of the various uses of the forest but, rather, to emphasize the growing importance of the subject, variously described by the terms "single use", "multiple use," or "integrated use." The Federal "Agricultural Reclamation and Development Act" which is described briefly in the following chapter aims, as one of its objectives, to classify land according to five principal uses, permitting more sophisticated decisions to be made by a Provincial Land Use Committee on the use or uses to which the land should be allocated.

The Association of British Columbia Professional Foresters has defined one of its objectives as follows:-

"To promote those policies of integrated use of forest land for timber production, recreation, wildlife, and water management which ultimately provide the greatest social and economic returns to society."

The structure of Government itself, with various Departments administering various uses, may itself prove to be a detriment to the formation of an adequate policy. It is probably that the uses of forest and forest land should be integrated in an administrative sense, into the Forest Service. Past experience has indicated the difficulty of achieving such an integration and use problems are currently handled by an inter-departmental liason at the Deputy Minister level.

Another recent development has been the formation by Government of two committees to advise on the selection and formation of ecological reserves in which areas of natural forest are reserved from human activity for the purpose of scientific investigation of the natural forest ecology. Such reserves will be invaluable to the future of British Columbia forestry.

CHAPTER TWENTY

The Role of the Canadian Government in British Columbia's Forest Policy and Administration

At the Confederation of the provinces and colonies to form the Dominion of Canada, natural resources were made the cornerstone of provincial finance—self government and, with it, certain rights of assets, including the Crown or public land were conceded to each province by the Imperial Government. The Dominion, however, held jurisdiction over such matters as Dominion chartered railways, Defence, National Parks, Indian Affairs, international waters and certain aspects of taxation and overseas trade. The practicalities of jurisdiction have been more complex than the principles. The history of the provincial railway grants ceded to the capital Dominion Government to assist in the financing of railway construction have been described. These grants related to the trans-Canada Canadian Pacific Railway and to the Esquimalt-Nanaimo Railway on Vancouver Island. Most of the former grant was returned to the provincial government in 1930 but most of the latter became private land in spite of provincial efforts to recover it. Timber berths which were granted under Dominion jurisdiction are described in annexure to this history. The Dominion also formed National Parks and Forest Reserves within the trans-Continental Railway Grant, which have been identified as the historical forerunners of the provincially created Public Working Circles.⁴⁰ While returning the Railway Grant Lands to the Province, the Dominion Government retained the National Parks, of which there are 1,671 square miles in south-eastern British Columbia.

There are approximately 550 thousand acres of Indian reserves in the Province, 90 thousand acres of military reserves and small areas of other federal lands. It has been estimated from Provincial Inventory data that the National Parks and other federal lands contain a portion of the total Provincial forest resources amounting to approximately one-tenth of one percent (by volume) and that only a small fraction of this is suitable for forest products. The forestry significance of federal lands from the Provincial viewpoint is, therefore, minor.⁷⁵

The Ottawa Forestry Conference of 1906, called by the Canadian Government, succeeded in focussing attention onto forestry matters. The second National Forestry Conference was not held until sixty years later at Montebello, Quebec in 1966. It reported on the estimate of future demand for wood. F.S. McKinnon, Deputy Minister of Forests for British Columbia commented at the conference that the general forest inventory program, supported by joint federal and provincial expenditures under the Canada Forestry Act, had supplied statistics suitable for broad management planning but that a program of detailed surveys was needed for use in management operations. It was apparent, he stated, that depletion by fire, insects and disease must be reduced and that prompt regeneration in every acre of productive forest land was needed. The latter would need substantial money appropriations which should be raised on a cost-sharing basis between Federal and Provincial Governments under the Canada Forestry Act. The general level of forest management practice in Canada left much to be desired, particularly in the fields of silviculture and access. The National Forestry Conference also dealt with questions of recreational, wildlife and other uses.

Under the provisions of the British North America Act, the Canadian Government holds jurisdiction over fisheries. Many British Columbia rivers are spawning grounds of salmon and are important to the coastal salmon fishing industry.

Overlapping areas of interest exist between the forestry and fisheries fields and can lead to cooperative endeavour or to disagreement. Two examples will serve to illustrate this point. The Canadian "Fisheries Act" prohibits, amongst other things, the placing of chemicals or logging debris in water frequented by fish. The Canadian Government has acted in cooperation with the Provincial Government in approving aerial spraying on Vancouver Island and log spraying for control of Ambrosia beetle, to ensure that chemicals do not enter water containing fish or, if they do, that their concentration is held at non-toxic levels. Similarly, cooperation exists in defining acceptable levels and kinds of effluent discharged from pulp mills. However, relations have not always been so compatible. A dispute arose in 1966 when the Canadian Government prohibited the floating of logs down a salmon-spawning river near Quesnel. The Provincial Government, apparently convinced that damage to the spawning beds would not occur and considering the prohibition to be an interference with its jurisdiction over the forest resource, approved the floating of the logs with concurrent research into the effects. The logs subsequently were floated under conditions of disagreement between the two governments.

The federal financial aid which was allocated to Canadian provinces in 1939-40 in connection with the National Forestry Program (a youth training scheme) and the supply of alternative service workers (conscientious objectors) for fire protection work during the period of labor shortage of the Second World War has been described.

In 1949, the Canada Forestry Act permitted, amongst other things, the establishment and maintenance of Forest Products Laboratories and the entry of the Canadian Government into financial agreements with the provinces on forest owners. The subsequent agreements of 1951 provided for the Federal Government to pay one-half of the cost to the provinces of the completion and maintenance of their forest inventories during the succeeding five years and also to pay one-fifth of the cost to the provinces of reasonable programs of reforestation of Crown lands. British Columbia entered into these agreements and subsequent agreements covering cost-sharing of forest fire protection and reforestation. The amounts were not large over the five year period from 1960-61 to 1964-65 when the Province received a total sum of \$13,815,276.00. The termination of the forestry agreements was announced by the Canadian Government in 1966 as an anti-inflationary measure.

The amount of direct and indirect ^{Federal} revenue being derived from the British Columbia forests, by comparison with the expenditures on these forests, have been the subject of comment by several persons and organizations, all advocating greater expenditures. R.G. McKee, a provincial Deputy Minister of Forests stressed the need for greater federal financial support for British Columbia forestry. The Council of Forest Industries of British Columbia, in 1966, published the revenue figures, indicating a revenue of 126.1 million dollars to the provincial government, 108.1 million dollars to the Canadian Government and 10.8 million dollars to British Columbia municipalities. The British Columbia Forest Service, in the same year, reported direct revenues (ie. those excluding taxation revenues and mostly derived from stumpage and royalty) of 50.9 million dollars and expenditures of 23.9 million dollars. The actual expenditures of the Canadian Government on British Columbia forestry and the forest industry are difficult to determine but they would not exceed 20 million dollars in 1966. The federal government revenues of 108.1 million dollars were mostly derived from corporation taxes on the forest industry and do not

include income and other taxes paid by the 77,000 direct employees in the industry, who drew wages and salaries in excess of 425 million dollars per year.

The Canadian Agricultural Rehabilitation and Development Act of 1961 enabled the establishment of federal-provincial programs of alternate land-use; soil and water conservation; rural development and research aimed mainly at correcting the serious national problem of low income in the rural areas. Because British Columbia is a relatively wealthy province and because of its few low income rural families, the money allocation to the Province under the ARDA program is much restricted. In Canada as a whole, during the period from 1st April, 1962, to 31st March, 1965, the shareable costs amongst the Canadian provinces, excluding British Columbia, were 59.7 million dollars and the federal contribution towards this was 31.4 million dollars. In British Columbia, for the same period, the shareable cost was 3.9 million dollars and the federal contribution was 2.0 million dollars. An additional federal contribution of 1.0 million dollars went towards national research which, because of its Canada-wide implications, was not shared by the various provinces but was borne wholly by the federal government. Under the Rural Development Agreement covering the period from 1st April, 1965, to 31st March, 1960 there was a maximum federal annual contribution of 25.0 million dollars, of which British Columbia was allocated 1.7 million dollars per annum or 7%.

The majority of the ARDA projects in the Province have dealt with soil and water conservation and have consisted mainly of the rehabilitation or irrigation systems in the Interior, including both increased water storage and distribution system renovations. An aspect having more direct significance to forestry is the Canada Land Inventory. Basically, this Inventory is a general land use classification, including estimates of potential for agriculture, forestry, recreation, water conservation and multiple uses. Some research has been conducted with ARDA assistance into a soil taxonomic classification, combined with the technique of land form recognition and the use of aerial photographs, producing a rapid survey of "land units," roughly corresponding to the soil series category.

Apart from these studies into land classification, the forest land capability program of ARDA classified, for land use purposes, a "special sale area" of 1.7 million acres between Prince George and Quesnel. The sale area was described as the centre of a "fantastic development and population increase" resulting in an unprecedented demand for land for urban, industrial, agricultural, forestry and speculative uses. The survey was to be employed in provincial government land use administration as a basis for allocating land to its various uses.

The Canadian Government employed twenty-two professional staff and thirty-four support staff at the Vancouver Forest Products Laboratory in 1965 and proposed to increase both categories by about one-third in 1966. The laboratory was conducting research into the general fields of timber engineering, plywood, utilization, wood chemistry, wood preservation, wood biology, engineering physics and physical chemistry, pulping and fibre research and biometrics. The research is of interest to British Columbia forest management in its potential effect of raising standing timber values by improving the competitive position and values of products. Progress in these directions should generally aid in permitting closer utilization of existing mature and overmature stands, as well as providing incentives for greater attention towards the practice of silviculture.

Forest research in British Columbia is conducted by the Forest Research Branch of the Canada Department of Forestry and the British Columbia Forest Service Research Division, the former being a better financed, housed and equipped organization than the latter. In addition, industry has conducted forest research and cooperated in a number of projects of the governmental organizations.

As an indication of the fields of activity, the Federal Forest Research Laboratory, located in Victoria, was studying a number of projects in 1966. These included studies into ecology, fire, land classification, mensuration, soils, tree physiology and forest entomology and pathology research. The two governmental forest research organizations generally coordinate their work so as to reduce overlapping of effort and the federal organization endeavours to orient research toward provincial needs, within the limits of federal policy and capability. The various programs are formulated with the assistance of advisory committees appointed from the various interested groups.

The "Roads and Resources" program, administered by the Canada Department of Mines and Technical Surveys, was started in 1958. The program was a separate one from the forest access road program which had been conducted under the Joint Forestry Agreements. The Roads and Resources program was a cooperative undertaking by the Canadian Government with each province, under which the Canadian Government was making available a total amount of 75 million dollars over a period set originally at five years but later extended, for some provinces, to periods of up to 11 years. The federal government paid 50% of the cost of approved provincial roads to resources (of any kind and including forests) up to a maximum of 1.5 million dollars for each province in any one year, with an overall maximum of 7.5 million dollars per province. During the period from 1958-59 to 1966-67 (8 years) British Columbia received 6.8 million dollars in federal payments under this program, which was administered in British Columbia by the Department of Highways. The major benefit to forestry lay in the gaining of main access routes into areas previously difficult to enter and this, of course, facilitated rational utilization, protection and management.

The Canadian Government has had a considerable influence on the profit capability and development of the British Columbia forest industry, primarily through its activities in the taxation field. The major source of revenue, other than personal income taxes is the Corporation Tax on company profits. Taxes on construction materials are another source of revenue.

The Federal Government, in the past, has assisted industrial research through the Industrial Research Council, which made grants to company and other research organizations. In addition, special corporate income tax allowances were provided under the Canadian Income Tax Act as an incentive for the forest industry to conduct its own research. These incentives, however, have been largely discontinued.

Also of financial importance is the incentive provided for corporations located in Canada to have a certain percentage of Canadian ownership. This has permitted companies who had roughly a minimum of 25% Canadian equity participation to have a special, favourable depreciation allowance on production machinery and to have a reduced taxation rate on dividends.

In 1933, the Province of British Columbia was in severe financial straits, with the Federal Government refusing to write off the Provincial debt unless it acquired the supervision of provincial finances. The suggestion was totally unacceptable

to the Provincial Government. In 1940, the Rowell-Sirois Commission reported on the financial controversy between the Dominion and Provincial Governments with the result that, in 1942, the provinces gave up the income tax field to the Federal Government for the remainder of the Second World War.

At the time, this move appeared to be logical. The Canadian Government had very heavy defence expenditures and, in any event, personal income taxes in British Columbia were not a very great source of income. But after the war, the Province began a period of rapid development which has continued to the present day. In 1939-40, the Provincial Government revenues had stood at 32.6 million dollars but, by 1948-49, they were 77 million dollars. During the same period, however, the populations and the cost of living increased rapidly and the demand for costly social services naturally increased. The ceding of the income tax rights which the Federal Government declined to return to the Province at the end of the war, proved to be highly embarrassing to the Provincial Government. By 1945, income taxes raised in the Province amounted to 160 million dollars, of which a mere 14.5 million dollars was returned to the Provincial Government by the Federal Government, under the 1942 Agreement. The position led to the imposition, by the Province, of a sales tax on all commodities purchased within the Province. The lack of finances for forestry is not new. The Honourable Herbert Anscomb, the Provincial Finance Minister, said in 1950

"We should have thousands and thousands more people, and a highly industrialized and prosperous Province, but we have neglected the full development of our natural resources, agriculture, fisheries, mining and forestry, of which the basis of our future rests, and this neglect was mainly due to the lack of necessary funds."

This was, and is, a traditional approach for the Provincial politician in power and the only answer to the problem was held to be the provision of more money by Ottawa. By 1966, the Provincial Premier, the Right Honourable W.A.C. Bennett, stated that the Federal Government retained 82% of the direct corporation tax and 76% of the direct personal income tax paid on earnings in British Columbia. He stated

"British Columbia has repeatedly pressed for a more equitable sharing of these direct resources."

