

BCAV

20361

634.909

711

BCMF

PRO

1982

MRJ

PROTECTION AS CONSERVATION: SAFEGUARDING BRITISH  
COLUMBIA'S FORESTS FROM FIRE, 1874 - 1921

John Parminter, Fire Ecologist  
Protection Branch  
Ministry of Forests  
1450 Government Street  
Victoria, B.C. V8W 3E7

In general terms, five sequential phases of man's interaction with the forests of any particular region have been described as: a primeval period when man's interest in the forest is limited; a time of forest clearance and exploitation; then recognition that the forest requires protection to ensure its survival; followed by the development of sophisticated silvicultural and forest management techniques; and finally forest land management which takes into account all forest users.<sup>1,2</sup> This article will examine a period in the development of forestry in British Columbia when the third phase, that of forest protection, assumed prominence both to the government and the lumber industry.

In the current sense, forest protection encompasses all biotic and abiotic agents responsible for injury to or destruction of the forest crop. While agents other than fire may be of equal or greater importance, it has been fire which has received the most attention for the longest period of time. Forest fires, whether of natural or human origin, are highly visible agents of destruction and represent a threat not only to forest cover but to man's habitations and industries situated in forested environments.

#### Historical Background

The nature of many of the forests of British Columbia and other physical indicators speak to the ubiquitousness of forest fires as natural phenomena. However, the arrival of man introduced new factors which eventually significantly altered the natural order.

The aboriginal use of fire for a wide variety of non-domestic purposes has been well documented and is considered by some to be universal,<sup>3</sup> dating back many millenia.<sup>4</sup> The native peoples of British Columbia manipulated wildlife habitat by burning to produce desired vegetation,<sup>5</sup> and similarly promoted the growth of food staples such as huckleberry.<sup>6</sup> Fire was used by the Haida, Kwakiutl, and Tlingit to fell trees<sup>7,8</sup> and by at least the Tahltans to provide a smokescreen for stalking game.<sup>9</sup>

Unplanned forest ignitions due to escaped campfires or the frivolous use of fire have been documented but disagreement exists over whether native peoples, at least in the northern forests, did or did not exercise due caution in handling fire.<sup>10</sup> With the arrival of European man the attitude of the aboriginals may have changed, as described by geologist George M. Dawson in 1886:

"It is often stated that the Indians are responsible for this [forest] destruction, and it is doubtless true that since they find the whole region in process of being ravaged by fires which they can not prevent, they have become more careless than before. They would not, however, willingly destroy their own hunting grounds, and the best evidence of their care is found in the fact that, while along the North Kootanie Pass (which so far has been scarcely used, except by the Indians,) the woods are generally unburnt, those in the vicinity of the parallel Crow Nest Pass, which has now been for a few years a route used by whites, are entirely destroyed and represented only by bleaching or blackened trunks."<sup>11</sup>

European man with his penchant for exploration, his advanced technology, and sheer numbers was the cause of many forest fires, especially during the 1800's. Those responsible ranged from:

"...fur traders, missionaries, surveyors, explorers, prospectors, etc. and, nearer to civilization, railway builders, common-road makers, lumbermen, bush-rangers, and settlers."<sup>12</sup>

The root causes of these fires were campfire escapes as well as the deliberate firing of the forest to create a supply of dry fuelwood, to drive off bothersome insect pests, to signal other parties, to promote the growth of grass for forage, and to remove vegetative cover to facilitate hard-rock prospecting.<sup>13</sup>

While forest fires were not new to British Columbia, their number and size assumed greater proportions with the advent of the Europeans. Geologist Dawson decried the consequences of the fires of the 1800's, citing the destruction of timber, creation of masses of deadfall, and marring of the fine mountain scenery. He added that:

"These destructive fires in most cases arise through sheer carelessness or wantonness and the most stringent measures should be taken to prevent them before it is too late. As the class of persons most careless in this respect is generally that least desirable to retain in any country, the authorities would find the respectable portion of the community in full sympathy with them in any measures adopted to check this evil."<sup>14</sup>

Such sentiments, however, might have been disputed by two prominent explorers of the Rocky Mountains, Sir James Hector and his companion Robert Sutherland. The former was a geologist and M.D. who discovered and named the Kicking Horse Pass while associated with the Palliser Expedition. When returning to their camp on September 13, 1858 the two found that their campfire of two days previous had escaped into the timber, resulting in a disturbed sleep

and a difficult exit from the valley the next day.<sup>15</sup>

Forest fires in remote areas may have caused little concern amongst the dispersed and sparse population and indeed many fires, especially those caused by lightning, no doubt burned undetected. At the other end of the spectrum, certain years clearly stand out as being times of peril and destruction.

A case in point is the late summer of 1868 when very droughty conditions prevailed on the west coast of North America and many forest fires broke out from the usual variety of causes. "Dark days" during September of that year necessitated the use of artificial illumination in the Pacific Northwest states and coastal navigation was made unsafe due to the pall of smoke.<sup>16</sup> British Columbia was similarly affected by fires as far north as the Skeena River and it was concluded that no summer previous to 1868 had destroyed as much timber.<sup>17</sup>

Forest fires followed in man's wake all through the province in the 1800's, beginning with the traders and explorers of the North West and Hudson's Bay Companies as well as the prospectors of later years. Over a period of six decades

"...British Columbia has lost by fire about seven hundred billion feet of merchantable timber, more than now exists in the whole of Canada, enough to supply the whole Canadian domestic and export demand for over one hundred years. There is no record in history of such a loss as the fire loss of British Columbia during the past two generations.<sup>18</sup>

#### Stirrings of Concern

The significant amount of forest destruction by fire could

hardly escape notice nor fail to arouse concern, if not in the minds of the general public then at least in the Legislative Assembly. The result was the first forest protection law in the province, the Bush Fire Act of 1874.<sup>19</sup> This particular legislation provided for a fine up to one hundred dollars, or imprisonment to a maximum of three months in default of payment, for each particular offence.

The Act dealt with private as well as Crown land - persons leaving open fires burning on either forested private or Crown land during the months of June to September inclusive were liable to prosecution should the fire result in any damage. Additionally, fires set on one's own land at any time which escaped to any adjoining private or public property "by reason of gross carelessness and negligence"<sup>20</sup> and caused damage or destruction of timber constituted another form of offense. As promising as the Act appeared, a suspending clause was included which stated that the law would not be enforced unless at least two-thirds of the settlers in a particular district petitioned the Lieutenant - Governor in Council to that effect.<sup>21</sup>

The need for care with fire in wooded areas was brought to the fore by the 'Great Fire' of Vancouver on June 13, 1886. Spawned by numerous land clearing fires to the west, the fire sprang to life on a sudden and nearly gale-force wind, advanced on the city and virtually destroyed it in a matter of minutes. Significantly, the Bush Fire Act was amended in April of the next year and given province-wide application.<sup>22</sup>

By this time the basis of provincial forest land tenure policy had been established. Governor James Douglas' Land Proclamation of 1859 specified that trees were included in the conveyance of land alienated by purchase and Crown grant unless otherwise announced at the time of sale.<sup>23</sup> The Land Ordinance of 1865 marks the origin of the policy of granting timber cutting rights on Crown land without alienating the land itself.<sup>24</sup> This Ordinance permitted the granting of Timber Leases to enable forest harvesting operations.<sup>25</sup>

Legislation as early as 1884 forbade the sale of timber lands but owing to the lack of an administrative staff, the attitude of the public that standing timber had no value, and subsequent muddled legislation, timber land continued to be sold.<sup>26</sup> Also of note at this time were the 6.4 million hectares of land granted in aid of railway construction, nearly all of which was located in the Railway Belt and Peace River Block, both administered by the Dominion government until 1930.

