

particularly that a northerly slope produces the better timber, having a brighter foliage and a heavier growth. Where the timber has been cut away on a southerly slope, and fires have occurred, the soil has lost its fertility, and the new growth is very sparse.

In many instances so unsatisfactory do the conditions appear that it might be considered waste land. As an instance of growth, in going to a favorite fishing pool in September, the writer in going along a well-trodden path had to step aside to pass a young poplar that had sprung up and had grown over eight feet in that one season. There were no signs of this tree on the same path in the spring. In 1902 a graft of Russett apple, considered to be the slowest grower of any of the fruit trees, grew from May to October 6 feet 8 inches. It was grafted on wild stock. Lumbermen who have been careful to cut spruce not less than 14 inches at the stump say that it will give them a cut every ten years, and the second cut will be better than the first. In Cumberland County, at the head of the Bay of Fundy, the growth is more vigorous, and they can cut every seven years. Two hundred to 2500 acres will produce a paying annual cut, and the value of the whole be maintained with systematic cutting. One reason for this is that the Western Nova Scotia forest area is overgrown in the number of trees, and the soil cannot support the growth unless thinned out. Both hardwood and spruce have an early maturity, and once past that point rapidly deteriorate. The soil is not rich and in many places does not retain sufficient moisture to keep the elder growth.

The country named is not subject to violent wind storms, and little damage is done by winds except to hardwood on exposed hills. There is an impression that the annual fall of rain or snow is decreasing, but the lack of sufficient water for driving logs, and the disastrous spring floods, may possibly be traced to the clearing out of timber along the water courses, so that snows melt rapidly in the spring and the land does not hold the moisture that it did in early years.

Professor Macoun said that the conditions in Nova Scotia were just an epitome of the destruction that is going on in every province of the Dominion. He was in favor of timber lands passing into the hands of private individuals, because the Governments of some of the provinces did not seem disposed to properly guard them. Ontario was doing much more than any other province.

Mr. G. Y. Chown was not in favor of private ownership of the forests. Professor Fernow, he said, contends that the individual cannot properly do forestry work, the returns being too slow. A large corporation may have immense wealth, but the private individual is anxious to obtain a proper return for his investment. We must, therefore, look to the governments and force them to protect the forests and reserve them for the people.

Mr. Thomas Southworth said that the original steps towards the protection of the forests had come from the government officials.

Mr. E. G. Joly de Lotbiniere maintained that the government fire ranging system was not sufficient. Private owners should have fire rangers of their own so as to provide some system of protection in addition to the government service. Mr. Joly told of the measures adopted to protect his property in the province of Quebec. On a section of twelve miles he kept two gangs of men, each gang provided with railway velocipedes, shovels, buckets, etc. These men had extinguished a large number of fires, and the parties owning adjoining property had adopted the same policy.

Mr. Aubrey White said that in Ontario the limit holder was not taxed so much per mile for fire ranging. He was asked to state how many rangers he would require and told to

select them, the government and the limit holder paying an equal share of the cost. He did not think there was any reason why fires should always follow railway construction, as Mr. Joly contended. With the construction of the Canada Atlantic Railway rangers were placed along the line and the necessary precautions taken, with the result that there were no fires.

Mr. Joly held that the danger arose after the railway was constructed.

Mr. George McCuaig said that the province of a ranger was to put out a fire in its incipient state. When a fire had obtained a good start it was almost impossible to extinguish it. The Quebec system worked satisfactorily, but he thought it might be extended by securing co-operation between the government on one hand and municipal authorities on the other. Municipal officers could do much good by looking after settlers who carelessly set out fires.

THE FIRE RANGING SYSTEM OF ONTARIO.

Following the reading of a paper on "Forest Fires," by Mr. W. A. Hendry, of Halifax, an address on the fire ranging system of Ontario was given by Mr. Aubrey White. Mr. White outlined the first steps that were taken to provide for the preservation of forests from destruction by fire. He then took up the appointment of the fire rangers and the manner in which they were chosen. The department had always impressed upon the rangers the necessity of not antagonizing the settler. The results of the fire ranging system in Ontario were detailed as follows:

In 1885 37 rangers were employed, at a cost of \$7,911. A number of fires were extinguished and the general effect of the system was good.