Without belaboring the point, it is quite clear that the British Columbia Government has been, and is, strongly dissatisfied with its financial receipts from the Federal Government. There is every indication that the Federal Government attempted to enter the forestry field in the provinces, with the formation of a Department of Forestry and the advent of the Federal-Provincial Forestry Agreements. There is little question that the Canadian Government would have liked to participate with its personnel in Provincial forestry, at least in those areas to which it was contributing funds. There is little question also that the Provincial Government, mindful of past history and opposed to anything that might represent an erosion of its jurisdiction, conferred by the British North America Act, over natural resources, opposed the entry of the Canadian Government into fields other than the research field and wanted the Federal contributions made, without their use being specified and left to the discretion of the Provincial Government.

These events cannot be said to have resulted in the satisfactory solution for the problem facing British Columbia forestry. In particular, the raising of sufficient funds to rehabilitate those acres not producing wood to their capacity, to reforest those currently being logged (where natural regeneration is not being

obtained) and to introduce more widespread and sophisticated silviculture to the forests appears to be a remote possibility so long as the major proportion of the Federal and Provincial revenues from the forest and its dependent industry are diverted to other activities. In brief, the joint and overall financial responsibility towards the resource is inadequately recognized and organized.

ANNEXURE 1

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ANNEXURE II

FOREST TENURES OF BRITISH COLUMBIA

The following are short descriptions of forest tenures in British Columbia.

1. Pre-emption and Crown Granted Land:

During the period of early immigration into British Columbia, it was socially necessary to permit the settlers to acquire limited acreages of land to form a basis for their livelihood. The initial legislation provided for the sale of Crown agricultural land whether it was cleared of timber or not and for the sale of land carrying enough timber for farm use. After 1887, the legislation endeavoured to preclude the sale or grant of timber land into private ownership but it permitted the land grants in aid of railway construction. The last of the latter was made in 1912 to the Pacific Great Eastern Railway Company.

In 1918, legislation was passed authorising the Minister to issue a Crown Grant in the case where a pre-emption record granted prior to 1917 was subsequently found to comprise timber land. However, the Crown reserved the stumpage value of the timber (in addition to the usual royalty) to itself. The "Land Act Amendment Act" of 1937 defined three classes of land with their purchase prices.

By 1944, there were 529,940 acres of crown Granted timber lands in the Province, on which an annual forest protection tax of 6 cents per acre was levied in addition to the usual taxes levied under the "Taxation Act". As a result of the successive changes of legislation the condition governing the grants vary, as follows:

Lands acquired prior to 7th. April, 1887 and Crown Granted on or before March 12th., 1906 Esquimalt and Nanaimo Railway Lands and Dominion Patented Lands

Timber cut from these lands is exempted from Royalty and there are no legal restrictions on its export from the Province.

Lands acquired prior to April 7th., 1887 and Crown Granted after March 12., 1906.

Timber cut from these lands is exempted from Royalty and cannot be exported from the Province in round log ("unmanufactured") form unless the export is approved by the Lieutenant-Governor in Council upon such terms and conditions as he sees fit.

Lands acquired on and subsequent to April 7th., 1887 and Crown Granted on or before March 12th., 1906.

Timber cut from these lands is subject to payment of royalty under Sections 56 and 59 of the "Forest Act" and may be exported from the Province without Governmental restriction.

Lands acquired on and subsequent to April 7th., 1887 and Crown Granted subsequent to March 12th., 1906 and on or before March 1st., 1914.

*Patented lands are lands granted between 7th. April, 1887 and 28th. April, 1888. The applicant had to make a declaration before a Justice of the Peace that the land was not chiefly valuable for timber, before his application was granted. Until 1903, it was necessary for the owners of patented lands to obtain a licence to cut timber on their lands.

Timber cut from these lands is subject to payment of royalty under Sections 56 and 59 of the "Forest Act" and cannot be exported from the Province in round log form unless the export is approved by the Lieutenant-Governor in Council upon such terms and condition as he sees fit.

Lands acquired on and subsequent to April 7th., 1887 and Crown Granted subsequent to March 1st., 1914 on lands held under pre-emption entry and record.

Royalty is payable on timber cut from these lands, under Sections 57 and 59 of the "Forest Act" and cannot be exported in round log form unless the export is approved by the Lieutenant-Governor in Council upon such terms and conditions as he sees fit.

APPX. A.

THE AREA OF CROWN GRANTED TIMBER LANDS
IN GOOD STANDING IN BRITISH COLUMBIA 1915 - 1959. (1)
(5 YEAR AVERAGES)

Period of Years	Area of Crown Granted (Private) Timber Land (Acres)
1915 - 1919	906,371
1920 - 1924	827,805
1925 - 1929	669,593
1930 - 1934	581,692
1935 - 1939	653,682
1940 - 1944	547,046
1945 - 1949	591,672
1950 - 1954	718,499
1955 - 1959	664,239
1960 - 1964	(2)

- NOTES: (1) Data derived from British Columbia Forest Service Annual Reports.
- (2) The figure for 1960 is 500,837 acres and for 1961, 490,061 acres. Thereafter, Forest Service data is not reported in the Annual Reports.

2. Timber Leases:

Most of the timber leases existing in the Province were granted prior to 1884 and were replaced by timber licences. The legal counsel to the Forest Service (Cooper, C. (1954). Address to the University of British Columbia Forest Club) has stated that he considered a "lease of timber" to be (an) obsolete (form of tenure) and a misnomer. He considered a lease to be a form of tenure of freehold, governed by complicated rules of law, which in substance was a lease of the soil, carrying with it exclusive and quiet possession. This exceeded what was required for sales of timber, for which a licence was adequate.

There is no provision for the issue of any more timber leases within the Province. Subsequent to 1912, in 1915, 1918, 1919 and 1921, legislation was enacted which had the objective of encouraging the conversion of leases into special timber licences. The leases were issued for a period of 21 years but the "Forest Act" of 1945 provided for their renewal, for additional periods of 21 years, under certain conditions.

The leases are not of great importance to the overall forest economy of the Province since there were, in 1944, only 152 leases, covering 197,939 acres. However, most of them are located on good growing sites in the Coastal Region. They are subject to an annual rental and annual forest protection tax and royalty is paid under Sections 57 and 59 of the Forest Act, but not stumpage. The export of unmanufactured timber derived from leases is not permitted without the consent of the Lieutenant-Governor in Council.

3. Timber Licences and Special Timber Licences:

Timber Licences were introduced as a more satisfactory form of tenure, from the Government's viewpoint, than timber leases which, as described, involved a degree of alienation of the land. Initially, they could not be transferred from one owner to another but the Government, in a period of fiscal difficulty, made them transferrable. This made the licences more attractive but also led to their acquisition on a large scale, for speculative purposes. The Government derived much-needed revenue but the anticipated increase in value of the licences did not occur and they reverted to the Crown in considerable numbers, partly because of high carrying charges.

In 1944, there were 2,850 timber licences, 1,795,817 acres but many of these have now been incorporated into tree farm licences. The licences are renewable annually, subject to payment of a renewal fee. They are also subject to the annual forest protection tax and royalty payments. The export of unmanufactured logs is restricted in the same way as it is in timber leases.

Within special timber licences, where a dispute arose between licence holders as to the areas of timber to which they were entitled, the holder having prior location on the area is deemed to hold the right to cut the areas. The licence holder holds rights of property to the trees, timber and lumber cut within the limits of the licence and he may seize any of those items in the possession of an unauthorised person and prosecute trespassers or other offenders. The annual renewal of a licence is an entitlement of the holder provided that there is enough timber left to make the licence commercially valuable. To ascertain this, the Minister may require the holder to cruise the timber.

The special timber licence is subject to terms which might be imposed at any time by a Statute or Order in Council.

If the Minister considered that the whole or any part of a licence is suitable for and required for settlement he may require the licence holder to remove the timber within a specified period of time and open the land for settlement or sale.

The Minister is also empowered to require the proper definition or a re-survey of boundaries of the licence holder's expense. If the licence holder does not comply, the Minister can have the work done and take a lien on the licence-holder's property. These particular provisions also apply to timber leases.

4. Wood-Pulp Leases:

These leases were issued specifically for the supply of pulp mills and, like timber leases, they are no longer issued. They were issued under the Provincial Statutes, Section 6, Chapter 30 of 1901 and could, by later legislation, be renewed for a period of not more than 30 years from the date of surrender on the same terms as the original lease, except that Royalty would be 35 cents per cord. The application for renewal was to be made within six months of the passage of this enabling legislation.

One of the problems connected with wood-pulp leases occurred when the leased area also contained saw-timber which, the lessee, in effect, had obtained at pulpwood prices. Legislation was passed so that if sawlogs were to be cut, it was obligatory on the lessee to secure a timber licence from the Government, pay timber licence rental and sawlog royalty. By a further amendment in 1927, the entire pulp lease had to be surrendered where the timber was found to be Douglas fir, western red cedar or other species considered at that time to be unsuitable for pulp and paper manufacture, with the proviso that a special timber licence would be issued in lieu.

In 1936, the tenure was again modified. All existing leases were surrendered within six months of the passage of the legislative amendment and renewed in accordance with the revised form of the tenure. On this basis, the expiry date of existing wood-pulp leases was September 3rd., 1954 and they were renewable thereafter for consecutive and successive periods of 21 years, under terms and conditions to be approved by the Lieutenant-Governor in Council. The leases are subject to annual rental and forest protection tax, as well as the taxes applicable under the "Taxation Act". Pulpwood is subject to pulpwood royalty and sawlogs to sawlog royalty plus an amount equal to the annual renewal fee of a hypothetical special timber licence whose acreage equalled the volume of sawtimber present on the pulp lease, divided by 20,000 board feet. The export of unmanufactured timber from the Province is prohibited, except by special authorisation. In 1944, there were 33 wood-pulp leases, covering 335,611 acres.

5. Pulp Licences:

Pulp Licences succeeded wood-pulp leases, in much the same way as the timber licensing system. Under the "Forest Act Amendment Act" of 1919, it became possible to convert special timber licences into pulp licences, provided that the latter were made appurtenant to the particular pulp mills for which they were issued. This procedure was repealed in 1921 in favour of a system whereby the Government could create pulp districts to encourage and perpetuate the pulp and paper industry. Any special timber licences, located within a pulp district, which carried timber suitable for pulp or paper and was held by the owner of a pulp and paper mill could be surrendered and exchanged for pulp licences over the same area. The advantage to the pulp mill of these conversion opportunities lay in the smaller royalties to be paid for pulp logs than for sawlogs. However, no pulp districts were actually formed.

In 1944, there were 252 pulp licences in good standing within the Province, covering an area of 155,778 acres.

A pulp licence is renewable from year to year, so long as sufficient merchantable timber remains to make it commercially valuable. The licence is subject to an annual renewal fee and forest protection tax, as well as taxation under the "Taxation Act". Pulpwood and material made into pulp and paper is subject to a pulp

royalty and timber which is not manufactured into pulp and paper is subject to sawlog royalty rates. The export of unmanufactured timber, cut on pulp licences, is prohibited without the consent of the Lieutenant-Governor in Council.

6. Pulp Timber Sales:

Pulp timber sales issued to or held by any person are required to be appurtenant to the pulp mill for which they were issued i.e. they were for the supply of that mill and could not be sold or transferred to another party separately from the mill. The total volume held under pulp timber sales by any one mill is limited to a maximum of thirty years' supply for the mill output capacity at any given time. In 1944, there were 19 of these sales in existence and they covered an area of 79,354 acres.

The sales are renewable for the period stated in the individual pulp timber sale licence. They carry an annual rental and fire protection tax charge and the holder pays the cost of cruising and the cost of advertising the sale.

The floor stumpage price ("upset" stumpage price) for which the pulp timber sale can be sold is determined by a Forest Service appraisal and the successful bidder pays this amount, in addition to royalty, based on the scale of the timber which he has cut. If, however, the successful bidder acquires the sale by bidding a stumpage rate higher than the upset stumpage, then he must pay the higher rate. If the timber is made into pulp and paper, a pulp rate of royalty applies. If it is not made into pulp and paper, sawlog royalty rates are charged and, also, an additional rental depending upon the volume of this material.

The export of unmanufactured timber derived from pulp timber sales is not permitted, unless authorised by the Lieutenant-Governor in Council.

7. Timber Sales:

Timber sale licences are an important tenure and a major means by which the Provincial Government disposes of Crown timber to the industry. Nowadays, they are closely connected with the administration of Public Sustained Yield Units and are described along with these units, below.

8. Hand Loggers' Licences:

The Hand Loggers' Licence, obtainable at a small fee per annum, was a personal licence catering to a very small logger. No stumpage, ground rent or protection taxes were payable. The licence was restricted to a specific area and the use of power tools of any description, including steam equipment was forbidden, with the sole exception of a jack for moving the timber. The licence was normally selected on ground in the Coastal Region that sloped steeply into salt water so that a log would slide easily down and float itself.

The licences were popular at the beginning of this century and, although the Royal Commission of 1909 - 1910 strongly recommended their discontinuance they remained in use. However, the early popularity waned. In 1915, for example, there were 222 licences in good standing, with an unreported annual cut. In 1925, there were 111 licences with a reported cut of 10.5 M.M. f.b.m. By 1956, only 1 licence was in existence with no reported cut. The licences were abolished as a form of tenure in 1966.