Timber Licences of 405 hectares in size were introduced in 1884 to meet the needs of independent loggers.<sup>27</sup> These were to become the most important form of timber disposal by the time of their discontinuation in 1907.<sup>28</sup> The introduction of new forms of tenure continued but the general policy of Crown retention of the ownership of the land itself remained in effect.

#### The State of the Lumber Industry

The first sawmills in the province began operation in the early

1850's and produced lumber for domestic use as well as for an embryonic export market. The Fraser River gold rush of 1858 resulted in a burgeoning population and an increased demand for wood products, thus a number of mills were established on Vancouver Island and the mainland.<sup>29</sup> During the next two decades the industry expanded in response to a developing market in the Pacific Rim and Europe.<sup>30</sup>

Early logging was concentrated near the coastal shoreline and relied solely upon manpower and ingenuity to get the large prime quality trees into the water for transport to the mill. Handlogging was supplemented by the bull team and skidroad method beginning in the 1860's<sup>31</sup> but neither method made large inroads into the forest resource.

The construction of the Canadian Pacific Railway in the early 1880's created a demand for lumber but also gave rise to communities and, most importantly, provided lumbermen in the interior of the province with access to the prairie market. The arrival of the railroad at Burrard Inlet brought boom times to the coastal communities as well.<sup>32</sup>

But the completion of the Canadian Pacific Railway in 1885 introduced another potential source of forest fires in the form of the steam locomotive. Accordingly, the Bush Fire Act was redrafted (based largely upon the 1887 forest protection legislation of Ontario<sup>33</sup>) and an improved version was enacted in 1896.<sup>34</sup> This new legislation was concerned with the definition of fire districts

and the proper care and use of fire within those districts, be it for land clearing or other purposes. Locomotive engines were required to have spark-arresting equipment and their operators were required to exercise certain precautions. The Act was enforceable by Government Agents, Gold Commissioners, Timber Inspectors, Forest Rangers, Mining Recorders, and Provincial Police Officers or Constables.<sup>35</sup>

#### The First Fire Rangers

The expanding logging industry was embracing new technology such as the steam donkey engine, first used in B.C. by the Moodyville Company in 1897,<sup>36</sup> and the woods steam locomotive, reportedly employed at Chemainus in 1900;<sup>37</sup> both of which caused their share of forest fires. The Bush Fire Act provided for penalties but was in essence of little benefit due to the lack of

"...an adequate organization for enforcement....The prevailing attitude of the public, and particularly of the lumbermen, prospectors and settlers, whose lives were spent in the forests, was that fires were inevitable and frequently more beneficial than otherwise. The popular belief that the supply of timber was inexhaustible was expressed in the cheapness of stumpage. Unless his equipment was destroyed, the lumberman considered the damage occasioned by forest fire as negligible."<sup>38</sup>

Concerned citizens throughout the province reportedly petitioned the government regarding the annual losses to forest fires and requested that preventative measures be adopted. A special committee of the Vancouver Board of Trade estimated in 1904 that the loss of potential government revenue as a result of forest fires of that year alone was at least \$500,000 and recommended the passage of

a new Bush Fire Act "entirely more drastic in its provisions, and better calculated to meet the exigencies of the case."<sup>39</sup> The committee suggested that this new legislation should provide for the appointment of a full time chief fire warden who would oversee a staff of fire rangers employed during the summer fire season to gather information on the extent of forest fires; to grant fire permits to the public to control the number of open fires; and to suppress forest fires, with the enlisted aid of the public if required.

Similar resolutions were passed at the sixth annual meeting of the Canadian Forestry Association, held in March of 1905 in Quebec City.<sup>40</sup> This Association was formed in Ottawa on March 8, 1900 and counted among its founding members the Hon. Sir Henri Joly de Lotbiniere (soon to become the Lieutenant-Governor of British Columbia); Elihu Stewart, the Dominion Superintendent of Forestry; Professor John Macoun of the Dominion Geological Survey; and R.H. Campbell of the Department of the Interior.<sup>41</sup> The objectives of the association were described as:

"The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; reforestation where advisable; tree planting on the plains and on the streets and highways; the collection and dissemination of information bearing on the forestry problem in general."<sup>42</sup>

The influence of George Perkins Marsh, the pioneer observer of modern man's destructiveness of nature,<sup>43</sup> is evident in a 1905 paper

by the Dominion Superintendent of Forestry, Elihu Stewart.<sup>44</sup> Citing the role of forests in the conservation of the water supply and the impending timber famine, Stewart called for the adoption of a "comprehensive forest policy" and the establishment of a provincial "forest fire ranging service" similar to that used on Dominion forest lands in the west since 1900.

Changes in the legislation relating to forest land tenure in 1905 made Special Timber Licences renewable and transferable,<sup>45</sup> precipitating a staking rush on vacant Crown timber land. Interest in the forests of the west coast was fueled by the exhaustion of the eastern pine forests, the construction of the Panama Canal, and a healthy lumber market.<sup>46</sup> The number of licences went from 1,451 to over 15,000 in a period of three years.<sup>47</sup>

The government was motivated to introduce this modified Special Timber Licence by a semi-stagnant economy; the abundant forest resources were essentially locked-up and could not provide adequate revenue to a young province in need of funds for development.<sup>48</sup> Rampant speculation in the staking of the licences led to an Order in Council of December 24, 1907 which prohibited all forms of temporary alienation of timber.<sup>49</sup> The desire of increasing government revenue had been fulfilled in the meantime through annual rental charges,<sup>50</sup> with revenues rising from \$455,366 in 1904 to \$2,785,807 in 1908.<sup>51</sup>

This boom period of timber staking between 1905 and 1907 had two important consequences for forest protection. It increased the amount of land for which timber cutting rights were held by a factor of ten, to

3.6 million hectares. This was in addition to Crown Grants and Timber and Pulp Leases which contained from 128 to 171 million cubic metres of timber.<sup>52</sup> The need for fire protection thus was seen to assume greater importance in order to protect the interests of those holding timber rights. Secondly, the government now had a much increased sum of money to allocate where it deemed necessary and could finance such measures.

The year 1905 saw the first appointment of a protection organization to enforce the provisions of the Bush Fire Act. Four Fire Wardens were appointed, three in the southeastern portion of the province and one on the coast near Vancouver. Employed by the Lands Branch of the Department of Lands and Works, this initial forest protection force was allocated \$2,719, of which \$1,473 was spent on fighting fires during the fiscal year ended June 30, 1906.<sup>53</sup>

Lumbermen pointed out that the system in use emphasized fire prevention and that while unlimited numbers of Fire Wardens could be appointed to enforce the law, no power was given them to conscript fire fighters at government expense to combat fires already underway. Such inadequacies had prompted a group of timber limit holders in the Kootenays to consider forming a cooperative fire protection unit. It was suggested that the government "would display good business sense" if it allocated monies during the summer months to protect the province's timber, for the sake of the revenue which accrued to the government as well as the lumber industry.<sup>54</sup>

The matter of forest protection against fire was given serious

consideration at a convention of the Canadian Forestry Association held in Vancouver in September of 1906. During his opening remarks Premier Richard McBride emphasized that:

"The first duty of British Columbians is the preservation of the forests, and the economical operation of the lumber industry."<sup>55</sup>

This theme was later continued by the Commissioner of Lands and Works, the Hon. R.F. Green who considered

"...the work undertaken by the Canadian Forestry Association as patriotism of the highest quality. Your work, gentlemen, as it presents itself to my mind, is essentially a labour of love, in which self interest has no place, your whole aim being the protection and perpetuation of the forests of Canada for the use and benefit of future generations."<sup>56</sup>