In 1886 45 rangers were employed, at a cost \$9,847. There was no trouble or friction with settlers. A large fire occurred on the Bonnechere river, although the quantity of timber damaged was not so large as supposed.

In 1887 55 rangers were employed, at a cost of \$15,000. This was the driest season on record. Day and night rangers fought with fire and called out assistance. As many as one hundred men, in addition to the regular staff, were employed. Settlers co-operated with rangers. The licensees were supplied with information as to the burned timber, which was taken out before the borers got into it. The number of fires reported was 110, and the timber damaged 200,000,000 feet, the loss being \$70,000. The licensees asked that limit holders be compelled to place rangers on their property. The causes of fires were settlers clearing land and setting out fires in dry season and high winds; river drivers making fires and not extinguishing them before leaving; locomotive sparks; hunters and fishermen using fire carelessly. In this year the system of having ranging on Crown lands was first adopted.

In 1888 70 rangers were employed, at a cost of \$17,854. Seventy fires were reported and 100,000,000 feet of timber damaged, 15,000,000 feet of which was a total loss. The main cause was carelessness of settlers.

There were 75 rangers employed in 1889 at a cost of \$15,468. Few fires occurred and all timber damaged was cut.

In 1890 there were 83 rangers, which cost \$17,525, and no fires.

In 1891 98 rangers cost \$20,053. This was a dry season and several fires occurred on Crown and licensed lands. Of 100,000,000 feet of timber destroyed, 95,000,000 was on Crown lands. The damage was \$60,000.

There were 80 rangers employed in 1892, at a cost of \$18,362. Being a wet season, there were no fires.

In 1893 there was a staff of 106 rangers, which cost \$19,831. There were several fires but no serious loss.

In 1894 108 rangers were employed, at a cost of \$20,276. There were no fires in the east, but in the west where no rangers were employed and there were extensive explorations for minerals, etc., several fires caused considerable damage. Owing to the slackness of demand the timber was not cut.

The season of 1895 was very dry; 117 rangers were employed, at a cost of \$26,253. The timber damaged was 46½ million feet, including some pine on Crown lands in the township of Grant.

In 1896 there was a staff of 160 rangers, which cost \$47,719. Fires on licensed lands were mostly suppressed, but there were three fires on Crown lands near Wahnapiatae and Biscotasing, 65,000,000 feet of timber being damaged, all of which was sold.

A staff of 179 rangers was employed in 1897, costing \$49,926. No fires occurred.

In 1898 195 rangers were employed on licensed territory and 11 on Crown lands, the former costing \$53,498. There were a few unimportant fires.

In 1899 190 rangers on licensed territory cost \$46,150. On Crown lands there were twelve rangers. A fire occurred in the townships of Howell, Foy and Harty, all the destroyed timber being sold.

On licensed territory 185 rangers were employed in 1900, at a cost of \$53,970. There were twelve rangers employed on Crown lands. Ninety fires were extinguished, including one in Dana township.

In 1901 there were 236 rangers employed on licensed territory, at a cost of \$60,132, and 10 men on Crown lands. In the Rainy River and Thunder Bay districts the rainfall was heavy, but in the east the season was dry. Early in July there was a serious fire in the Temiskaming district, said to have been caused by smouldering brush heaps left by settlers. Not much pine was damaged, but a quantity of spruce and other soft woods.

In 1902 234 rangers on licensed territory cost \$68,400. There were forty fires and 10,000,000 feet of timber damaged.

Mr. White said that in no case had the Government received a complaint from a licensee as to the fire-ranging system.

Mr. J. R. Booth said that the Ontario Government measures had saved millions of dollars' worth of timber. He urged that the Government enforce the regulations in every possible way and keep settlers out of districts where there is only a small tract of agricultural land. He thought some of the officers had been too lenient in this respect in the past.

Mr. Stewart thought that the government should take up the exploration of the country with a view to ascertaining what land should