9. Timber Berths:

Under the terms of union with Canada, the Province ceded to the Dominion Government, twenty miles of land on each side of the roadbed of the Canadian Pacific Railway. The Dominion Government, by 1910, had issued timber licences and permits, covering some 1,280,000 acres of the belt. In 1930, the Railway Belt lands were returned to the Province and the cutting rights, known as Timber Berths, were respected by the Provincial Government. In 1965, there were 102 timber berths in existence, covering 337,198 acres, of which 3 (8,416 acres) were incorporated in tree farm licences. The number of tree farm licences in the Railway Belt is low and this meant that most berths have remained outside the Provincial Sustained Yield programme, introduced in 1945. The berths gave cutting rights, at the time when they were issued, to all timber of 10 inches d.b.h.o.b. and larger and this has later been interpreted by berth holders to mean that all timber above this size could be cut at any point in the life of the tenure. The Government, conversely, has interpreted the right to cut as being restricted to timber which was larger than 10 inches d.b.h. at the time of the issue of the licence i.e. trees of less than 10 inches d.b.h. at the time of issuance were excluded from cutting, irrespective of their subsequent growth. This difference of interpretation does not appear to have been resolved and the owners appear to be cutting according to their interpretation.

The boundaries of a timber berth are specified but the area is reduced where it is found that the forests are immature or where logging has taken place. There are requirements that an owner should maintain a certain level of cutting and keep a record of it but these requirements have not been enforced for many years and, in some instances, were formerly impractical to enforce. The berths are renewed annually, upon payment of a licence fee, are subject to forest protection tax, property taxes and the payment of royalty for the timber cut. The value of the standing timber has increased over the years, to a figure in excess of the royalty and capital gains have been made or incomes accrued, from the transfer of cutting rights or outright sale.

The Forest Service has reported that, in its view, timber leases, licences and berths are no longer in step with present forest policy. In some there are no restrictions on what can be cut and immature material is not reserved. Most of the tenures (including timber berths) make no provision for any silvicultural treatment to provide for regeneration. Older stands may be withheld from cutting indefinitely, as a speculative measure. Also, rights-of-way to other timber can be impeded. ?

In an effort to accelerate cutting, so that the lands can be returned to the Crown and incorporated into the sustained yield policy, the carrying charges have been increased and the Forest Service has endeavoured to obtain commitments from berth holders that their logging would be completed within a specified number of years. In a number of cases, the Minister of Lands, Forests and Water Resource has ordered that legal surveys of boundaries must be made at the berth-holder's expense and increased attention has been paid to the withdrawal from berth areas of immature timber and logged areas. Some facets of the legal position of timber berths are obscure but there appears to have been some reluctance to test the issues before the Courts.

10. Tree Farm Licences:

Tree Farm Licences are an important modern tenure in British Columbia since, unlike the tenures described above, they provide for the practice of sustained yield forestry by the licensee, under Forest Service supervision. The contracts for these licences vary somewhat but the following description applies generally to all licences. The licence is granted the management of specified Crown lands which are reserved to the sole use of the licensee:-

"for the purpose of growing continuously and perpetually successive crops of forest products to be harvested in approximately equal annual or periodic cuts adjusted to the sustained yield capacity of the said lands."

A licence is granted for the maintenance of a manufacturing plant or plants owned and operated by the licensee, within a specified area. The plant has to be able to utilise the current allowable cut, as specified in the successive working plans of the licence.

The management of the licence is governed by the appropriate legislation in the "Forest Act" and in accordance with a management working plan prepared by the licensee and approved by the Chief Forester. A number of the earlier licences were perpetual tenures, provided that the licensee complied with requirements, terms and conditions, but later licences were issued for a 21 year term, renewable under certain conditions.

The licence area includes all unalienated Crown lands (described as "Schedule B" lands) within its boundaries and all lands owned or controlled by the licensee (Schedule A" lands) within or in the vicinity of the licence boundaries. Because much more land in the Coastal Region was owned or controlled by companies than was the case in the Interior, the percentage of these lands in Coast licences is much higher than is the case with the Interior licences. In the case where a licensee subsequently acquired lands in or near the licence, he was required to include them in the licence..

The Government have retained the right to withdraw, from the Crown lands within the ~~area~~^{licence}, lands required for forest experimental purposes, parks or other aesthetic purposes. However, these lands were not to exceed one percent of the total area of land within the licence, without the consent of the licensee. In the case of lands being required for a higher economic use than the raising of forest crops or for any use deemed to be essential to the public interest, the Government can withdraw them although, if this reduces the productive capacity of the licence by more than one-half of one percent, other lands are substituted, if available. Also, the Government can withdraw lands needed for right-of-way. Where lands are withdrawn, the Government may require the licensee to remove all movable property and compensates the owner for his costs of removal or for improvements, such as roads or areas of reforestation, which cannot be moved. An arbitration procedure is provided in case of disagreement on the amount of compensation.

In a similar vein, the licensee could, with the consent of the licensor, withdraw lands which he owns or controls ("Schedule A" lands) from the licence as and where they are required for a higher economic use than raising forest crops.

Whilst the plant capacity of the licences is required to be at a level capable of utilising the amount of periodic cut, it is specifically required that 80 percent of this cut must be processed in the plant or plants. However, the licensee may process less than this if he can obtain permission from the Government in the form of an annual permit.

The tree farm licence actually governs only forestry use and does not limit the use of the lands, at the Government's discretion, for other purposes such as mining, trapping, hunting, fishing, hydro-electric development and any use which it is considered, does not materially prejudice the forestry rights of the licence. It is specified that the licensee does not acquire any riparian or foreshore rights vested in the Crown or any Crown land within the licence.

The Government may direct the licensee to survey and define on the ground, at the licensee's expense, any or all of the boundaries. Should the licensee fail to complete a survey within the time limit set by the Government, the latter may then carry out the survey and be paid for the costs by the licensee.

The licensee agrees in the licence contract, to keep all potentially productive forest land within the licence area in growing stock and adequately stocked to Forest Service standards. This includes any land which is not satisfactorily restocked at the time of granting the licence, provided that it is of a site quality index of 80 or more. However, the Government can excuse the licensee from planting land that is occupied by an advance growth of brush or is otherwise in such a condition as to make planting operations economically impractical.

In the case of lands denuded after the issue of the licence, those of a site quality index higher than 110 which have not restocked satisfactorily five years after logging are to be artificially regenerated, by the licensee, before the end of the seventh year after logging. Where the site quality index was between 80 and 110 and satisfactory restocking has not taken place eight years after logging, the licensee must regenerate them artificially before the end of the tenth year after logging. Failure to observe these conditions can result in the Government carrying out the reforestation operations, with costs being recovered from the licensee.

The licensee is required to submit successive management plans, covering periods of time determined by the Provincial Chief Forester, for the approval of the Chief Forester. Operations are required to conform to the plan. The contract recognizes that emergencies such as fire damage of major proportions, serious windthrow, insect or disease attacks, serious damage to the licensee's plant or a national emergency brought about by war or severe economic depression may make it necessary or expedient to alter the rate of cutting contemplated in the cutting budget. This alteration may be accomplished upon request of the Chief Forester or the licensee, to a level approved by the former. If agreement can not be reached on the level, plan and methods of cutting, the Government alone will decide them.

If injurious insect epidemics occur within the licence area which would seriously reduce the current or future allowable harvest of wood but which, at the same time, can be controlled, then the licensee and the Government will take control measures alone. However, the cost of the control measures to the licensee in any one calendar year may not exceed one-half of the cost of control measures incurred during that year, or the total stumpage value of that year's cut, whichever might prove to be less.

it is required that While logging on the licence area is to be conducted in accordance with the management working plan, it can only be carried out after a cutting permit has been issued by the Provincial Chief Forester. If the logging is on tenures other than Crown land (i.e. Schedule A lands), the permit constituted the licensor's concurrence that the cutting is according to the plan and specified such other details as the Government considers necessary, in keeping with the provisions of the management working plan and the licence contract. If cutting is done on Crown lands (i.e. Schedule B lands), then the permit also specifies the stumpage rate.

The holder of a tree farm licence elects, at the time of taking the licence, to pay stumpage by one of two alternative methods, for the timber cut from Crown lands. (On Schedule A lands, the amount of royalty to be paid is that specified for the particular forms of tenure placed in the schedule). The first alternative method provides that the licensee pays the full appraised stumpage rate, as and when the timber is cut, under the appraisal method currently in use by the Forest Service. Using this alternative, no allowance can be made in the appraisal for any extra forestry costs incurred as a result of operating under the terms of the tree farm licence. As and when timber, which at the time of issue of the licence was of an age of less than one-half of the rotation age, becomes merchantable and is cut, then the licensee will pay for that timber, a sum equal to 16 percent of the stumpage rate (including royalty) appraised by the current Forest Service appraisal method. Under the second alternative method, all the timber cut from Crown land not held under other tenure is paid for at the rate appraised by the Forest Service but the appraisal allows as a cost, the extra forestry costs sustained as a result of operating under the terms of the tree farm licence. Most tree farm licensees have elected this second alternative. Where heavy additional expenditures are incurred, such as in a forest inventory of the licence or in the construction, in advance of logging needs, of a road system, it is usually the practice to include these costs in the appraisals at an agreed rate over a period of years, since their inclusion in one year's appraisals could only result in negative indicated stumpages.

It is a condition of the licences that all timber cut from them is to be scaled in cubic feet.

The approved management and working plan contains a figure for the approved annual cut, resulting from a yield calculation and considerations of sustention. The licence agreement provides that the wood harvested from the licence area in any one year should not be less than fifty percent and not more than 150 percent of the approved annual cut during any one calendar year. Also, the total cut over any period of 5 years may not vary more than 10 percent from the total approved cut for that period. Damages are payable to the Government for failure to observe these cut requirements, although some of these damages are to be refunded for subsequent correction of the situation. The licensee may elect to start a new five year period from any year in which the periodic cut from the preceding five year period was within ten percent of the accumulated approved annual cuts.

Forest protection tax is payable on the approved annual productive capacity of the licence and an annual rental of one cent per acre for Schedule B lands. Certain other taxes are also payable under the "Taxation Act".

The licensee, if instructed to do so by the Government, must provide suitable office and living accommodation for a Forest Service inspection staff and is required to employ at least one British Columbia Registered Forester who signs the Working Plan

and its revisions and amendments prior to submission to the Chief Forester for approval.

The licence may be terminated in the event of bankruptcy or insolvency of the licensee and terminated or amended by mutual consent.

The question of conducting logging and road building with the licensee's own crews or with contract loggers was unregulated in the early tree farm licences. Starting with Tree Farm Licence No. 14, however, the licensee is required to provide the opportunity for contractors, other than the licensee's own employers or shareholders who own more than one percent interest, to harvest a minimum of thirty percent of the allowable cut from Crown lands not held under other tenure (Schedule B lands). In Tree Farm Licence No. 22 the percentage was increased from 30 to 65 for the portion of the licence which formerly lay within the Clayoquot Public Working Circle. However, where the Minister of Lands, Forests and Water Resources is satisfied that contract operations are not possible, he is empowered to relieve the licensee from his responsibility to employ contractors.

The following four tables summarize the statistics of tree farm licences in British Columbia in 1955 and are derived from the Sloan Royal Commission Report of 1956.

TOTAL ACRES OF TREE FARM LICENCES IN EACH FOREST DISTRICT BY TENURE IN 1955.

Forest District	Total Area in Tree Farm Licences (Acres)				Percentage	
	Vacant Crown Land	Timber Licence	Total Crown	Crown Grant	Total	Crown Private
Vancouver	2,408,602	562,280	2,970,882	281,034	3,251,916	91 9
Prince Rupert (Coast)	240,615	5,272	245,887	-	245,887	100 -
Totals, Coast	2,649,217	567,552	3,216,769	281,034	3,479,803	92 8
Prince Rupert (Interior)	1,811,061	-	1,811,061	-	1,811,061	100 -
Prince George	83,745	-	83,745	215	93,960	100 -
Kamloops	643,960	-	643,960	1,102	645,062	100 -
Nelson	3,180,868	34,510	3,215,378	-	3,215,378	100 -
Totals, Interior	5,719,634	34,510	5,754,144	1,317	5,755,466	100 -
Grand Totals	8,368,854	602,062	8,970,913	282,351	9,253,264	97 3

NOTE: In the text, the Commissioner has treated timber licences as a contribution by the tree farm licensee to the tree farm licence. In the Tables of the Commission Report, they are shown, as in the above table, as a contribution of the Crown. The timber licences are a tenure of timber by the licensee, the land remaining Crown land. Consequently, the contribution by the tree farm licensee toward the licence were of the timber but not of the land.

PRODUCTIVE AREAS OF TREE FARM LICENCES IN EACH FOREST DISTRICT BY TENURE IN
1955

Forest District	P r o d u c t i v e L a n d (A c r e s)			P e r c e n t a g e			
	Vacant Crown Land	Timber Licence	Total Crown	Crown Grant	Total	Crown	Private
Vancouver	1,250,435	495,592	1,746,027	253,322	1,999,349	87	13
Prince Rupert (Coast)	73,297	5,090	78,387	-	78,387	100	-
Totals, Coast	1,323,732	500,682	1,824,414	253,322	2,077,737	88	12
Prince Rupert (Interior)	716,881	-	716,881	-	716,881	100	-
Prince George	81,215	-	81,215	195	81,410	100	-
Kamloops	531,538	-	531,538	1,102	532,640	100	-
Nelson	1,237,367	31,255	1,268,622	-	1,268,622	100	-
Totals, Interior	2,567,001	31,255	2,598,256	1,297	2,599,553	100	-
Grand Totals	3,890,733	531,937	4,422,670	254,619	4,677,289	95	5

MATURE TIMBER VOLUMES OF TREE FARM LICENCES IN EACH
FOREST DISTRICT, BY TENURE IN 1955.