The Commissioner then described how the forest fire prevention and fire fighting work of the provincial Fire Wardens as well as those of the Dominion in the Railway Belt, had produced gratifying results. However, the cooperation of the public would be essential for the continued success of the program:

"The vigilance of an army of forest rangers would prove inadequate to prevent the occurrence of fires without the sympathy and assistance of the community. Eternal vigilance on the part of every man, woman, and child in British Columbia is necessary to prevent our woods from suffering the scourge of fire, and in order to create a general interest in the subject of forest preservation the people must be educated to a sense of the importance to the future of the country....The school children should be enlisted in the army of foresters and taught that the wanton destruction of a tree is a crime against society."<sup>57</sup>

The convention passed a series of resolutions urging the provinces to enact more stringent regulations regarding the use of fire in forested regions. Several suggestions made by the Associated Boards of Trade at a meeting held in Cranbrook in

February of 1906 were endorsed and recommended to the government. One of these was that land owners and timber holders should pay a part of the expenses incurred in forest fire prevention and suppression.<sup>58</sup>

As the revenue accruing to the government from timber charges increased, so did the expenditures on the Fire Warden service. The initial force of four wardens grew to thirty-seven within two years and a number of assistant wardens were also appointed. These men had specific areas to patrol, within which they posted copies of the Bush Fire Act and handbills urging the proper care and use of fire in the woods. When fires could be caught in their incipient state suppression action was taken and the assistance of others solicited.

This forest protection force made rapid growth, especially after 1907, and in 1911 reached its maximum size with a staff of 123. By this time the province had been divided into two sections of six Mountain and four Coast Divisions, each headed by a Divisional Fire Warden. Within these Divisions were a total of 110 Patrol Districts, each of which was manned by a District Fire Warden.

With large territories to patrol by foot, horseback, and coastal motor launches, the patrols were of necessity extensive rather than intensive and no doubt action was taken on many fires only after they had been burning for some time.<sup>59</sup> The wardens were referred to as "wandering patrolmen who were hard to find in any emergency" but they did serve to spread the gospel of forest protection, put out forest fires which were within their

capabilities, and to supervise the controlled burning of logging slash and other debris.

Forest Protection by the Dominion Government

Under the conditions of entry into Confederation, the province of British Columbia ceded to the Dominion of Canada a total of 5.8 million hectares of land in support of the construction of the transcontinental railway - the majority as the Railway Belt following the C.P.R. line, most of the remainder as the Peace River Block. In 1883 the federal government assumed responsibility for settlement and resource use on all unalienated lands in the Railway Belt but the Peace River Block was not selected until 1907.<sup>61</sup> Suitable land in the Railway Belt was reserved for homesteads to encourage ranching and farming while other areas were set aside as Glacier Park (1888), Yoho Park (1902), and the Long Lake Forest Reserve (1902).

The Forest Reserves Act of 1906 allowed for the creation of Dominion Forest Reserves on federal lands:

"...in order to protect and improve the forests for the purpose of maintaining a permanent supply of timber, to maintain conditions favourable to a continuous water supply, and to protect, so far as the Parliament of Canada has jurisdiction, the animals, fish and birds within the respective boundaries of such reserves, and otherwise to provide for the protection of the forests...."<sup>62</sup>

All lands within the reserves subject to the Act were withdrawn from sale, settlement, and occupancy and could not subsequently be occupied or alienated except as provided for in the regulations.

The Superintendent of Forestry in the federal Department of the

Interior was given control and management of the Dominion Forest Reserves, with the Governor in Council able to make regulations "for the maintenance, protection, care, management and utilization of such reserves."<sup>63</sup> Six forest reserves were created in 1906 in the Railway Belt, and an additional four in 1913 for a total of one million hectares.<sup>64</sup>

Two separate organizations within the Dominion Forestry Branch of the Department of the Interior were responsible for forest protection work on Dominion lands; one for the forest reserves and the second for the forest land outside of reserves. This protection force was similar in structure to that of the B.C. Department of Lands - a number of fire rangers in reporting to a district supervisor.

The rangers patrolled their individual districts, which varied in size in relation to "the fire risk and accessibility to movement of the general public."<sup>65</sup> During periods of low forest fire hazard the rangers carried out improvement work such as the building of roads and trails, communication lines, and cabins.

The need to convey the fire prevention message to the nation was challenging, given the diverse origins of the Canadian population:

"Thirty thousand fire notices giving warning of the danger of fire, in English, French, German, Icelandic, Galician, Indian (Cree and Chipewyan), Norwegian, Russian, Hungarian, Hindu, Japanese and Chinese, were distributed and posted throughout the fire ranger's districts. Two hundred thousand copies of a small pamphlet explaining the danger of fire, the chief provisions of the Fire Acts, and the best methods of fighting fire, were distributed in English, French, Ruthenian, German, Norwegian, Hungarian, Swedish and Russian."<sup>66</sup>

The provincial regulations also applied to the Dominion Forest Reserves within the provinces, and therefore the federal rangers enforced the provincial Bush Fire Act and its successors.

In 1918 the average area patrolled by each fire ranger in the Railway Belt varied from 37 000 hectares in the forest reserves to between 38 000 and 51 000 hectares on other forested land. A federal Fire Protection Tax of 2.4 cents per hectare on lands under licence or permit provided operating funds for the protection force.<sup>67</sup>

The forest protection work of the Dominion Forestry Branch continued until 1930 when the Railway Belt and Peace River Block were conveyed back to the province.

#### The Fulton Royal Commission on Forestry

Conservation themes continued to occupy the minds of politicians, lumbermen, and other businessmen, and those engaged in forestry work. Dr. Judson F. Clark, a partner in the Vancouver forestry consulting firm of Clark and Lyford (and formerly the Provincial Forester of Ontario) delivered an address to the Canadian Club of Vancouver on December 16, 1908. To an audience "representing strongly the business element of the city"<sup>68</sup> Clark equated the practice of forestry with forest conservation, the purpose of the latter being to maintain forests for their role in improving the climate; as national playgrounds; as the crop most suitable to some lands; as producers of wood for industry; and as conservers of streamflow.<sup>69</sup>

Clark outlined the first steps needed to embark upon a forestry program as the development of a policy to utilize the timber in the forested vacant Crown land under reserve; the formulation of equitable tenure and taxation regulations; an inventory of provincial forest resources; and the establishment of a forestry bureau to administer the programs. The province's forest revenue and the equity represented by the standing timber demanded a forest fire protection force second to none:

"Besides, protection from fire is not only the corner stone of all forest policy, but it is the whole foundation of practical forestry."<sup>70</sup>

The need for fire prevention had again become front page news with the destruction of Fernie on July 30, 1908. A forest fire swept into the town and reduced the majority of it to rubble and ashes in the space of ninety minutes. This, plus destructive fire seasons in the immediately previous years were cause for public concern.<sup>71</sup> Concurrently, lumbermen had been debating the matter of the terms of Special Timber Licences and pressing for decisions. For its part, the government had received considerable forest revenue yet was unsure of what particular forestry goals to set.<sup>72</sup> These issues coupled with

"...the necessity of putting into practice the new doctrine of conservation as applied to forest resources demanded the appointment of a special board of investigation...."<sup>73</sup>

namely the Royal Commission of Inquiry on Timber and Forestry, chaired by the Hon. Fred. J. Fulton, which came into being on July 9, 1909.