Forest District	M a t u r e T i m b e r (M.c.f.)				Percentage		
	Crown	Timber Licence	P r i v a t e Crown Grant	Total	Total	Crown	Private
Vancouver	4,572,155	2,635,278	667,554	3,032,832	7,604,987	60	40
Prince Rupert (Coast)	362,938	26,583	-	26,583	389,521	93	7
Totals, Coast	4,935,093	2,391,861	667,554	3,059,415	7,994,508	62	38
Prince Rupert (Interior)	2,685,618	-	-	-	2,685,618	100	-
Prince George	136,100	-	172	172	136,272	100	-
Kamloops	273,107	-	1,180	1,180	274,287	100	-
Nelson	1,846,084	47,226	-	47,226	1,893,310	98	2
Totals, Interior	4,940,909	47,226	1,352	48,578	4,989,487	99	1
Grand Totals	9,876,002	2,439,087	668,906	3,107,993	12,983,995	76	24

AVERAGES OF SITE INDEX, ROTATION, MEAN ANNUAL INCREMENT,
SUSTAINED YIELD CAPACITY AND APPROVED ANNUAL CUTS OF TREE
FARM LICENCES IN EACH FOREST DISTRICT IN 1955

Forest District	Average Site Index	Rotation Years	M.A.I. per ac. (Cu.Ft.)	Annual Production S.Y. Capacity	(M.cu. ft.) Approved
Vancouver	119	92	70	113,910	115,534
Prince Rupert	77	133	40	21,000	22,000
Totals, Coast	113	96	67	134,910	137,534
Prince George	102	130	36	2,500	2,500
Kamloops	Not Recorded	135	28	5,788	5,718
Nelson	85	113	27	29,982	20,515
Totals, Interior	90	123	28	38,270	28,733
Grand Totals	-	-	-	173,180	166,267

11. Public Sustained Yield Units:

A second major tenure in British Columbia is the Public Sustained Yield Unit. This stemmed, as did Tree Farm Licences, from recommendations of the Royal Commission on Forestry of 1945, in conjunction with the introduction of the sustained yield forest policy. Initially, the boundaries were gazetted and the tenure was named "Public Working Circles". This procedure made boundary amendments cumbersome and "Sustained Yield Units" were introduced, the boundaries of which can be amended by Forest Service regulation. In other respects, the Circles and Units are similar and they are normally referred to, jointly, as "Public Sustained Yield Units". By 1965, there were 75 P.S.Y.U.s in existence, covering 69,781,944 productive acres and with an approved annual allowable cut of 687,492,876 cubic feet. The P.S.Y.U. is an area of Crown land managed by the Forest Service.

For each P.S.Y.U., the Forest Service used its inventory data in a yield calculation, the details of which have not been published, to arrive at an annual allowable cut figure. All of the companies or individuals who had logged within a P.S.Y.U. area, during the five year period immediately prior to the formation of the unit were allotted a portion of the annual allowable cut. The particular portion or "quota" allotted, was calculated by taking the average annual cut of each quota holder, over the five year period, and totalling them. If the total of average annual cuts exceeded the annual allowable cut, the unit was said to be "over committed" and the quota holder was allotted a quota which was reduced below the average annual cut figures by the percentage difference between the average cut total and the annual allowable cut. Conversely, if the annual allowable cut exceeded the average annual cut, the quota holders were allotted a quota equal to their average annual cut and the surplus of allowable cut was open for public auction in the form of timber sales, the successful bidder thereby acquiring a larger quota. However, in some instances, the local industry has insufficient capacity to fully utilize the annual allowable cut, and the units are said to be under-committed. The quota simply conveyed the privilege of applying for a timber sale or sales with the location at the applicant's choice, which would provide sufficient timber to fill the quota for a specified number of years, usually not exceeding ten years. Timber sold in this way is termed a "commitment" against the future annual allowable cuts concerned.

Once a quota holder has secured enough timber, the privilege of application for a timber sale is suspended until approximately two years prior to the time when his timber, cut at the annual level of the quota, runs out. If the quota-holder cuts more than his quota and removes the timber at an accelerated rate, this does not affect the date upon which his privilege to apply for more timber takes effect, so that he would place himself in the position of having no timber supply during the intervening period. Conversely, if he does not on the average, remove his quota annually from the timber sale and, at the time when he could normally apply for more timber, a volume of his timber remains on the timber sale, it is usual to re-commit this volume against his future quota requirements. As an added safeguard against erratic rates of cutting and to avoid the repercussions, such as plant closure, which might result, it has become usual for the Timber Sale contract to include a clause, specifying the maximum and minimum cuts which are permitted in each year of the term of the timber sale. The clause allows for a cut of up to 150 percent or down to 50 percent of the annual quota in any given year but requires an increasingly close adherence to the cumulative total of annual quotas, as the term of the timber sale progresses. As an added complication,

it has frequently been the case that inaccuracies in Forest Service cruise estimates have meant that the total volume of timber sold as a timber sale does not correspond to the annual quota multiplied by the term of years of the timber sale. As a rule of thumb, if it is found, at the expiry of the term of the timber sale that a significant volume of timber remains, even though the operator has removed all of his annual quotas, then that volume is re-committed to meet the timber sale holder's future quota requirements. If a deficiency occurs and the timber on the sale is removed before the quota is satisfied, an application for additional supplies to make up for the loss of quota will usually be considered by the Forest Service.

If a quota-holder holds more than one timber sale he can usually obtain permission to "group" them, if he so desires. This permits the operator a greater degree of flexibility of operation—for example, he can conduct one logging operation on one timber sale to remove his entire annual quota, rather than having to remove a small volume from each timber sale. Thus, the group of sales is controlled by their total annual quota, rather than each sale being controlled by its individual quota.

It will, no doubt, be apparent to the reader that the various measures to control cutting so as to equal the annual allowable cut can be very complex, particularly where a company has a large number of timber sales. Further administrative complexities occur when it becomes evident that public competition for timber sales within P.S.Y.U.s could result in an operator losing all or part of his quota and, in turn, result in the partial or total closure of a plant, causing local economic and social problems. Under public auction procedures, the bidder who acquires the sale also acquires the rights and privileges of the quota attached to it. Thus, a sawmill could be deprived of its supply of timber by an aggressive competitor, especially one prepared to bid more than the value of the timber, seeking to gain a position in a particular P.S.Y.U. In order to counteract these tendencies, the Government has introduced certain provisions, the major of which are as follows:

- a. In a fully-committed P.S.Y.U., only an established quota holder may apply for a timber sale although anyone may bid on it. In the case where the Forest Service puts up timber for sale in a P.S.Y.U. which is not fully committed, anyone may bid on it and the commitment and quota go to the successful bidder.
- b. When a quota-holder applies for timber, he may elect for the sale to be made by public auction or by sealed tender bidding. In the case of sealed tender bidding the applicant, should his bid not be the highest, has the opportunity to meet the highest bid and thus to acquire the sale without further competition.
- c. The Minister of Lands, Forests and Water Resources has discretionary powers to reject any, or all, bids on a timber sale where he considers that they are unreasonably high and he can award the sale to the applicant.

It is to be expected that the administration of P.S.Y.U.s and timber sales will continue to be subject to rapid change for some time to come.

The P.S.Y.U.s do not have completed working plans, governing their management at the present time, as explained in the main text. The main features of present day management are the regulation of cutting on a sustained yield basis, a varying amount of artificial regeneration and provision of fire protection. The road systems of P.S.Y.U.s are being built by the forest industry or by the Forest Service as it is necessary to obtain access to untouched timber areas.

The allowable cuts in the P.S.Y.U.s are not to be regarded as being fixed at their present level. Although reductions of cut based on estimates of the accessibility of timber for logging have been abandoned, improvements in inventory information, trends toward closer utilization and improved road systems may be expected to increase them above their present levels. There is also a major opportunity to increase yields by the application of improved silvicultural practice.

The timber sale which is the means of disposing of timber is itself in a state of change. "Timber sale harvesting areas" have been issued which give to a licensee the right to log a given volume of timber per year within the boundaries of a sustained yield unit for a specified number of years. Separate boundaries for the timber sale harvesting area are not specified. However, in order that the logging is controlled, the licensee is required to submit a cutting plan to the Chief Forester of the Province and to apply for cutting permits in accordance with these plans. The cutting permit, when issued by the Chief Forester designates the area of logging; the annual rental, the forest protection tax and the stumpage to be paid; the trees to be cut, the method of slash disposal and similar matters concerning the logging operation.

PUBLIC SUSTAINED YIELD UNITS IN BRITISH COLUMBIA - 1956.

Region	Total Productive Area (Acres)	Mature Volume (M.cu. ft.)	Allowable Annual Cut (M.cu. ft.)	Actual Cut, 195 (M.cu. ft.)
Coast	2,100,558	6,514,873	86,560	62,399
Interior	19,568,228	12,531,904	181,080	126,056
Totals	21,668,786	19,046,777	267,640	188,455

12. Pulpwood Harvesting Areas: (P.H.A.)

The pulpwood harvesting area tenure was designed for the primary purpose of encouraging the growth of the pulp and paper industry in the Interior of the Province by providing a guaranteed supply of timber, within the framework of the sustained yield policy. Section 17A of the provincial "Forest Act" of 1966, defines a P.H.A. as an area of Crown land situated east of the Cascade Mountains (i.e. in the Interior) and within a P.S.Y.U. or P.S.Y.U.s administered by the Forest Service, for the purpose of growing and sustaining crops continuously on the area, for periodic harvesting. There must also be pulpwood within the area.

The Minister of Lands, Forests and Water Resources is authorized, by public advertisement, to invite proposals from persons interested in establishing a plant to utilize the pulpwood from a P.H.A. A public hearing of interested parties is then held by the Minister. Where there is more than one applicant, there is provision for a public auction, where bidders may offer to pay a bonus, over and above stumpage rates, to the Government. The Minister may accept a proposal or reject any or all of them.

An option to purchase pulpwood sold or granted in a P.H.A. cannot be granted for a longer period than twenty-one years. Whilst the option is renewable at the expiry date, it will be subject to renegotiation, according to the provisions of the "Forest Act" and regulations in force at the time.

The Minister is also empowered, subject to the terms and conditions of the option, to increase or decrease the size of any P.H.A. or to cancel it. The Crown must be paid stumpage, inclusive of royalty, on the pulpwood cut from a P.H.A., as appraised by the Forest Service.

It is clear that the legislation permits a degree of diversity of the terms and conditions of the P.H.A. tenure. The following description of a P.H.A. is thus subject to variation in other P.H.A.s but serves to illustrate the nature of the tenure.

In the case of the particular P.H.A. concerned, the Minister granted to the company an option to purchase the pulpwood from several public sustained yield units within the P.H.A., so as to ensure a sufficient supply of pulpwood to sustain the pulp mill built in connection with the P.H.A. agreement. The period of the agreement is for 21 years and this term is renewable.

There is no comprehensive, official description of pulpwood in British Columbia and the Minister, in the P.H.A. agreement, simply declared that it included wood, below the standard of utilization for sawmilling in the particular Forest District concerned. Specifically, tops or long butts of felled trees, damaged or fallen trees, logs below sawmill utilization standards, standing live trees of a size or species unsuitable for sawmilling and stands which, at the rotation ages currently in effect in the P.H.A., will be below the standard of utilization for sawmilling purposes.

The Minister, under the agreement, may change boundaries of P.S.Y.U.s within the P.H.A. and may eliminate areas from it which are required for a higher economic use (including experimental forests and recreational uses). If it is found that the pulpwood volume which is present is in excess of that required to sustain the pulp mill, the Minister may reduce the P.H.A.

The company is expected to use the pulpwood from present or past timber sales, to purchase surplus top logs and other material suitable for pulp from logging operators, to purchase pulpwood from bona fide settlers if the foregoing two categories of wood are offered at competitive prices and to purchase pulp chips, slabs and edgings, free from bark.

The Minister, in the P.H.A. agreement, retains the right to sell timber sales to cut sawlogs within the P.H.A. to persons other than the pulp company. These timber sales may include the right to cut and remove pulpwood but only when the timber sale licensee has agreed with the pulp company to sell the pulpwood to the company on a first refusal basis or has obtained a letter from the company stating that it is not interested in acquiring the pulpwood. The pulp company, itself, is not permitted to compete for sawlog timber sales within the P.H.A., unless the action is approved by the Minister. However, the company is allowed to purchase and harvest pulpwood from an existing timber sale within the P.H.A., when the timber sale licensee agrees to it.

The Provincial Chief Forester may establish pulpwood cutting budgets, in accordance with sustained yield management principles, for each P.S.Y.U. within the P.H.A. and the cut of pulpwood may not exceed the budgeted amount. Also, the company must submit an annual cutting plan to the Chief Forester, showing the areas proposed for pulpwood harvesting during the ensuing year.

When a timber sale licensee within the P.H.A. has completed his logging for sawlogs and has not elected to purchase the pulpwood on the sale area (by the methods described above), then the pulpwood may be purchased by the pulp company. However,

the company has 90 days in which to act, otherwise the pulpwood may be sold at public auction. For each sale of pulpwood made to the company by the Government, a timber sale licence is issued. The stumpage for tops and long butts, damaged or fallen trees, logs below sawmill utilization standards and standing live trees of a size or species unsuitable for sawmilling use, is 20 cents per c unit. In the case of pulpwood from stands which are decadent and/or unsuitable for sawmilling and those stands which, at their rotation age, will be unsuitable, the stumpage for the first twelve years of the agreement is 55 cents per c unit or per cord. After the first twelve years, the rate of stumpage will be appraised and assessed by the Forest Service.

The agreement requires the company to ensure that areas from which it has removed pulpwood in a primary logging operation become restocked to a standard and within a period of time specified by the Chief Forester. However, reforestation requirements placed on the pulp company are not to be more onerous than the requirements generally imposed on other operators who harvest timber from within the same P.S.Y.U.*

In an important part of the agreement, the company agrees to build a pulp mill of a stated capacity, by a stated time and specifies the performance bond to be placed with the Minister.