The Commission carried out its investigations during the latter part of a boom period in the B.C. economy, led largely by the lumber industry.<sup>74</sup> The terms of reference were sufficiently broad to cover almost any pertinent subject but included specifically forest preservation and the prevention of forest fires.<sup>75</sup>

The Commissioners attended the First National Conservation Congress in Seattle, Washington from August 26 to 28, 1909. In an address to the congress one of the leading proponents of conservation, the United States Forest Service's Chief Forester Gifford Pinchot, outlined the "three great primary objects" of conservation as being the development of natural resources for current benefits; the prevention of needless waste and destruction of resources to ensure future prosperity; and the development and protection of resources for the welfare of the many rather than the profit of the few.<sup>76</sup>

The Commission held hearings in various parts of the province for over a year and it was security of tenure for licences which occupied the bulk of their time.<sup>77</sup> Nevertheless, forest protection from fire was a common concern and the majority of witnesses, regardless of background, felt that the government and lumbermen should equally bear the costs.<sup>78</sup>

Logging methods, the question of disposal of logging slash, fire prevention, and reforestation were other items of concern, often overlapping. The creation of large areas of logging slash constituted a fire hazard which jeopardized the young growth, thus

emphasizing the need for fire prevention. Natural reforestation was expected by the majority of witnesses,<sup>79</sup> such as Supervisor of Scalers Andrew Haslam:

"...nature will attend to it on a much grander and more comprehensive scale than is possible by the people of B.C. but the Government must see to it that the efforts of nature are not made useless by the inroads of fire."<sup>80</sup>

Even with careful disposal of slash by burning, reforestation could be expected, as described by lumberman E.J. Palmer of Chemainus:

"If the lands are properly burned over they will reforest themselves, and it is very important to burn old slashings in the Autumn, winter or spring, and thereby remove the most serious menace to standing timber."<sup>81</sup>

In its final report the Commission happily noted that the government had appropriated monies to forest protection over the previous few years and stated that large expenditures for this purpose were justified because of the magnitude of both public forest revenue and that of the lumber industry.<sup>82</sup> As natural conditions were considered to be conducive to natural reforestation, a permanent yield of lumber would be possible as long as fire was controlled:

"Protection from fire is thus the supreme need of our forests; and to secure it the most thorough-going methods are demanded."<sup>83</sup>

The methods suggested included a government organization of fire wardens operating in the hazardous months under the direction of permanent forest rangers and superintendents to be engaged in patrol of wooded areas. The costs of this work were to be divided equally between the government and the holders of timbered lands, the latter

being assessed in proportion to their holdings. The government would have to assume the total cost of protecting the unalienated forest land still vested in the Crown.

The prevention of fires was also stressed, one method being the avoidance of creating areas of high fire hazard such as the accumulations of debris which followed logging. Concern for future forest crops was foremost:

"That the young timber, upon which our whole future as a lumber-producing country depends should be left, at the pleasure of any thoughtless workmen, to grow up amid the tangled wreckage of lumbering, under the imminent menace of fire so heavy that it may serve to destroy not only reproduction but even the soil that makes the growth of valuable species possible, is so absurd, commercially, that an attempt at regulation is imperative."<sup>84</sup>

The commissioners therefore recommended that the tops, branches, and other debris of logging be disposed of, presumably by controlled burning although the methods were not detailed, to reduce the hazard of fire "to the satisfaction of the officers of the Department of Forests."<sup>85</sup>

#### Railway Fire Prevention

The fact that coal and wood-fired steam locomotives were the cause of many forest and brush fires was recognized in the original Railway Act of 1903.<sup>86</sup> This legislation provided for the establishment of the Board of Railway Commissioners for Canada, whose purpose was to design and issue regulations dealing with "fire-protective appliances on locomotives" and the "construction and maintenance of fire-guards."<sup>87</sup> The intent of the Railway Act

was that the railways themselves should assume the responsibility for protecting the public against property losses from railway-caused fires.<sup>88</sup>

Standards were issued by the Board of Railway Commissioners in July of 1907 as Order No. 3245 with respect to the prevention of fires by the careful operation of railways. However, provisions requiring the clearing of railway rights of way did not apply to British Columbia and, prompted by the preliminary report of the Fulton Royal Commission, the provincial government in 1909 made an application to the Board for the issuance of stricter regulations.<sup>89</sup>

Railways had proven to be a two-edged sword. They opened up the hinterland and provided access to the lumber market of the prairie provinces but also caused the destruction of many of the forests along their routes, not only during the construction phase but in the course of normal operations as well. That this required special action was noted by those appearing before the Fulton Royal Commission; such as one witness who referred to the forthcoming construction of the northern link:

"Unless there are regulations as to the construction of the Grand Trunk Pacific that whole country is going to be burned up. It is virgin forest and very inflammable. There should be special legislation. A great deal of timber is going to be burned up."<sup>90</sup>

The Commissioners recommended that patrols follow each train through wooded districts in the dry months, that rights of way be cleared of debris, that efficient spark arrestors be employed on

locomotives, and that oil fuel should be adopted where possible.<sup>91</sup> The Fire Wardens of the Department of Lands were empowered to act as officials of the Board of Railway Commissioners and to enforce its regulations.<sup>92</sup>

The concerns expressed in the 1909 submission of the British Columbia government to the Board were shared by both the Commission of Conservation of Canada and the Dominion Forestry Branch. The Railway Act was amended in 1911 to give the Board wider powers<sup>93</sup> and following hearings in Ottawa and Toronto, a new set of regulations known as Order No. 16570 were issued on May 22, 1912.<sup>94</sup>

These were technically very detailed and as well provided for the maintenance of a force of fire rangers by the railway companies, with all work being subject to the supervision of the Chief Fire Inspector of the Board of Railway Commissioners. The prevention of railway-caused forest fires was considered to be essential to the public interest as well as good policy for the railways:

"...since forest fires will inevitably result in a future decrease of freight and passenger traffic, as well as in raising the price of ties and other wood products which the railway companies must purchase for their own use."<sup>95</sup>

Cooperative railway fire prevention plans were drawn up in June of 1912 between the Dominion Forestry and Parks Branches of the Department of the Interior, the British Columbia government, and the railway companies. The objective was to provide an efficient means of fire prevention at minimal cost to the railways themselves.<sup>96</sup>

Instructions were given regarding the type and frequency of patrol

required for specific sections of track, either under construction or in operation.

The board periodically re-issued the basic regulations, but the ever-increasing use of oil as a locomotive fuel was gradually reducing the risk of railway fire starts. The use of oil fuel seems to have been pioneered in British Columbia - in 1914 oil was used exclusively on 1 170 kilometres of Canadian track, all within British Columbia.<sup>97</sup> By 1918 this provincial figure had more than doubled<sup>98</sup> and within a decade special railway fire patrols were no longer required, these duties having been assumed by regular section crews.<sup>99</sup>

The Forest Act and the British Columbia Forest Branch

Following the submission of the report of the Fulton Royal Commission in November of 1910, plans were made for the establishment of a special government department to oversee all aspects of forestry and the required enabling legislation was drafted. In the meantime the Department of Lands continued its duties of timber inspection, royalty collection, and forest protection.