The agreement cannot be assigned to another party without the consent of the Minister, except under certain circumstances, such as to another company which the original company organizes to own and operate the pulp mill.

13. Timber Sale Licences:

Timber sales are the tenure providing the means of disposing of Crown timber, regulating the method of cutting, specifying stumpages and royalties, and stating the terms and conditions under which the timber is sold, including provisions for burning of slash. The role of timber sales in public sustained units and pulpwood harvesting areas has been described in connection with those tenures. It is worthwhile to add that an occupier of a timber sale has major responsibilities in connection with fighting fire originating on or burning into the sale area. These responsibilities, however, are not so great as in a tree farm licence, where the licensee is responsible for fighting fire over the entire licence area and not just in the cutting permit areas designated for logging.

Timber sales provide for an annual rental charge and forest protection tax and the licensee pays for the charges of cruising and advertising the sale, incurred by the Forest Service.

14. Tree Farms:

In effect, a new form of forest land tenure was created in 1951 by amendments to the "Taxation Act". The land classification of "tree farm land" was introduced and provision was made for the special taxation of Crown-granted (privately owned) forest land, at a level intended to encourage the use of suitable private land for forestry..

*This portion of the agreement probably looks ahead to the time when timber sale licensees will be required to reforest, if necessary by planting, the lands that they log. At the moment, there is no obligation to plant and, consequently, the P.M.I. licensee has very little current obligation in the matter of reforestation.

The lands qualifying for tree farms were normally subject, in addition to school taxes, to an annual tax of 1½ or 3 percent of their assessed value. The changes to the "Taxation Act" defined the land which might qualify for the less onerous tree farm taxation, as follows:

Tree farm land is any land for which the best economic use is forestry and on which:

- a. There is a stock of young growth meeting the minimum standards of stocking of the Forest Service; or
- b. An approved working plan prescribes a reforestation programme, designed to establish a growing stock that will meet the minimum standards; or
- c. There is a stock of mature timber which will be harvested, on a sustained yield basis, in compliance with an approved working plan; or
- d. There is any combination of a, b and c.

The assessed value of tree farm land is ascertained only by giving consideration to the present use, revenue or rental value of the land from the sustained annual growth and annual or periodic cuts of the trees. The value is based on the anticipated annual or periodic income, less anticipated costs of operation and the resulting nett income, capitalised at the rate of 12 percent. This rate is intended to include 4 percent for a return on a safe investment such as Government bonds, 6 percent for the additional risk factor in the forest industry and 2 percent to cover the annual property taxes. The forest protection tax is treated as a cost of operation in determining the nett income. The tax rate on the assessed value, as determined by this means is 1 percent, to which is added the school tax of the district in which the tree farm is situated. In 1957, there were 19 tree farms in British Columbia, all located in the Coastal Region, with a total area of 535,596 acres and with a total annual allowable cut of somewhat in excess of 25.M.M. cu. ft.

It is worthy of note that the Candian Forestry Association once had a voluntary tree farm certification programme, a tree farm being "an area of privately owned forest land devoted to the continuous growth of merchantable forest products under good management". In 1955, there were 195,563 acres of these tree farms in British Columbia, but the programme was subsequently abandoned.

15. Timber Sale Harvesting Licences:

A timber sale harvesting licence, which has superceded the timber sale authorises the licensee to harvest a stated volume of timber from a particular P.S. Y.U. The stated volume of timber is taken to include all of the timber cut and removed, wasted or damaged by the licensee.

The logging operation is controlled by the Forest Service through issuance of Cutting Permits and must be in accordance with development plans submitted by the licensee and approved by the Forest Service. Operations are only allowed on those portions of the T.S.H.L. which are covered by a Cutting Permit. The licensee does not have control of any of the lands within the T.S.H.L. but only a right of entry to the extent provided by the Cutting Permit(s).

The development plans are required to be submitted by a licensee not later than six months prior to proposed start of operations unless the Forest Service (licensor) provides otherwise. The plans must be signed and sealed by a forester and contain all of the information required by the Forest Service. The licensor reserves the right to designate the licensee's areas of operation, should it be considered necessary in the interests of obtaining "maximum and proper" development of the P.S.Y.U.

The licensee may submit or the licensor may require the licensee to submit revisions to the development plan in the event of an emergency such as insect attack, fire or blowdown. In such an emergency the licensee must take measures to harvest the timber, as directed by the licensor.

The cutting permits issued within a T.S.H.L. may apply for no longer a period than three years except that those issued for the harvesting of timber from road rights-of-way within the area of an approved development plan may have an expiry date coinciding with that of the licence.

The licensor may direct the licensee to survey and define the boundaries of cutting permits on the ground at the licensee's expense, should the licensor deem it necessary. If the licensee does not comply, the licensor may cause a survey to be made at the licensee's expense.

A cutting budget has to be included in the development plan and the amount of timber cut, wasted or damaged in anyone year must not exceed 150% or be less than 50% of the annual commitment (the part of P.S.Y.U. annual allowable cut for which the T.S.H.L. was issued). The quantity of timber cut, wasted or damaged must not continuously exceed the annual harvest.. Also, the total quantity of timber harvested during a period not longer than five designated, consecutive years must not exceed 110% or be less than 90% of five times the annual commitment. If the amount should exceed 110% then the total of the next five year's annual harvest is reduced accordingly. For exceeding either a one maximum percentage or the five-year maximum percentage, the licensee pays stumpage and the licensor may cancel the licence. If the cuts are less than the specified annual or five yearly minimum, the license is subject to cancellation.

Under the subject of forest protection the "area of occupation" in which the licensee has fire-fighting special responsibilities defined in Part XI of the "Forest Act" is restricted to those areas described in the current cutting permits. The entire cutting permit area is deemed to be occupied by the licensee until such time as the licensor notifies the licensee that slash has been disposed of in a satisfactory manner over the entire area. In addition, the licensee has to submit each year a fire protection pre-organization plan including a duty roster. A minimum standby force of three men must be provided during the close season (1st May - 31st October each year), although the licensor can approve a variation in this number according to the area of occupation and the hazard conditions. The licensor may require the licensee to maintain an additional man, over and above the three, for each 300 acres of the area of occupation. This standby crew must be trained and equipped for forest fire suppression, including transportation and radio equipment.

Provision is also made for road construction, maintenance and erosion control and the Crown reserves the right to take possession of any or all roads, subject to permitting the licensee to use the roads for the duration of the T.S.H.L. There are provisions for the protection of the water supply, including protection of stream channels.

The foregoing conditions and others are standard to T.S.H.L. contracts but other conditions are frequently added as circumstances demand it and the Forest Service deems them necessary.

This programme was discontinued in view of the changes in the "Taxation Act", with its financial incentives, which made the Canadian Forestry Association programme somewhat superfluous.

SUMMARY OF BASIC DATA⁽⁵⁾ FOR CERTIFIED TREE FARMS (PRIVATE SUSTAINED YIELD UNITS) - 1966

	No.	Productive Area (Acres)				Total Area (Acres)	Mature Volume M.c.f.	Estimated Annual Productive Capacity M.c.f.
		Mature	Immature	N.S.R. and N.C.C.	Total			
Within Tree Farm Licences	14(1)	89,965	182,600	30,967	303,532	342,449	404,685	21,579
Not Within Tree Farm Licences	32(2)	231,200	433,803	47,149	712,152	933,842	1,327,042	34,146
Totals	46	321,165	616,403	78,116	1,015,684	1,276,291	1,731,727(3)	55,725(4)

- NOTES:
- (1) Of these 14, 11 were on the Coast and 3 in the Interior.
 - (2) Of these 32, 23 were in the Vancouver Forest District (Coastal Region) and 9 in the Nelson Forest District (Interior).
 - (3) In addition to this timber volume, tree farms in the Nelson Forest District had a stock of 1,685,724 Christmas trees.
 - (4) In addition, tree farms in the Nelson Forest District had an estimated annual productive capacity of 1,158,200 Christmas trees.
 - (5) Data from Forest Service sources.

ANNEXURE III

FOREST INDUSTRY PRODUCTION

IN

BRITISH COLUMBIA

SUMMARY OF EXPANSION IN THE PULP AND PAPER INDUSTRY OF
BRITISH COLUMBIA 1966 - 1975

Existing and proposed new capacity as announced to October 31st, 1966

<u>PULP</u>		
	<u>Capacity</u> (Short Tons per Year)	<u>Estimated Capital Expenditure</u> \$ mil.
Capacity of pulp mills currently operating.....	4,324,000	-
Expansions to existing pulp mills.....	740,000	184
Estimated repairs expenditure.....	-	200
 New pulp mills under construction for completion by end 1966.....	270,000	80
 New pulp mills under construction, in 1966 for completion over period 1967-70.....	1,170,000	335
 New pulp mills proposed; timber supply allocated.....	1,020,000	275
 New pulp mills projected for construction prior to 1975 (forest resources still to be allocated).....	1,700,000	420
Estimated total rated pulp mill capacity by 1974.....	<u>9,224,000 tpy</u>	
Estimated capital investment and repairs expenditure.....		<u>11,500</u>

<u>NEWSPRINT</u>		
	<u>Capacity</u> (Short Tons Per Year)	
Capacity of newsprint mills currently operating.....	1,415,000	
Expansions announced to existing newsprint mills.....	285,000	
(Newsprint production at projected pulp mills.....)	240,000)	
<u>OTHER PAPERS</u>		
Capacity of other paper and board mills currently operating.....	526,000	

Adapted from "The Pulp and Paper Industry of British Columbia." Industrial
Development Department. B.C. Hydro and Power Authority.

SAW AND SHINGLE MILLS OF BRITISH COLUMBIA 1915 - 1969. (1)
5 Year Averages

Period of Years	OPERATING				CLOSED			
	S a w m i l l s		Shingle Mills		S a w m i l l s		Shingle Mills	
	No.	Total Daily (2) Capacity (Cunits)	No.	Daily Capacity M Shingles	No.	Total Daily (2) Capacity (Cunits)	No.	Daily Capacity M Shingles
1915 - 19 (3)	217	14,275	72	11,015	51	3,068	7	565
1920 - 24	327	17,528	96	14,329	76	3,035	10	805
1925 - 29	359	20,143	69	11,828	107	3,668	13	1,652
1930 - 34	314	15,565	59	7,216	140	6,188	17	1,583
1935 - 39	434	18,707	86	8,516	124	2,887	17	560
1940 - 44	614	22,768	66	8,080	130	1,690	14	383
1945 - 49	1,427	28,013	62	8,098	178	1,838	10	258
1950 - 54	2,182	37,742	60	1,161	303	3,165	15	58
1955 - 59	2,239	46,607	63	1,370	496	5,135	7	43
1960 - 64	1,660	48,298	53	828	529	5,578	11	63
1965 - 1969 (5)	1,023 ⁽⁴⁾	41,160	61	757	378	4,535	11	45

- NOTES: (1) Data derived from British Columbia Forest Service Annual Reports.
- (2) Figures converted from thousands of board feet, B.C. Log Scale using a conversion factor of 6 (1 cu. ft. = 6 fbm B.C. Log Scale).
- (3) These figures are actually 3 year averages for 1917, 1918 and 1919. Data for 1915 and 1916 is incomplete and has not been used.
- (4) In 1969, these mills included 194 log barking installations and 227 "waste" chipping installations.
- (5) In 1969, there were also 19 pulp mills and 22 veneer and plywood plants in the Province.

EXPORT OF ROUND LOGS FROM BRITISH COLUMBIA 1915 - 1969 (1)
(5 YEAR AVERAGES - CUNITS (2))

Period of Years	Douglas Fir	Western Red Cedar	Spruce	Western Hemlock	Amabilis & Alpine Firs	Western White Pine	Ponder- osa Pine	Lodge- pole Pine	West- ern Larch	Cotton- Wood (Black Poplar)	Cypress	Misc. (includ- ing hard- woods)	Total (3)	Percentage of Provin- cial Annual Cut
1915-19	12,253	58,170	4,130	10,802	1,080	98	-	-	68	--	-	2,088	88,693	-
1920-24	79,945	101,957	12,308	42,127	2,938	2,538	-	-	720	-	-	6,498	249,031	-
1925-29	178,550	142,085	4,913	48,160	7,800	5,112	1,428	-	2	87	-	337	388,474	7.8
1930-34	181,042	79,165	2,665	36,660	6,282	2,685	1,278	-	18	3,298	-	418	313,511	9.1
1935-39	221,273	55,475	21,468	117,922	8,458	3,192	562	142	177	2,945	-	1,283	432,897	8.6
1940-44	43,477	62,457	9,312	139,728	29,567	2,267	-	-	-	175	-	238	287,221	5.1
1945-49	27,003	58,167	1,473	85,373	15,818	422	-	23	-	142	230	2	188,653	3.0
1950-54	21,953	24,383	748	124,125	28,348	110	-	33	-	390	663	3	200,756	2.4
1955-59	9,735	11,230	428	38,583	14,293	40	2	-	-	325	1,400	25	76,061	0.8
1960-64	9,138	14,948	29,045	40,695	17,018	32	-	2	-	2,715	7,195	12	120,800	0.9
1965-69	5,800	28,959	66,315	88,078	29,494	-	1	1,452	-	6,668	21,240	373	248,380	1.5

NOTES: (1) Compiled from British Columbia Forest Service Annual Reports.

(2) Converted from thousands of board feet, B.C. Log Scale using a conversion factor of 6. (1 cubic foot - 6 board feet, lumber tally).

(3) Totals are adjusted to agree with columns and thus contain a cumulative calculating error. For the purposes of the table, the error is unimportant and does not exceed $\pm 0.5\%$.

ANNEXURE IV
FOREST PRODUCTION
IN
BRITISH COLUMBIA

TOTAL AMOUNT OF TIMBER SCALED IN BRITISH COLUMBIA 1915 - 1969
(Cunits (1) - 5 Year Averages)

Period of Years	Coastal (2) Forests	Interior Forests	Total
1915-1919	2,006,430	481,800	2,488,230
1920-1924	2,908,428	693,932	3,602,360
1925-1929	4,187,307	791,402	4,978,709
1930-1934	3,013,395	432,267	3,445,662
1935-1939	4,468,482	546,822	5,015,304
1940-1944	4,781,898	791,652	5,573,550
1945-1949	4,897,303	1,371,303	6,268,606
1950-1954	5,947,623	2,403,512	8,351,135
1955-1959	5,944,745	3,923,258	9,868,003
1960-1964	7,573,343	5,579,757	13,153,100
1965-1969	9,222,744	7,306,568	16,529,312

- NOTES: (1) The original scale figures in MBM, British Columbia Log Scale are converted using a conversion factor of 6 (1 cu.ft. = 6 fbm B.C. Log Scale).
- (2) The Coastal forests consist of the Vancouver Forest District and the Coastal portion of the Prince Rupert Forest District. The Interior forests cover the rest of the Province.

ANNEXURE IV
TABLE 2

TOTAL SCALE OF LOGS CUT IN BRITISH COLUMBIA SEGREGATED
(FIGURES IN CUBITS (?))

TO SHOW LAST STATUS OF ORIGIN, 1925 TO 1969 (1)
(5 YEAR AVERAGES)

(FIGURES IN CENTS (2))																		
Period of Years	Timber Licences	Timber Leases	Hand Loggers' Licences	Timber Sales	Pre-Options S.R. and Misc.	CROWN GRANTS				Location Lands	Timber Berths	Pulp Leases	Pulp Licences	Pulp Timber Sales	Unidentified	Tree Farm Licences	Farm Woodlots	Totals (5)
						To 1887	1887-1906	1906-1914	1914 to date									
1925-29	945,632	645,243	11,468	537,103	63,713	1,569,671	450,948	162,722	93,552	429,341	-	-	-	-	-	-	-	4,979,393
1930-34	757,048	642,953	10,369	388,779	46,718	1,125,131	227,680	73,506	59,590	113,927	-	-	-	-	-	-	-	3,445,729
1935-39	1,338,742	867,108	5,425	651,508	54,930	1,726,582	173,143	96,137	79,413	29,292	-	-	-	-	-	-	-	5,022,980
1940-44	1,445,424	742,942	2,012	1,000,297	99,060	1,761,072	197,247	101,647	97,882	49,398	49,600	9,003	32,595	2,150	-	-	-	5,590,329
1945-49	1,125,041	312,295	843	1,921,852	107,650	1,633,848	245,130	131,584	216,811	64,768	259,470	75,340	110,971	29,862	-	-	-	6,235,465
1950-54	1,211,539	197,399	453	3,253,883	139,155(1)	1,915,628	258,103	156,900	325,865	99,345	253,985	58,206	100,799	94,112	171,005	138,753	100	8,375,230
1955-59	1,154,362	183,462	237	4,873,170	98,508	1,524,840	244,050	130,513	437,077	87,945	175,283	72,760	87,902	90,415	148,782	557,167	988	9,861,645
1960-64	1,516,644	170,075	-	6,484,593	91,278	1,554,493	225,885	125,034	412,697	106,862	272,980	144,946	127,356	24,010(4)	161,056	1,702,846	2,155	13,152,910
1965-69	1,902,384	363,463	11	7,346,267	205,380	1,936,436	240,587	166,927	620,898	135,839	315,723	258,947	233,826	73,674	275,304(6)	2,522,173	3,257	16,601,096

NOTES: (1) Derived from British Columbia Forest Service Annual Reports - data not compiled or published prior to 1921.

(2) The original figures, in thousands of board feet, B.C. Log Scale have been converted to cunits using a conversion factor of 6 (1 cubic foot = 6 board feet, B.C. Log Scale).

(3) Logs shown in 1950, 1952 and 1953 as being from the "Forest Reserve Account" are included in this column.

(4) No cut recorded after 1962.

(5) Totals are adjusted to agree with other figures. The error introduced by calculation is small and not considered to be significant. (The cumulative error in totals does not exceed $\pm 0.5\%$). Table I of Annex. IV gives accurate five year average totals.

(6) No mark visible, beachcomb and trespass logs.

ANNEXURE IV
TABLE 2

TOTAL SCALE OF LOGS CUT IN BRITISH COLUMBIA SEGREGATED
(FIGURES IN CUNITS (2))

Period of Years	Timber Licences	Timber Leases	Hand Loggers' Licences	Timber Sales	Pre-Emptions S.R. and Misc.	C R O W N G R A N T S			
						To 1887	1887-1906	1906-1914	1914 to date
1925-29	945,632	645,243	11,468	537,103	63,713	1,569,671	450,948	162,722	93,552
1930-34	757,048	642,953	10,369	388,779	46,718	1,125,131	227,680	73,506	59,590
1935-39	1,338,742	867,108	5,425	651,508	54,930	1,726,582	173,143	96,137	79,413
1940-44	1,445,424	742,942	2,012	1,000,297	99,060	1,761,072	197,247	101,647	97,882
1945-49	1,125,041	312,295	843	1,921,852	107,650	1,633,848	245,130	131,584	216,811
1950-54	1,211,539	197,399	453	3,253,883	139,155(3)	1,915,628	258,103	156,900	325,865
1955-59	1,154,362	183,462	237	4,873,170	98,508	1,524,840	244,050	130,513	437,077
1960-64	1,516,644	170,075	-	6,484,593	91,278	1,554,493	225,885	125,034	442,697
1965-59	1,902,384	363,463	11	7,346,267	205,380	1,936,436	240,587	166,927	620,898

- NOTES: (1) Derived from British Columbia Forest Service Annual Reports - data not compiled or published prior to 1921.
(2) The original figures, in thousands of board feet, B.C. Log Scale have been converted to cunits using a conversion factor of 6 (1 cubic foot = 6 board feet, B.C. Log Scale).
(3) Logs shown in 1950, 1952 and 1953 as being from the "Forest Reserve Account" are included in this column.
(4) No cut recorded after 1962.
(5) Totals are adjusted to agree with other figures. The error introduced by calculation is small and not considered to be significant. (The cumulative error in totals does not exceed $\pm 0.5\%$). Table I of Annex. IV gives accurate five year average totals
(6) No mark visible, beachcomb and trespass logs.

TO SHOW LAND STATUS OF ORIGIN, 1925 TO 1969 (1)
(5 YEAR AVERAGES)

Dominion Lands	Timber Berths	Pulp Leases	Pulp Licences	Pulp Tim- ber Sales	Unidentified	Tree Farm Licences	Farm Woodlots	Totals (5)	Period of Years
499,341	-	-	-	-	-	-	-	4,979,393	1925-29
113,957	-	-	-	-	-	-	-	3,445,729	1930-34
29,992	-	-	-	-	-	-	-	5,022,980	1935-39
49,398	49,600	9,003	32,595	2,150	-	-	-	5,590,329	1940-44
64,768	259,470	75,340	110,971	29,862	-	-	-	6,235,465	1945-49
99,345	253,985	58,206	100,799	94,112	171,005	138,753	100	8,375,230	1950-54
87,945	175,283	72,760	87,902	90,415	148,782	557,167	988	9,867,645	1955-59
106,862	272,980	144,946	127,356	24,010(4)	161,056	1,702,846	2,155	13,152,910	1960-64
135,839	315,723	258,947	233,826	73,674	275,304(6)	2,522,173	3,257	16,601,096	1965-69

ANNEXURE IV
TABLE 3
AVERAGE ANNUAL CUTS BY SPECIES FOR BRITISH COLUMBIA 1915 - 1969 (1)
(5 YEAR AVERAGES - CUNITS (2))

Period of Years	Douglas Fir	Western Red Cedar	Spruces	Western Hemlock	Amabilis & Alpine Firs	Ponderosa Pine	Western White Pine	Lodgepole Pine	Western Larch	Cottonwood (Black Poplar)	Miscellaneous, including hardwoods	Cypress	Total (3)	Period of Years
1915 - 19	1,124,483	639,822	256,385	224,945	42,847	101,508	14,260	8,815	69,878	5,108	193	-	2,488,244	1915 - 19
1920 - 24	1,581,127	847,135	327,067	460,138	85,882	83,618	47,045	71,853	75,847	3,002	19,502	-	3,601,216	1920 - 24
1925 - 29	2,333,437	1,202,682	356,972	564,408	123,480	56,495	46,900	106,032	59,497	3,958	124,850	-	4,178,711	1925 - 29
1930 - 34	1,701,188	651,888	211,387	474,380	103,532	43,840	37,452	42,675	40,358	6,135	132,830	-	3,445,665	1930 - 34
1935 - 39	2,560,853	936,852	254,015	808,090	137,953	66,908	51,740	40,333	66,323	5,887	76,347	-	5,005,301	1935 - 39
1940 - 44	2,419,305	1,007,678	489,395	1,063,230	234,018	63,172	55,193	22,028	70,263	5,885	145,048	-	5,575,215	1940 - 44
1945 - 49	2,479,883	1,154,653	611,872	1,261,438	327,597	69,495	58,510	77,965	146,088	15,625	38,320	7,145	6,248,591	1945 - 49
1950 - 54	3,300,782	1,281,403	1,013,105	1,723,923	486,238	77,232	83,962	166,585	173,788	13,330	13,497	17,287	8,351,132	1950 - 54
1955 - 59	3,733,015	1,350,582	1,439,892	1,973,082	613,658	67,327	95,412	325,272	203,090	26,502	9,233	33,603	9,870,668	1955 - 59
1960 - 64	3,815,163	1,723,868	2,342,867	2,999,900	1,208,020	73,415	96,828	568,162	186,690	50,732	10,080	55,088	13,135,813	1960 - 64
1965 - 69	3,714,676	2,183,695	3,433,846	3,862,597	1,801,749	87,017	100,146	1,048,427	136,054	84,483	31,650	116,613	16,600,953	1965 - 69

- NOTES: (1) Derived from British Columbia Forest Service Annual Reports
- (2) The original figures are of all products converted to B.C. Log Scale. They were converted into cunits using a conversion factor of 6 (1 cubic foot = 6 board feet, B.C. Log Scale).
- (3) Totals are adjusted to agree with other figures. Thus, they are subject to a small calculating error (approximately $\pm 0.5\%$).

TABLE 4

TOTAL SCALE OF PRODUCTS FROM AREAS UNDER SUSTAINED YIELD REGULATION
IN BRITISH COLUMBIA 1956 - 69 (1)

Year	Tree Farm Licences		Tree Farms (2)		Christmas Trees			Farm Woodlots		Public Sustained Yield Units		Totals (4) Cubic Feet
	No.	Cunits	No.	Cunits	No.	Permits	Other Sources	No.	Cunits	No.	Cunits	
						No. of Trees	No. of Trees					
1956	23	1,218,697	11	8,620	221	430,447	3,403	37	921	47	1,884,640	3,112,878
1957	23	1,256,222	15	235,270	283	498,286	2,500	44	701	58	2,078,925	3,571,118
1958	27	1,442,605	26	275,930	277	408,874	2,700	53	1,394	61	2,548,762	4,268,691
1959	36	1,787,424	26	303,080	279	398,504	297,691	50	2,057	64	3,120,490	5,213,051
1960	37	2,414,104	25	326,830	294	495,697	349,513	52	922	72	3,852,000	6,593,856
1961	39	2,799,173	22	278,420	282	434,796	323,254	50	2,446	78	4,540,296	7,620,335
1962	39	3,370,576	22	356,780	306	552,512	153,618	57	2,777	80	5,270,540	9,000,673
1963	39	3,656,316	25	330,050	346	617,753	220,393	53	2,637	82	6,331,930	10,323,933
1964	39	3,508,064	28	345,430	348	511,726	395,168	55	2,534	83	6,076,416	9,932,444
1965	40	3,740,623	31	395,877	352	509,876	207,643	51	2,165	75	6,874,929	11,013,594
1966	38	4,056,234	32	450,587	347	494,798	239,378	47	1,670	76	6,409,467	10,917,958
1967	36	4,493,868	31	433,083	351	541,930	454,031	46	3,783	76	6,395,422	11,326,156
1968	36	5,154,661	31	655,740	350	499,373	413,398	43	2,892	77	7,005,608	12,818,901
1969	35	4,990,935	30	576,465	344	470,004	317,801	43	2,407	77	7,288,446	12,858,253

NOTES: (1) From British Columbia Forest Service Annual Report

(2) Exclusive of tree-farms incorporated into tree-farm licences.

(3) Includes Christmas trees cut from tree-farm licences, tree farms and farm woodlots.

(4) Total Christmas tree cut is not shown.