Following a disastrous fire season of 1910 and no doubt anticipating the imminent creation of the Forest Branch, the Minister of Lands, the Hon. W.R. Ross, met with representatives of the Canadian Pacific Railway and the Mountain Lumbermen's Association at Cranbrook in September of 1911. The purpose of the meeting was to consider forest protection needs such as cooperative

fire prevention, improved and more comprehensive tactics of dealing with the fire danger, and the problems of logging slash disposal.<sup>100</sup> He concluded his remarks by saying:

"My ambition is to see British Columbia take the lead in modern forest legislation (sic) and to establish a new record, the best, for the preservation of timber from the destruction by fire. I believe that this can be done most effective (sic) by energetic and honest co-operation of the interests affected, and I can assure you all that a government can do by careful and thorough legislation (sic), by the establishment of a really efficient fire preventative service, and by earnest efforts to educate public opinion - I assure you that all this will be done gentlemen, earnestly and always by the government of this province."<sup>101</sup>

These sentiments were expressed again by Ross in a speech to the Legislative Assembly on January 23, 1912 on the occasion of the second reading of 'The Forest Bill.' He reviewed how his government had recently given

"...an enthusiastic welcome to the conservation movement, of which its own policy was an effective interpretation; it did not confine itself to mere talk, but at once began to carry out its ideas in a practical manner. The great essential of forest conservation was the prevention of fire, and this the Government first attacked, both by putting on a force of fire wardens and by fighting fires."<sup>102</sup>

Forest fire prevention was necessary in the opinion of the Minister, or "reafforestation" and the permanence of the lumber industry were just idle dreams.<sup>103</sup>

The Forest Act<sup>104</sup> was assented to on February 27, 1912 and while it was neither altogether new nor particularly innovative<sup>105</sup> it did bring about important changes in forest protection methods. Part IX of the Act dealt with fire prevention and contained greatly expanded legislation dealing with railway operations<sup>106</sup> and

slashings or other debris.<sup>107</sup> The foundations of legislated cooperative forest protection were laid down by the creation of the Forest Protection Fund,<sup>108</sup> which was independent of other government finances. Owners of timber land as defined by the Taxation Act and holders of Timber, Pulp, and Tan-bark Leases or Special Timber Licences were required to pay an annual tax of 2.4 cents per hectare of land, due on the first day of February.

The Crown was required to match these contributions out of revenue and the total sum obtained went to the Forest Protection Fund. Monies thus derived were to be used exclusively to maintain and equip a fire patrol and prevention force; to construct trails, lookouts, phone lines, and other improvements; and to enlist assistance in suppressing forest fires when necessary. Provided that certain conditions were met, the Fund could also be used to pay for one-half the costs of extinguishing fires on lands subjected to forestry operations.<sup>109</sup>

The British Columbia Forest Branch authorized by the Forest Act of 1912 was soon organized under Chief Forester H.R. MacMillan. He viewed the Branch's mandate to be:

"...the protection, improvement and wisest use of the forests of this province. Those who know British Columbia best know that the future prosperity of the population depends upon the permanency of the forest industries."<sup>110</sup>

These sentiments were reiterated in the first Annual Report of the Forest Branch,<sup>111</sup> although MacMillan also noted there that

"The annual growth of the forests of British Columbia is even now, before they are either adequately protected from fire or from waste, certainly not less than five times the present annual lumber cut."<sup>112</sup>

The separate Timber Inspection, Scaling, and Protection Branches of the Department of Lands were assimilated into the new Forest Branch, within which forest protection, personnel, purchasing, and planning were the functions of the Operations Division. With a stronger mandate and more funds to devote to forest protection the staff of the Forest Branch was quickly augmented.

Using monies from the Forest Protection Fund the Fire Wardens continued with their work of patrolling, fire fighting, and controlled burning of accumulations of debris. The wardens were expected to spend most of their time in "constant and unceasing patrol" of their districts, visiting the "danger points" more frequently.<sup>113</sup> In addition they educated the public to the danger of fire and constructed roads, trails, phone lines, lookout stations, cabins, boat houses, and tool caches.<sup>114</sup>

Patrol was still necessarily primitive - by foot, horseback, bicycle, boat, coastal launch, and railway speeder. With large areas to cover, the cooperation of the public was sought by appealing to their "pride of citizenship."<sup>115</sup> Signposts and mileage markers alongside roads and trails carried copies of the fire prevention regulations and slogans such as:

"Our forest industry, though only thirty years old, supports 150,000 people."

"Small fires cost nothing to put out. Big fires cost money - your money."

Schools and public movie theatres were supplied with material illustrating the value of the forest and the need to protect it.

Even whetstones supplied to loggers and sportsmen bore fire prevention messages.<sup>116</sup> Notices were posted in industrial camps, post offices, hotels, and general stores, and at campsites.

On the assumption that logging slash was "bound to burn sooner or later"<sup>117</sup> and that it would be best to burn it at the proper time and with due care, such disposal was invited by circular letters to lumbermen from the Chief Forester encouraging the burning of slash to protect the remaining timber and enable the establishment of a second crop.<sup>118</sup> Compulsory slash burning as existed at the time in Pacific Northwest states of Washington and Oregon was not imposed upon the lumbermen of B.C. due to the "unsatisfactory condition of the lumber industry" and a lack of knowledge regarding the effects of fire in the various forest types.<sup>119</sup>

However, where the accumulation of flammable debris was judged to be a threat to life or the safety of property, the Minister of Lands or the Forest Branch could instruct the landowner to "immediately remove or abate such nuisance."<sup>120</sup> In the more open forests of the interior of the province, piling and burning of debris or lopping and scattering of the branches was often carried out as the accumulations were much less than on the coast.

Protecting the forest from the depredations of fire continued to be a major concern of the Forest Branch during its first decade of operation. Fire patrols and improvement work expanded with support from the Forest Protection Fund, which gradually increased along with the area-based levy. The policies and procedures which existed

in 1912 at the time the Forest Branch was created were continued without major change. At the same time the Branch's horizon broadened to embrace land classification, forest surveys, forest investigation, grazing, forest insect damage and control, wood products research, and promotion of the export market.

The activities and efficiency of the forest protection force varied with the severity of each fire season and during World War I the staff was severely reduced by enlistments. The spring of 1917 saw the formation of two Forest Protection Boards, one each for the coast and interior regions. This was done in response to appeals by the lumbermen to have some voice in the administration of the Forest Protection Fund. The Boards were composed of representatives from the loggers and lumbermen, the Chief Forester and other members of the Forest Branch, and were chaired by the Deputy Minister of Lands.<sup>121</sup> The Boards made recommendations regarding the work being carried out and promoted cooperation between government and industry.

#### The Commission of Conservation of Canada

At the first annual meeting of the Commission of Conservation held in January of 1910, the Chairman, the Hon. Clifford Sifton, outlined the aims and objectives of the Commission. The maintenance of forest cover was deemed to be beneficial in conserving and regulating the water supply and in providing for the prosperity of the country.<sup>122</sup> Consequently forest fire prevention, and especially the avoidance of repeated burning which is so destructive

of the soil, represented a mandatory prerequisite to forestry.<sup>123</sup>

Forest investigative work in British Columbia was begun by the Commission in 1913.<sup>124</sup> Dr. Clifton D. Howe of the Faculty of Forestry at the University of Toronto studied forest regeneration in relation to fire on the south coast. He determined that repeated fires on the same site would lead to tree barrens, but that a single moderate burn would favour the establishment of Douglas-fir, a preferred timber species.<sup>125</sup>

Three years of study lead to the publication in 1918 of the first comprehensive examination of British Columbia's forest resources.<sup>126</sup> The authors, Dr. H.N. Whitford and R.D. Craig, concluded that two-thirds of the province's forests had been totally destroyed by fire and over one-half of the remaining timber had been likewise damaged.<sup>127</sup>

During its existence from 1909 to 1921 the Committee on Forests of the Commission of Conservation addressed the national problems of fire prevention, railway fires, debris disposal, timber utilization, land classification, tree planting, forest surveys, and scientific studies. The popularization of conservation ideals was one of the Commission's main efforts and by 1917 the theories had taken root, prompting the Chairman of the Commission to conclude that

"...the time has arrived when we need no longer devote time and attention to arousing interest in the subject of conservation. We shall henceforth be able to devote ourselves more exclusively to the work of investigating and advising on the attainment of ends which are universally commended as essential to the highest degree of national welfare."<sup>128</sup>