ANNEXURE V
PLANTING OPERATIONS
IN
BRITISH COLUMBIA

ANNEXURE V
TABLE 1

SUMMARY OF PLANTING OPERATIONS IN BRITISH COLUMBIA UP TO 31st. DECEMBER 1969

Year	Forest Service on Crown Land		Forest Service on Crown-granted land (Forest Act Sec. 125 ⁽¹⁾)		Company on Tree-farm Licences		Other Private		T o t a l	
	Trees in Thousands	Acres	Trees in Thousands	Acres	Trees in Thousands	Acres	Trees in Thousands	Acres	Trees in Thousands	Acres
<u>Coast</u>										
Prior to 1953	75,975.7	89,042	1,005.4	1,140	9,544.6	13,918	1,658.6	2,221	88,184.3	106,321
1953 - 55	10,296.6	13,483	3,644.2	4,465	6,802.1	11,301	415.1	372	21,158.0	29,621
1956 - 58	2,178.1	3,074	1,894.4	2,128	9,333.7	22,330	247.2	343	13,653.4	27,875
1959 - 61	1,323.6	2,570	3,400.2	6,739	14,273.9	41,100	1,650.0	4,397	20,647.7	54,806
1962 - 64	4,455.2	11,383	4,515.7	11,025	18,307.8	53,394	8,643.5	25,127	35,922.2	100,929
1965 - 67	11,129.8	27,876	647.0	1,508	22,507.0	67,288	12,121.9	36,085	46,405.7	132,757
1968 - 69 ⁽²⁾	8,310.9	19,562	189.0	412	18,778.9	53,805	11,143.9	31,573	38,422.5	105,352
Coast Total	113,669.9	166,990	15,295.9	27,417	99,548.0	263,136	35,880.0	100,118	264,393.8	557,661
<u>Interior</u>										
Prior to 1953	278.1	450	-	-	2.0	2	4.9	5	285.0	457
1953 - 55	1,098.1	1,639	-	-	200.0	263	39.8	50	1,338.1	1,952
1956 - 58	871.0	1,123	-	-	234.9	463	133.0	187	1,238.9	1,773
1959 - 61	1,385.5	2,687	-	-	517.7	1,155	10.7	15	1,913.9	3,857
1962 - 64	2,239.4	5,370	-	-	870.1	2,898	51.1	135	3,160.6	8,411
1965 - 67	5,833.8	14,024	-	-	1,817.8	6,145	346.6	893	7,998.2	21,062
1968 - 69 ⁽²⁾	7,532.2	17,021	-	-	662.3	1,833	200.0	349	8,394.5	19,203
Interior Total ⁽³⁾	19,238.1	42,314	-	-	4,304.8	12,759	786.1	1,634	24,329.4	56,715
Grand Total ⁽³⁾	132,908.0	209,304	15,295.9	27,417	103,852.8	275,895	36,666.1	101,752	288,723.2	614,376

- Notes: (1) Section 125 of the Forest Act authorizes the Forest Service to enter upon Crown-Granted lands, which are not satisfactorily restocked and to restock them at the owner's expense.
 (2) Subject to correction for 1969. Note that these figures are sums for 2 years, the remainder, sums for 3 yr. periods.
 (3) Owing to retroactive adjustment of figures by the Forest Service, there are small discrepancies between these totals and those given in the Forest Service 1959 Annual Report.

ANNEXURE VI

FOREST PROTECTION

IN

BRITISH COLUMBIA

ANNEXURE VI
TABLE I

FOREST PROTECTION EXPENDITURES IN BRITISH COLUMBIA, BY THE B. C. FOREST SERVICE (FISCAL YEARS ENDING 31st. MARCH) (2)
(AVERAGE ANNUAL EXPENDITURES FOR FIVE-YEAR PERIODS)

Year	Salaries & Expenses	Tools & Equipment	Pipes	Improvements	Aircraft	Hazard Reduction	Planning and Research	Uniforms	Insect Control	Travelling Expense	Maintenance Buildings & Grounds	Increased Protection Peace River	Acquisition of Construction of Buildings and Works	Motor Vehicles and Accessories	Rise.	Total
1950-51 to 1954-55	190,707	386,733	283,174	528,055	385,940	154,515	17,353	16,449	-	-	-	-	-	-	12,163	2,727,060
1955-56 to 1959-60	19,937	381,295	255,632	1,302,567	447,892	201,709	32,335	9,554	-	-	-	-	-	-	17,367	3,847,864
1960-61 to 1964-65	9,721	1,436,910	363,948	2,073,746	229,093 (1)	501,562	8,489	9,349	16,864	15,011	165,123	121,011	119,957	73,381	23,611	5,553,867

NOTES: (1) Accounting for improvements ended in 1962 and was divided under new accounts e.g. Acquisition or construction of Buildings & Works, commencing in 1963.

(2) Data derived from British Columbia Forest Service Annual Reports.

ANNEXURE VI

FOREST PROTECTION EXPENDITURES IN BRITISH COLUMBIA, BY THE B. C. FOREST SERVICE

TABLE I

(AVERAGE ANNUAL EXPENDITURES FOR FIVE YEARS)

Year	Salaries & Expenses		Tools & Equipment		Fires	Improvements	Aircraft
	Permanent	Temporary	New	Maintenance & Operation			
1950-51 to 1954-55	190,707	711,480	386,733	283,174	528,055	385,940	154,515
1955-56 to 1959-60	19,937	1,084,226	381,295	255,632	1,302,567	447,892	201,709
1960-61 to 1964-65	9,721	1,436,910	363,948	312,069	2,073,746	229,093 (1)	501,562

- NOTES: (1) Accounting for improvements ended in 1962 and was divided under new accounts e.g. Acquisition or construction of Buildings & Works, commencing in 1963.
- (2) Data derived from British Columbia Forest Service Annual Reports.

UMBIA, BY THE B. C. FOREST SERVICE (FISCAL YEARS ENDING 31st. MARCH) (2)
 ANNUAL EXPENDITURES FOR FIVE-YEAR PERIODS)

Improvements	Aircraft	Hazard Reduction	Planning and Research	Uniforms	Insect Control	Travelling Expense
385,940	154,515	10,486	17,353	16,449	-	-
447,892	201,709	45,350	32,335	9,554	-	-
229,093 (1)	501,562	69,017	8,489	9,349	16,864	15,011

nts e.g. Acquisition or

Travelling Expense	Maintenance Buildings & Grounds	Increased Protection Peace River	Acquisition or Construction of Buildings and Works	Motor Vehicles and Accessories	Misc.	Total
-	-	-	-	-	12,163	2,727,060
-	-	-	-	-	7,367	3,847,864
15,011	165,128	121,011	119,957	73,381	28,611	5,553,867

ANNEXURE VI
TABLE 2

ESTIMATED AND KNOWN COSTS OF FOREST PROTECTION IN
BRITISH COLUMBIA TO AGENCIES OTHER THAN THE BRITISH
COLUMBIA FOREST SERVICE (1) 1935 - 1968
(AVERAGES FOR FIVE YEAR PERIODS)

Period of Years (2)	Tools and Equipment \$	Improvements \$	Patrol \$	Firefighting \$	Totals \$
1935 - 39	58,926	1,771	62,992	108,623	232,312
1940 - 44	73,015	3,729	61,312	103,446	241,502
1945 - 49	164,219	12,812	141,227	122,206	440,464
1950 - 54	369,104	80,590	263,550	339,427	1,052,671
1955 - 59	394,149	344,324	292,197	351,530	1,382,200
1960 - 64	541,357	281,603	380,881	319,666	1,523,507
1965 - 68 (3)	882,942	266,226	421,952	887,196	2,458,316

NOTES: (1) Data is derived from British Columbia Forest Service Annual Reports and refers to costs paid almost entirely by industry. These expenditures do not include payments of Forest Protection Tax to the Provincial Government.

(2) Calendar Years.

(3) The Forest Service ceased publication of this information in 1968.

ANNEXURE VI
TABLE 3

Period of Years	ACCESSIBLE MERCHANTABLE TIMBER				INACCESSIBLE MERCHANTABLE TIMBER			IMMATURE TIMBER		NOT SATISFACTORILY RESTORED		
	Net Area Killed (Acres)	Total Volume Killed (Cunits)	Salvageable Killed Volume (Cunits)	Net Stumpage Loss (Dollars)	Net Area Killed (Acres)	Total Volume Killed (Cunits)	Damage (Dollars)	Net Area Killed (Acres)	Damage (Dollars)	Logged, Not Slash- burned (Acres)	Logged and burned (Acres)	Burn & no Loss (Ac)
1915 - 19	28,817	238,602	69,955	105,943		Not Recorded		18,758	39,386	-	Not Recorded	
1920 - 24	61,933	322,942	115,618	308,852		Not Recorded		78,775	218,104	30,833	Not Recorded	
1925 - 29	63,749	391,505	207,033	409,371		Not Recorded		145,560	308,402	25,826	Not Recorded	
1930 - 34	98,332	509,348	94,455	389,498		Not Recorded		132,165	448,766	25,664	Not Recorded	
1935 - 39	41,405	546,630	153,530	359,354		Not Recorded		45,792	167,939	13,753	17,416	31
1940 - 44	30,685	250,322	18,738	190,709	7,247	28,585	10,461	61,570	201,782	16,617	4,970	32
1945 - 49	22,295	210,838	51,738	186,985	1,477	7,001	2,131	37,928	98,014	4,085	2,112	21
1950 - 54	10,002	194,155	110,015	206,177	1,678	7,043	14,541	38,103	187,979	7,715	4,515	29
1955 - 59	28,390	531,015	211,702	791,417	35,157	226,958	12,164	53,440	1,066,333	5,782	1,070	40
1960 - 64	54,473	90,011	32,797	1,738,247	- (1)	- (1)	- (1)	61,378	1,276,302	18,230	880	35
1965 - 69	45,483	90,431	34,944	1,975,696	-	-	-	56,121	1,472,827	9,884	3,636	2

NOTE: (1) From 1960 onwards no merchantable timber has been considered to be inaccessible.

DAMAGE TO BRITISH COLUMBIA FORESTS CAUSED BY FOREST FIRES

(5 YEAR AVERAGES)

<u>IMMATURE TIMBER</u>		<u>NOT SATISFACTORILY RESTOCKED</u>			<u>Damage</u> (Dollars)	<u>NON-COMMERCIAL COVER</u>		<u>GRAZING OR PASTURELAND</u>	
<u>Net Area</u> <u>Killed</u> (Acres)	<u>Damage</u> (Dollars)	<u>Logged,</u> <u>Not Slash-</u> <u>burned</u> (Acres)	<u>Logged</u> <u>and</u> <u>Burned</u> (Acres)	<u>Burned</u> <u>& not</u> <u>Logged</u> (Acres)		<u>Area</u> <u>Burned</u> (Acres)	<u>Damage</u> (Dollars)	<u>Area</u> <u>Burned</u> (Acres)	<u>Damage</u> (Dollars)
18,758	39,386	-	Not Recorded	-	-	Not Recorded	-	32,904	2,362
78,775	218,104	30,833	Not Recorded	-	-	Not Recorded	-	72,635	2,720
145,560	308,402	25,826	Not Recorded	-	-	Not Recorded	-	28,057	1,479
132,165	448,766	25,664	Not Recorded	-	-	Not Recorded	-	32,361	1,717
45,792	167,939	13,753	17,416	31,15	26,214	54,573	23,970	11,548	572
61,570	201,782	16,617	4,970	32,77	18,945	87,056	28,862	15,842	833
37,928	98,014	4,085	2,112	21,27	7,215	75,736	20,690	41,036	3,079
38,103	187,979	7,715	4,515	29,98	44,519	114,853	29,787	60,403	3,226
53,440	1,066,333	5,782	1,070	30,84	134,782	290,163	73,208	11,217	732
61,378	1,276,302	18,230	880	15,51	380,980	135,553	33,712	12,826	2,768
56,121	1,472,827	9,884	3,636	218	116,692	58,181	15,363	11,773	888

GRAZING OR PASTURELAND		NON-PRODUCTIVE SITES		CUT-OVER LAND, UNMERCHANTABLE TIMBER, OLD BURN NOT RESTOCKING			GRAND TOTALS			
Area Burned (Acres)	Damage (Dollars)	Area Burned (Acres)	Damage (Dollars)	Area Burned (Acres)	Quantity Killed (Cunits)	Damage (Dollars)	Area (Acres)	Quantity (Cunits)	Damage (Dollars)	Period of Years
d 32,904	2,362	N o t R e c o r d e d		166,284	802	1,623	246,763	239,404	142,314	1915 - 19
d 72,635	2,720	N o t R e c o r d e d		288,641	2,337	41,107	532,817	325,279	570,783	1920 - 24
d 28,057	1,479	N o t R e c o r d e d		297,248	14,352	128,326	560,440	405,857	847,578	1925 - 29
d 32,361	1,717	N o t R e c o r d e d		303,304	-	79,538	591,826	509,348	919,519	1930 - 34
11,548	572	16,356	7,860	56,370	5,542	7,117	289,028	552,172	593,025	1935 - 39
15,842	833	82,122	16,512	Recorded under other columns			338,486	278,907	468,104	1940 - 44
41,036	3,079	59,394	15,156	Recorded under other columns			265,790	217,840	333,270	1945 - 49
60,403	3,226	27,346	6,861	Recorded under other columns			294,113	201,198	493,090	1950 - 54
11,217	732	128,222	27,874	Recorded under other columns			584,425	757,973	2,106,510	1955 - 59
12,826	2,768	23,737	6,345	Recorded under other columns			322,538	90,011	3,438,354	1960 - 64
11,773	888	21,614	5,597	Recorded under other columns			209,310	90,431	3,587,063	1965 - 69

A COMPARISON OF THE DAMAGE CAUSED BY FOREST FIRES
IN BRITISH COLUMBIA (1) 1915 - 1969
(5 YEAR AVERAGES)

NOTES: (1) Data derived from information included in Forest Service Annual Reports. Whilst some data is available for the period 1910 - 14, it is incomplete and has not been used.