Developments After World War I

As the Forest Branch regained its strength following the Great War, a number of developments took place which were to assume importance later during the 1920's and lay the foundation for forestry activities which are today considered to be a matter of course. Following along the lines of investigation established by Dr. C.D. Howe's 1913 study, concern was expressed for the adequacy of the rate and amount of natural reforestation taking place in the province.<sup>129</sup> The need for silvicultural treatments on a "solid scientific basis" was evident and could be met by carrying out studies on reforestation, forest conditions, and forest growth and yield.<sup>130</sup> An article which appeared in August of 1920 continued this discussion by emphasizing the damage done by repeated fires. The control of fire would largely solve the problems associated with natural regeneration, and is a more economical alternative to large-scale planting,<sup>131</sup> although some doubt lingered as to the correct choice:

"There are numerous places which must remain barren for centuries unless planted and if these are particularly well situated or a forest cover is necessary for the protection of watersheds, planting should be resorted to. Looking at the problem in a broad way, however, the question naturally arises as to whether the money could not be more advantageously spent in encouraging and protecting natural reproduction."<sup>132</sup>

In an overview of the need for research in forestry the Chief Forester of the Forest Branch, Peter Z. Caverhill, considered "silvical investigation" to be of especially

"...vital importance to the future of the industry; if we are to stop treating our forest land as a mine to be developed along the lines of least resistance and to realize that the forest is a crop that reproduces and grows in accord with natural laws and that this crop may be destroyed or improved according to the treatment of the site just as other field crops are improved with cultivation."<sup>133</sup>

While the field of vision was expanding away from the basic activities of forest harvesting, revenue collection, and forest protection, these areas were not being reduced in stature. Several technological advances of the post-war years brought about a radical improvement in fire fighting capability. The development of communication networks, the expanded use of the automobile, the portable gasoline-powered fire pump, and the use of the airplane for fire detection and materials transport were all products of this period.<sup>134,135</sup> Such advancements were cause for optimism:

"The success, however, of any scheme of forestry depends on the degree of success attained in fire control. Forest protection is the foundation on which all practical forestry is based. Give us forest protection and markets for our products, and other problems are only incidental."<sup>136</sup>

### Discussion

The end of the period under consideration here was fixed as 1921 as this represents the conclusion of three identifiable periods of natural resource policies in Canada. These covered the "doctrine of usefulness" from 1878 to the turn of the century; the early conservation movement; and the lifetime of the Commission of Conservation.<sup>137</sup> A number of recurring themes regarding forest protection against fire losses have their origins in the latter part of the 1800's but reached their greatest expression in the first two decades of this century.

The need to dispel the myth that both Canada's and British Columbia's forests were inexhaustible was emphasized in order to counteract the notion that the depredations of fire were of minor consequence to such a vast natural resource. The campaign to promote forest protection took on evangelical overtones when the "Demon of Destruction" or the "Fire Fiend" was singled out and roundly denounced.

Protection of the forests from fire was seen by lumberman, forester, and politician alike as the cornerstone and necessary first step towards a practical forestry program as well as the larger issue of natural resource conservation. Forests were needed to produce wood and other products, to support important industries, to provide governments with revenue, and to conserve waterflow. It is clear that forest fires were the bane of the lumber industry in the early period - one of the members of the Fulton Royal Commission described timber investments as "merely a gamble against the fire hazard."<sup>138</sup> Within a short period however, organized forest protection effectively transformed these gambles into "gilt-edged investments."<sup>139</sup>

While conservation of natural resources was the main subject of discussion for an extended period of time, the term "conservation" was rarely coherently defined. This brings to mind United States President William H. Taft's comment that "There are a great many people in favour of conservation no matter what it means." Indeed, as Marris contends, conservation was apparently used as a

smokescreen to disguise the real reasons for action, such as Crown revenue, lumbering profits, and security of forest land tenure.<sup>140</sup>

In the definitions of conservation that were made, concern for present and future benefits was a strong theme. Forester Clyde Leavitt of the Commission of Conservation considered that

"The fundamental idea of conservation is to secure the fullest possible utilization of all natural resources, avoiding all unnecessary waste, and so using those resources which are the result of growth that the supply will continue, adequate for the future needs of the people, instead of becoming exhausted."<sup>141</sup>

Lumberman E.J. Palmer of Chemainus held similar views:

"Our forests are a vast heritage handed down to the present generation, to a large extent in trust, for the use of the generation that is to follow, and it is true that we should make every effort to conserve that wealth as much as possible, but must not lose sight of the fact that we have the present generation to serve, and our policy should be one that will not only conserve to the coming generation what rightly belongs to it, but will at the same time increase the wealth of the present generation, supply its demands, and practise a practical economy in the handling of our forest products."<sup>142</sup>

Others such as A.C. Flumerfelt were more blunt:

"...conservation in British Columbia ought to be very different and a very business-like affair. That is what conservation means, at the bottom - the application of ordinary business principles to natural resources. It must be action and not mere talk; immediate action and expenditure of large sums of money."<sup>143</sup>

Even James White, the Assistant to the Chairman of the Commission of Conservation held a very business-oriented view:

"The Commission has never subscribed to the narrow interpretation which has often been placed upon the word 'conservation' and which has prejudiced many business men against the conservation movement. We have not now, and never have had, any sympathy with the extremist who

advocates the locking up of our resources and thus killing development. It has been the guiding principle of the Commission that the only proper way to conserve any resource is to develop it to the point of the highest productivity and with the maximum of efficiency and to use every means to maintain its productivity at that pitch."<sup>144</sup>

The motherhood aspect of conservation was ably illustrated by the Minister of Lands, the Hon. William R. Ross, in his speech to the Legislative Assembly on January 23, 1912:

"We raise ourselves today above our transitory interests of this week, this year; we glance down the vista of the years to come, and turning from that vision of the future, we call the world to witness that we legislate today, not only for ourselves and for the needs of this day and this generation, but also, and no less, for our children's children, and for all posterity - that we may hand down to them their vast heritage of forest wealth, unexhausted and unimpaired."<sup>145</sup>

These views of conservation fit squarely into the utilitarian and material doctrines espoused by such leaders of the American conservation movement as Gifford Pinchot.<sup>146</sup> Using Anthony Scott's definitions as a guide,<sup>147</sup> the protection of British Columbia's forests from fire qualifies as conservation because the concerns expressed centred upon rates of resource use, policies and actions of change, and future needs; dealt with a single renewable resource; and were largely based on physical rather than value terms. Protection against the depredations of forest fires was, in essence, the "right thing" to do. The physical magnitude of the problem was far in advance of the relatively meagre capabilities of the forest protection force and yet the cause was never abandoned. The policies and procedures established during this period continue to influence forest resource management today.

LITERATURE CITED

1. Richard E.M. Yerburgh, An Economic History of Forestry in British Columbia (Vancouver, B.C.: University of British Columbia, unpublished M.A. Thesis, 1931), pp.55 - 56.
2. F.D. Mulholland, The Forest Resources of British Columbia (Victoria, B.C.: King's Printer, 1937), pp.9 - 10.
3. Omer C. Stewart, "Fire as the First Great Force Employed by Man," in W.L. Thomas, Jr., ed. Man's Role in Changing the Face of the Earth (Chicago, Ill.: The University of Chicago Press, 1956), p.29.
4. David Watts, Principles of Biogeography (London: McGraw-Hill Book Co., 1971), p.335.
5. James Hatter, "Wildlife and People in Interior British Columbia," in The British Columbian: Product of His Environment, Transactions of the 13th British Columbia Natural Resources Conference (Victoria, B.C.: B.C. Natural Resources Conference, 1961), p.226.
6. Stewart, p.120.
7. Joan M. Vastokas, "The Importance of the Forest to the Northwest Coast Indians," Journal of Forest History, Vol. 13, No. 3, October 1969, p.16.
8. Arland S. Harris and W.A. Farr, The Forest Ecosystem of Southeast Alaska: Forest Ecology and Timber Management, U.S.D.A. Forest Service General Technical Report PNW-25 (Portland, Ore.: U.S.D.A. Forest Service, 1974), p.1.
9. Edward J. House, A Hunter's Camp-fires (New York, N.Y.: Harper and Bros., 1909), pp.389 - 390.
10. Harold J. Lutz, Aboriginal Man and White Man as Historical Causes of Fires in the Boreal Forest, With Particular Reference to Alaska, Yale University, School of Forestry, Bulletin No. 65 (New Haven, Conn.: Yale University, 1959), p.1.
11. George M. Dawson, "Preliminary Report on the Physical and Geological Features of that Portion of the Rocky Mountains Between Latitudes 49° and 51° 30'," in Annual Report, Volume 1, 1885, Geological and Natural History Survey of Canada (Montreal, Que.: Dawson Bros., 1886), pp.36B - 37B.
12. Robert Bell, "Forest Fires in Northern Canada," American Forestry Congress, Atlanta Meeting, 1888. 7 p. (reprint) (Cited by Lutz, 1959, p.43)

13. Lutz, pp.23 - 34.
14. Dawson, Loc. cit.
15. William L. Putnam, "Before the Beginning...The Earliest Ascents in the Canadian Rockies," Off Belay: The Mountain Magazine, No. 42, December 1978, p.12.
16. William G. Morris, "Forest Fires in Western Oregon and Western Washington," Oregon Historical Quarterly, Vol. XXXV, No. 4, December 1934, p.326.
17. William Shannon, "The Year of the Great Fire," The (Vancouver) World, October 3, 1906, p.13.
18. H.R. MacMillan, "The Forest Fire, A National Danger and its Remedy," The Canadian Magazine, Vol. XLIV, No. 6, April 1915, p.549.
19. Statutes of British Columbia: 1874, 37 Victoria, No. 22.
20. Ibid., Section 2.
21. Ibid., Section 3.
22. Statutes of British Columbia: 1887, 50 Victoria, Chapter 3.
23. Robert E. Cail, Land, Man, and the Law, The Disposal of Crown Lands in British Columbia, 1871 - 1913 (Vancouver, B.C.: University of British Columbia Press, 1974), p.92.
24. Gordon McG. Sloan, Report of the Commissioner Relating to the Forest Resources of British Columbia (Victoria, B.C.: King's Printer, 1945), p.Q86.
25. Peter H. Pearse, A.V. Backman, and E.L. Young, Forest Tenures in British Columbia, Policy Background Paper Prepared by the Task Force on Crown Timber Disposal (Victoria, B.C.: Queen's Printer, 1974), p.10.
26. Cail, pp.93 - 94.
27. Statutes of British Columbia: 1884, 47 Victoria, Chapter 16.
28. Pearse et al., p.11.
29. Joseph Collins Lawrence, Markets and Capital: A History of the Lumber Industry of British Columbia (1778 - 1952) (Vancouver, B.C. : University of British Columbia, unpublished M.A. Thesis, 1957), pp.4 - 10.

30. Ibid., pp.11 - 29.
31. F. Malcolm Knapp, "The Recent Application of Science and Engineering to Forestry," in Proceedings of the Fifth Pacific Science Congress, Victoria and Vancouver, B.C. (Toronto, Ont.: University of Toronto Press, 1933), Volume I, p.532.
32. Lawrence, pp.38 - 41.
33. Revised Statutes of Ontario: 1887, Chapter 213.
34. Revised Statutes of British Columbia: 1897, Chapter 84.
35. Ibid., Section 14.
36. Ed Gould, Logging, British Columbia's Logging History (Saanichton, B.C.: Hancock House Publishers, 1975), p.55.
37. Robert E. Swanson, "A History of Railroad Logging," in Loggers Handbook (Portland, Ore.: Pacific Logging Congress, 1973), Vol. 33, p.22.
38. H.N. Whitford and R.D. Craig, Forests of British Columbia (Ottawa, Ont.: Committee on Forests, Commission of Conservation, Canada, 1918), p.126.
39. British Columbia Lumberman, Vol. 2, No. 1, January 1905, pp.1 - 2.
40. Lumberman and Contractor, Vol. 2, No. 4, April 1905, p.7.
41. Robson Black, "Half Century of Endeavour," Forest and Outdoors, Vol. 46, No. 11, November 1950, pp.14 - 16.
42. James Elliot Defebaugh, History of the Lumber Industry of America (Chicago, Ill.: The American Lumberman, 1906), Volume 1, p.67.
43. George Perkins Marsh, Man and Nature, or, Physical Geography as Modified by Human Action (New York, N.Y.: Charles Scribner, 1864) Reprinted by the Belknap Press of Harvard University, Cambridge, Mass., 1974, passim.
44. Elihu Stewart, "Forestry in British Columbia," Lumberman and Contractor, Vol. 2, No. 11, November 1905, pp.12, 13, 23.
45. Cail, p.102.
46. Pearse et al., p.13.
47. Whitford and Craig, p.90.

48. William R. Ross, British Columbia's Forest Policy, Speech by the Minister of Lands on the Second Reading of the Forest Bill (Victoria, B.C.: Special Publication of the Legislative Assembly, 1912), p.3.
49. Sloan, p.Q94.
50. Robert Howard Marris, 'Pretty Sleek and Fat': The Genesis of Forest Policy in British Columbia, 1903 - 1914 (Vancouver, B.C.: University of British Columbia, unpublished M.A. Thesis, Dept. of History, 1979), p.29.
51. Fred. J. Fulton, A.S. Goodeve, and A.C. Flumerfelt, Final Report of the Royal Commission of Inquiry on Timber and Forestry 1909 - 1910 (Victoria, B.C.: King's Printer, 1910), p.D31. (Hereafter referred to as Fulton Report)
52. Whitford and Craig, p.90
53. C.D. Orchard, "Notes on Forest Protection," in C.D. Orchard Papers, Special Collections Division, The Library, University of British Columbia, Vancouver, B.C. Folder 6 - 9. n.d.
54. Lumberman and Contractor, Vol. 3, No. 9, September 1906, p.19.
55. Lumberman and Contractor, Vol. 3, No. 10, October 1906, p.26.
56. Ibid., p.28.
57. Ibid., p.29.
58. Ibid., p.27.
59. F.A. MacDonald, "A Historical Review of Forest Protection in British Columbia," The Forestry Chronicle, Vol. 5, No. 4, December 1929, p.31.
60. Report of the Minister of Lands for the Year Ended December 31, 1911, in Sessional Papers of British Columbia, 1912 p.G23.
61. Whitford and Craig, p.102.
62. Statutes of Canada: 1906, Chapter 14, Section 4.
63. Loc. cit.
64. J.H. White, "Forestry on Dominion Lands," in Clyde Leavitt, compiler, Forest Protection in Canada, 1913 - 1914 Committee on Forests, Commission of Conservation, Canada. (Toronto, Ont.: William Briggs, 1915), p.248.