(2) Original figures quoted in thousands of board feet, B.C. Log Scale have been converted into cubic feet, employing a conversion factor of 6. (1 cubic foot = 6 board feet, B.C. Log Scale)

ANNEXURE VI
TABLE 5

DAMAGE CAUSED BY FOREST FIRES IN BRITISH COLUMBIA TO
PROPERTY OTHER THAN FORESTS 1915 - 1969
(DOLLARS - FIVE YEAR AVERAGES)

Period of Years	Forest Products in Process of Manufacture	Buildings	Logging and Railway Equipment	Misc.	Total
1915 - 19	32,574	54,803	40,840	27,503	155,720
1920 - 24	143,994	115,843	161,453	82,725	504,015
1925 - 29	80,323	113,337	126,264	34,570	354,494
1930 - 34	77,436	44,978	55,790	16,372	194,576
1935 - 39	119,345	33,203	90,497	8,872	251,917
1940 - 44	61,240	32,729	75,244	41,033	210,246
1945 - 49 (1)	127,208	12,113	114,680	20,337	274,338
1950 - 54	206,484	32,584	264,857	33,457	537,382
1955 - 59	94,387	24,900	220,947	28,747	368,981
1960 - 64	78,381	39,033	129,121	18,759	265,194
1964 - 69	223,719	42,375	198,206	44,757	509,057

NOTE: (1) Figures from 1945 on, exclude losses resulting from intentional slash-burns escaping from control.

ANNEXURE VI

SUMMARY OF SNAG FALLING, SLASH DISPOSAL (1) AND SLASH-
BURNING DAMAGE (2) IN THE VANCOUVER FOREST DISTRICT
OF BRITISH COLUMBIA (3) 1950 - 1965

Year	Total Area Over Which Snags Cut Down	A C R E S		
		Total Area of Slash Dealt With	Total Area of Slash Carried Over for Later Disposal	Total Damage \$
1950	72,205	76,545	36,303	109,279
1951	66,120	75,271	24,344	8,625
1952	67,214	96,140	21,165	116,365
1953	73,566	88,171	31,006	2
1954	74,332	84,752	22,996	2,468
1955	78,450	77,997	20,103	2,517
1956	82,688	44,257	23,981	-
1957	68,510	69,871	-	174,258
1958	57,576	45,012	-	42,118
1959	77,199	61,101	18,645	4,430
1960	87,872	72,883	4,075	21,819
1961	80,609	59,634	922	154,630
1962	99,854	73,948	18,122	27,262
1963	7,037	78,361	12,471	16,122
1964	104,153	83,408	38,238	8,018
1965	105,463	77,181	22,720	277,037

NOTES: (1) Slash disposal in the Vancouver Forest District is carried out almost entirely by broadcast slash burning.

(2) Damage caused is mainly the value of timber destroyed by broadcast slash burns escaping control.

(3) From British Columbia Forest Service Annual Reports.

(4) The Forest Service reduced published data in 1965 and later years.

RELATIONSHIP OF CROWN (PROVINCIAL) CONTRIBUTIONS
TO FOREST FIRE PROTECTION TO TOTAL CROWN FOREST
REVENUES AND TOTAL CROWN FORESTRY EXPENDITURES IN
BRITISH COLUMBIA.

(1)	(2)	(3)	(4)	(5)	(6)
YEAR	TOTAL FORESTRY EXPENDITURE	CONTRIBUT- IONS TO FIRE PROTECTION	PERCENTAGE OF (3) to (2)	REVENUE	PERCENTAGE OF (3) to (5)
1943-44	\$ 1,186,093	\$ 500,000	42.15	\$ 3,907,160	12.7
1953-54	7,724,876	2,089,521	27.1	19,054,607	10.9
1954-55	7,847,532	2,000,000	25.5	21,150,833	9.5
1955-56	8,672,298	2,348,291	27.1	23,867,705	9.8
1956-57 (estimate)	13,078,468	2,705,000	20.1	29,563,000	9.1

ANNEXURE VII
FOREST FINANCE
IN
BRITISH COLUMBIA

TABLE 4
BRITISH COLUMBIA GOVERNMENT FOREST EXPENDITURES (1915-65)
(INCLUDING FEDERAL CONTRIBUTIONS)

Period of Years	Reconnaissance	Insect Control	Research	Reforestation incl. Forest Nurseries	Forest Management	Engineering Services	Forest Development Fund	Forest Protection	Fire Suppression	Forest Reserve Account	Forest Surveys	Ranger School	Youth Training Programme	War Service Temporary Assistance
1915-16 to 1919-20	-	-	-	-	-	-	-	118,503	-	-	-	-	-	-
1920-21 to 1924-25	39,239	18,405	1,843	-	-	-	-	374,474	-	-	-	-	-	-
1925-26 to 1929-30	15,578	8,232	16,204	-	-	-	-	415,081	-	56,770	-	-	-	-
1930-31 to 1934-35	5,326	963	6,189	4,882	-	-	-	344,000	-	42,367	-	-	-	-
1935-36 to 1939-40	5,580	-	9,061	15,852	-	-	-	388,000	-	62,838	-	-	-	-
1940-41 to 1944-45	7,942	-	11,358	92,457	-	-	-	500,000	-	94,857	-	-	-	17,594
1945-46 to 1949-50	-	5,237	20,896	282,565	43,934	-	-	1,310,000	-	170,885	-	40,253	86,589	14,385
1950-51 to 1954-55	-	-	59,406	410,775	114,588	57,225	199,159	2,254,672	-	614,884	-	61,344	63,033	-
1955-56 to 1959-60	-	-	145,553	397,548	1,360,087 (4)	2,030,343 (2)	87,843	2,545,297	1,303,432	-	1,055,180	95,197	-	-
1960-61 to 1964-65	-	-	209,579	548,980	2,200,201 (5)	3,384,834 (2)	-	3,480,121	2,062,940	-	1,118,127	108,559	-	-
1960-61 to 1964-65 Percentage of Total Expenditure	-	-	1.2	3.1	12.4	19.0	-	19.5	11.6	-	6.3	0.6	-	-
1964-65 (9)	-	-	223,150	686,522	2,265,470 (4)	3,221,213 (2)	-	3,869,308	129,242	-	1,218,426	121,512	-	-

NOTES: (1) Data derived from British Columbia Forest Service Annual Reports.
(2) Including costs of Forest Development roads.
(3) Includes Federal Contributions under the Federal/Provincial Forestry Agreements.
(4) Including silvicultural costs.
(5) Including silvicultural costs and Peace River power dam timber salvage.
(6) Including expenditures on Peace River community pastures.
(7) The percentages given are of gross expenditure (including the Federal Contributions) as a percentage of Provincial Direct Forest Revenue. In 1963/64, for example, the Federal contribution was 3.1%.
(8) To the Canadian Forestry Association of British Columbia.
(9) The Forest Service changed its method of reporting in 1965 - 1966 making it difficult to continue the breakdown employed in this table up to 1968-69.

EXPENDITURES (FISCAL YEARS 1915 - 16 TO 1964 - 65)(1)
FEDERAL CONTRIBUTIONS)

War Service Temporary Assistance	Trade Extension	Refunds to the United Kingdom	Provincial Parks	Public Relations	Grants	Grading - Range Improvement Fund	Forest Service Salaries	Pay of Forest Service Temporary Assistance	Legislative Expense Vote	Special Warrants	Office Furniture and Equipment	Rentals, Ad- ministration Buildings & Property	Local- Business	Total Expenses (3)	Direct Forest Revenue	Percentage Expenditure (7) of Revenue
-	19,617	-	-	-	-	-	137,081	-	73,621	-	-	-	144	350,966	2,168,164	16.2
-	27,312	-	-	-	-	5,035	201,303	7,625	146,158	-	-	-	111	827,505	3,271,436	25.3
-	15,553	-	-	-	-	6,121	234,494	7,674	133,751	-	-	-	098	915,515	3,532,017	25.9
-	31,872	-	-	-	1,600	4,924	256,603	936	95,411	-	-	-	670	795,743	2,240,349	35.5
-	30,000	-	-	-	3,200	5,186	237,609	1,483	106,287	-	-	-	58	865,154	3,063,887	28.2
17,594	-	-	15,415	-	000	10,197	262,771	2,981	141,528	-	-	-	1,380	1,162,420	3,981,640	29.2
14,385	-	19,809	155,321	16,751	-	-	-	1,098	281,869	-	-	-	1,381	3,004,742	6,837,214	43.9
-	-	-	641,129	62,196	-	-	-	-	806,978	-	31,028	32,888	-	7,135,496	16,989,166	42.0
-	-	-	496,921	89,135	-	-	-	32,629	925,912	19,100	38,535	64,770	-	13,144,728	29,727,204	44.2
-	-	-	-	108,174	-	-	-	-	1,088,387	1,627	28,644	-	-	17,777,802	34,512,534	51.5
-	-	-	-	0.6	-	-	-	-	6.1	-	0.2	-	-	(100.0)	-	-
-	-	-	-	116.6	-	-	-	-	1,053,738	-	27,948	-	-	16,822,439	43,776,221	38.4

Original
missing

tribution was \$1,831,428.00 and the Provincial expenditure was \$36,683,312.00. The Provincial percentage of expenditure was 34.3 percent.

ANNEXURE VIII

Glossary

G L O S S A R Y

- board feet: (1) board foot, lumber tally. Theoretically, a piece of lumber measuring 12" x 12" x 1" thickness. In commerce, the thickness may vary. For example, lumber sawn scant (ie. thinner than one inch) is frequently measured as if it were one inch thick.
- (2) board foot, log scale. The theoretical number of board feet, lumber tally, as measured by the Official British Columbia Board Foot Log Scale (or scales based on other formula, where specified in the text) which can be sawn from a log, after making deductions for decay, defects, saw kerf (the width of the saw cut) and so on.
- bush: a colloquial word used in British Columbia to refer to the forest. A synonym of "forest."
- car stakes: squared timbers which are erected along the sides of railway cars to support loads reaching higher than the sides of the car, or, on a flatdeck car, to support the whole load.
- caskets: coffins.
- choker: a wire rope sling which is placed round one end of a log and by which it is moved during the skidding operation.
- cooperage: wood used for making barrels, such as barrel staves.
- coupe: French for "cut." In forestry, the term is used to describe an area which has been logged. French usage employs the word for describing silvicultural systems of felling. eg. "coupe rase" is a description for the clear-cutting system.
- closed season: The period of potential fire hazard in British Columbia during which a variety of fire protection regulations take effect.
- conversion: In forestry terminology, this describes the process of making trees into logs or, more generally, of making manufactured products from logs. Hence, a "conversion plant" is a mill making forest products.
- cubic foot: a cube of wood 12" x 12" x 12" in size. The British Columbia Cubic Foot Log Scale is based on the Smalian formula and measures the number of cubic feet in a log. The term "firmwood cubic scale" refers to the measurement of all solid wood in a log whether it is suitable for the production of lumber or not. Thus, unlike the B.C. Board Foot Scale, deductions are only made for decay and not for other defects in the B.C. Cubic Foot Log Scale.

- diameter, breast height: In British Columbia, the diameter of a tree at a height of four feet above the ^{estimated location of section} highest point of the ground surface at the base of the tree.
- exotic: in forest terminology, a tree which has been imported from another country, ie. a tree which is not native to the area in which it is growing.
- forest policy: (a) a course of action in forestry determined according to the social and economic objects which it is desired to achieve. It includes allocation of land for forestry in relation to other forms of land use.
(b) the general principles adopted for the creation and/or maintenance of forests and their use.
(Commonwealth Forestry Society)
- hop poles: long, slender poles used to support a mesh of string, providing support to growing hops.
- increment: the increase in girth, diameter, basal area, height, volume, quality or value of individual trees or crops during a given period. (Commonwealth Forestry Society)
- lagging: wood used in mining for lining the mine tunnel.
- lath: a sawn product of small dimension used for agricultural, ^{house} and other purposes.
- log grade: a classification of logs according to their value for producing lumber and pulp. The Coastal area of B.C. has a log grading system but there is none in the Interior.
- lumber: sawn wood products one inch ^{or more} in thickness, or, in the case of "dimension lumber," two inches in thickness.
- mining cap: a wooden beam, supported by posts, for supporting the roof of a mine tunnel.
- normal forest: a theoretical organization of forest in which all age classes are present in a proportion in which the annual growth of the forest is constant and the annual yield of products is constant. The creation of a normal forest is frequently an objective of forest management.
- packer: a man transporting goods by oxen, horse or back pack.
- pre-emption: occupancy by settling on land and subsequently obtaining ownership of it.
- railway ties: the cross beams on which a railway line is supported. They may be hewn by hand (by a "tie-hack") or sawn. Also known as "railway sleepers" in Britain.
- royalty: a prescribed fee (in British Columbia set by legislation) for forest produce payable to the ^{Prov. Government} forest owner.

- shakes and shingles: split or sawn pieces of wood, usually cedar, used for roofing houses.
- silvicultural system: A ~~method of silvicultural~~ procedure worked out in accordance with accepted ~~sets of silvicultural~~ principles, by which forest crops are tended, harvested and replaced by new crops of distinctive forms.
- skid road, skid trail: A narrow road or trail used for the skidding of logs from the stump to a "landing" (area of concentration of logs).
- slash: The unusable residue after logging, viz., branches, tops, bark, chunks, unutilizable logs, uprooted stumps and broken or uprooted trees left on the area; also any large accumulation of debris after wind and fire.
- snag: (a) A standing dead tree from which the leaves and most of the branches have fallen, or a standing section of the stem of a tree broken off at a height of ten feet or more. If less than twenty feet, properly called a "stub."
(b) A sunken or submerged stump.
In the text, definition (a) applies.
- stumpage: The value of timber as it stands uncut in a forest. In British Columbia, the Forest Service has developed its own system of appraisal, sometimes referred to as a "modified Rothery system."
- sustained yield: (a) The material that a forest can yield annually (or periodically) in perpetuity.
(b) As applied to a policy, method or plan of management (sustained yield management) implies continuous production with the aim of achieving, at the earliest practical time and at the highest practical level, an approximate balance between net growth and harvest, either by annual or somewhat longer periods.
- thinning: a felling made in an immature stand for the purpose of improving the growth and form of the trees that remain, without permanently breaking the canopy.
- upset stumpage price: The stumpage price at which the Forest Service offers Crown timber for sale. Bids or sealed tenders from potential purchasers may offer the upset price or a higher price.