65. Ibid., p.250.
66. R.H. Campbell, "Report of the Superintendent of Forestry," in Annual Report of the Department of the Interior for the Fiscal Year Ending March 31, 1911. Sessional Paper No. 25 (Ottawa, Ont.: King's Printer, 1912), p.4.
67. Whitford and Craig, p.148.
68. Western Lumberman, Vol. 6, No. 1, January 1909, p.18.
69. Dr. Judson F. Clark, "Conservation of the Forest Resources of British Columbia," in Canadian Club of Vancouver, Addresses and Proceedings, 1908 - 1909 (Vancouver, B.C.: News-Advertiser Printers, 1910), p.3.
70. Ibid., p.6.
71. C.D. Orchard, "A Course of Lectures on Forest Policy and Administration, Prepared for the Fourth Year Students in Forestry at the University of British Columbia, School Year 1963/64," (n.p., mimeo, 1964), p.343.
72. Marris, p.33.
73. A.C. Flumerfelt, "Forest Resources," in Adam Shortt and A.G. Doughty, eds. Canada and Its Provinces (Toronto, Ont.: Glasgow, Brook and Company, 1914), Archives Edition, Vol. XXII, Section XI, The Pacific Province, Part II, p.496.
74. Marris, p.6.
75. Fulton Report, p.D7.
76. British Columbia Royal Commission of Inquiry on Timber and Forestry, 1909. Originals, 1909 - 1910. Provincial Archives of British Columbia, GR 271, Box 1, File 3, p.1349. (Collectively hereafter GR 271)
77. Marris, p.65.
78. Ibid., p.61.
79. Ibid., p.63.
80. A. Haslam, Correspondance dated July 31, 1909 to the Hon. Fred. J. Fulton, Chief Commissioner of Lands. GR 271, File 2 (Correspondance inward) p.4.

81. Compilation of abstracts from evidence and printed sources collected by the Commission. Testimony of E.J. Palmer. GR 271, File 8, p.D4A.
82. Fulton Report, p.D60.
83. Loc. cit.
84. Ibid., p.D65.
85. Ibid., p.D60.
86. Statutes of Canada: 1903, Chapter 58.
87. Clyde Leavitt, "Railway Fire Protection in Canada," in Third British Empire Forestry Conference, Papers Presented (Canberra, Australia: Government Printer, 1928), p.734.
88. Clyde Leavitt, Forest Protection in Canada, 1912 Committee on Forests, Commission of Conservation, Canada (Toronto, Ont.: The Bryant Press, 1912), p.1.
89. Ibid., pp.4 - 5.
90. GR 271, File 8, p.F11.
91. Fulton Report, p.D61.
92. Loc. cit.
93. Statutes of Canada (Third Session):1911, Chapter 22.
94. Reproduced in Leavitt, 1912, pp.6 - 12.
95. Ibid., pp.14 - 15.
96. Loc. cit.
97. Clyde Leavitt, "The Railway Fire Situation," in Clyde Leavitt, compiler Forest Protection in Canada, 1913 -1914 Committee on Forests, Commission of Conservation, Canada. (Toronto, Ont.: William Briggs, 1915), p.44.
98. Whitford and Craig, p.131.
99. Leavitt 1928, p.737.
100. Western Lumberman, Vol. 8, No. 10, October 1911, p.26.

101. Ibid., pp.26 -27.
102. Ross, p.10.
103. Ibid., p.16.
104. Statutes of British Columbia: 1912, Chapter 17.
105. Marris, p.90.
106. Statutes of British Columbia: 1912, Chapter 17, Sections 112 - 122.
107. Ibid., Sections 123 - 124.
108. Ibid., Section 125.
109. Ibid., Section 126.
110. Western Lumberman, Vol. 9, No. 10, October 1912, p.41.
111. Report of the Forest Branch of the Department of Lands for the Year Ending December 31, 1912 (Victoria, B.C.: King's Printer, 1913) p.6.
112. Ibid., p.5.
113. P.Z. Caverhill, General Instructions to Forest Guards (n.p.: B.C. Forest Branch, 1914), unpagged, 11p.
114. B.C. Forest Service (sic), Department of Lands Forest Guard's Manual (Victoria, B.C: King's Printer, 1916), p.20.
115. MacMillan, p.549.
116. Ibid., p.552.
117. Report of the Forest Branch for the Year 1912, p.13.
118. R.E. Benedict, "Disposal of Logging Slash in British Columbia," in Clyde Leavitt, compiler, Forest Protection in Canada, 1913 - 1914 Committee on Forests, Commission of Conservation, Canada. (Toronto, Ont.: William Briggs, 1915), pp.115 - 117.
119. Ibid., p.115.
120. Statutes of British Columbia: 1912, Chapter 17, Section 123.
121. Western Lumberman, Vol. 14, No.4, April 1917, p.32.

122. Clifford Sifton, "Inaugural Address," in Commission of Conservation, Canada, Report of the First Annual Meeting (Ottawa, Ont.: The Mortimer Co. Ltd., 1910), p.20.
123. Ibid., p.22.
124. Clyde Leavitt, "Report of the Committee on Forests," in Commission of Conservation, Canada, Report of the Fifth Annual Meeting (Toronto. Ont.: The Bryant Press, Limited, 1914), p.31.
125. C.D. Howe, "The Reproduction of Commercial Species in the Southern Coastal Forests of British Columbia," in Clyde Leavitt, compiler, Forest Protection in Canada, 1913 - 1914 Committee on Forests, Commission of Conservation, Canada. (Toronto, Ont.: William Briggs, 1915), p.213.
126. Whitford and Craig, 1918.
127. Ibid., p.7.
128. Clifford Sifton, "Review of the Work of the Commission," in Commission of Conservation, Canada, Report of the Eighth Annual Meeting (Montreal, Que.: The Federated Press, 1917), pp.20 - 21.
129. Chas. O. Marston, "Reforestation in British Columbia," Western Lumberman, Vol.16, No. 4, April 1919, p.37.
130. Ibid., p.38.
131. Western Lumberman, Vol. 17, No. 8, August 1920, p.79.
132. Loc. cit.
133. P.Z. Caverhill, "Forest Research in the West," Western Lumberman, Vol. 18, No. 12, December 1921, p.21.
134. M.A. Grainger, "This Year's Forestry Progress Aably Reviewed," Western Lumberman, Vol. 17, No. 11, November 1920, pp.34 - 36.
135. R.V. Stuart, "Mechanical Improvements in Fire Fighting," Western Lumberman, Vol. 18, No. 10, October 1921, pp.27 - 28.
136. P.Z. Caverhill, "Forest Protection Insures Future Forests," Western Lumberman, Vol. 18, No. 8, August 1921, p.56.
137. Thomas L. Burton, Natural Resource Policy in Canada, Issues and Perspectives (Toronto, Ont.: McClelland and Stewart Limited, 1974) p.26.

138. Flumerfelt, 1914, p.497.
139. Ibid., p.501.
140. Marris, p.32, 44, 52.
141. Clyde Leavitt, "How Fire Damage Along Railway Lines is Reduced to a Minimum," Western Lumberman, Vol. 12, No. 1, January 1915, p.22.
142. Western Lumberman, Vol. 9, No. 10, October 1912, p.31.
143. A.C. Flumerfelt, "The Forestry Commission of British Columbia," in Report of the Canadian Forestry Convention held at the City of Quebec, January 18, 19, & 20, 1911 (Kingston, Ont.: The British Whig Publishing Company, Limited, 1911), p.134.
144. James White, "Forest Conservation Affects Interest of Every Man," Western Lumberman, Vol. 17, No. 9, September 1920, p.34.
145. Ross, p.24.
146. Gifford Pinchot, The Fight for Conservation (Doubleday, Page & Co., 1910) Reprinted by the University of Washington Press, Seattle, Wash., 1967, pp.42 - 48.
147. Anthony Scott, Natural Resources, The Economics of Conservation (Toronto, Ont.: McClelland and Stewart Limited, 1973), p.29.