

24,410 square miles of pine lands still unsold. These areas are exclusive of a territory of 89,000 square miles that is more or less timbered, but as it is not supposed to have large quantities of pine upon it, no account has been taken of it by the Department of Crown Lands. It is known, however, that much of it is well timbered, and where pine is not present there are large quantities of spruce and other woods. Assuming this territory to be fairly covered with timber, we will take half of it for the purpose of this calculation, which will give the total forest area of the Crown in Ontario as 89,910 square miles. As lumbering operations are being carried on to a greater or less extent in parts of the licensed area, we will allow for this and take 80,000 square miles as the timber area of the Province, certainly a very low estimate, having regard to not white pine alone, but to other timber as well. Eighty thousand square miles is equivalent to 51,200,000 acres. Estimating the annual addition of timber over this area at sixty cubic feet per acre, we have a total addition to the amount of timber each year amounting to 3,072,000,000 cubic feet. This estimate is of timber exclusive of tops and branches.

According to the report of the Commissioner of Crown lands for 1894 the amount of timber cut on the Crown lands, of all kinds in lumbering operations, amounted to 60,695,250 cubic feet for that year. Deducting this amount from the annual growth, there would be 3,011,304,750 cubic feet in excess of the cut of timber each year, as may be more clearly shown by the following table :

ANNUAL CUT OF TIMBER IN LUMBERING OPERATIONS AS PER CROWN LANDS REPORT, 1894.

|  | Cubic Feet.       |
|--|-------------------|
| Saw logs, boom timber, dimension stuff . . . .       | 53,200,555        |
| Square timber, pine and other than pine . . . .      | 1,185,529         |
| Cordwood . . . . .                                   | 1,879,936         |
| Pulp wood . . . . .                                  | 1,381,504         |
| Posts and shingle bolts (estimated) . . . . .        | 767,872           |
| Piles and head blocks . . . . .                      | 279,854           |
| Railway ties and telegraph poles (estimated) . . . . | 2,000,000         |
| Total . . . . .                                      | <u>60,695,250</u> |

ANNUAL GROWTH ON CROWN LANDS.

|   |                      |
|---|----------------------|
| Estimated annual growth per acre of ordinary forest land adopted by the U. S. Forestry Bureau, 60 cubic feet; total area of Ontario Crown Lands licensed and otherwise, pine-bearing and other forest land, say 80,000 square miles; 80,000 square miles, or 51,200,000 acres, will produce per year according to this estimate, 3,011,304,750 cubic feet in excess of the annual cut of timber, or | Cubic Feet.          |
| Annual growth . . . . .   | 3,072,000,000        |
| Annual cut . . . . .  | <u>60,695,250</u>    |
| Annual growth in excess of annual cut . . . . .   | <u>3,011,304,750</u> |

This is assuming that the lumberman's axe is the only cause of the removal of timber. Unfortunately, however, this is not the case. The amount of timber destroyed by fire from one year to another is an unknown quantity. That the amount far exceeds what falls before the axe of the lumberman is probable, and in any scheme of forest perpetuation protection from fire must occupy the most prominent place. Notwithstanding the efforts of the Government fire rangers for the past few years the loss to the province through forest fires has been considerable, though vastly less than would have been the case had the protective measures employed not been used. If fires could be prevented or even very much lessened the present rate of cutting on the Crown lands could be continued indefinitely, for the annual increment of growth far exceeds the annual cut. These figures are of course theoretical for the

reason that in much of the primeval forest the decay of over-ripe trees may be said to equal the growth of the others. This is not the case generally though, and more particularly where through lumbering operations the larger timber has been taken out, enabling the smaller trees to grow so much faster. Besides, the enormous difference of three billions of cubic feet will allow for considerable latitude in this respect.

FIRE PROTECTION.

In 1886 Mr. Aubrey White, now Assistant Commissioner of Crown lands, addressed a report to the Commissioner, strongly advocating the adoption of a system of fire-ranging. Acting upon this recommendation the present system, substantially embodying the plan submitted by Mr. White, was adopted with highly satisfactory results. The following are the leading provisions:—A number of men are placed upon the Crown Lands during the dangerous season, which lasts from May until about the close of September, in localities specially exposed to fire by reason of settlement, railway constructing, lumbering or any other cause. Where the land is under license, the co-operation of the limit-holders is requisite, it being optional with them to take advantage of the system. The number of men necessary to give adequate protection is decided by the owners of the limit, as being familiar with the country and the direction from which danger is likely to come. The selection of the men to be employed on the staff is also in their hands, the Department reserving the right to reject or remove any man whom they consider unfit for the position. The fire rangers are constituted officers for the enforcement of the Fire Act by section 14, and act under the instruction of the Department. They make the public acquainted with its provisions by putting up posters in conspicuous places and circulating copies of it among settlers and others. In case fires break out they are authorized to engage assistance for suppressing them, and should they become extensive it is their duty to notify both the limit-holder and the Department. Half of the expense incurred in maintaining the staff and suppressing fires is borne by the Crown Lands Department and the remainder by the owners of the limits. The pay of the fire rangers is fixed at \$2 per day without board or other extras. They report at the end of the season as to the duties performed and number and extent of the fires which may have occurred.

The good effects of the system were specially manifested last year. Though the summer of 1895 was the driest for many years, the temperature being unusually high in addition to the light rainfall, the destruction of timber by fire was remarkably small. In consequence of the danger the staff was strengthened in specially exposed places and closer vigilance maintained.

Reports from forty-nine timber limits where the system was in operation in 1895 show that as closely as can be estimated the quantity of timber damaged by fire amounted to 57,556,000 feet, valued at \$41,600. The number of fires specifically reported was ninety-three, in addition to which there were many others, principally small ones not enumerated. Any one at all familiar with backwoods life and conversant with the conditions which prevailed prior to the introduction of the system can easily realize the enormous saving which has been effected by pro-

viding this safeguard against forest devastation. When the dry character of the season and the number of fires actually started but suppressed before they had made headway is taken into account, it can readily be seen that but for the presence of the fire rangers at the most exposed points, areas amounting to hundreds of square miles would probably have been ravaged and the losses to timber licensees and the public would have been immense. This saving has been effected by the employment of 114 men for a few months in the year, at a total cost of \$26,253, shared between the public treasury and limit-owners.

WHAT TREES SHALL WE PLANT?

Recent observations lead to the conclusion that white pine will make merchantable timber much sooner than is generally believed, and instances are not wanting to show that under favorable circumstances trees of this variety thirty years old have yielded good marketable timber. In fact the white pine is a rapid-growing tree and a valuable tree to plant, the principal drawback to its merits in this respect being the amount of care required in the earlier stages of its growth.

The shellbark hickory is among the most desirable trees to plant for profit for the reason that it can be harvested when comparatively young and its nuts are marketable. If planted close together the young trees taken out in thinning have a value for carriage work. One cut of a hickory tree six inches in diameter will make about twelve or fourteen spokes. In small trees of say four inches diameter, the first two cuts are used for spokes, the rest for head-blocks and other parts of carriages. Prof. Budd, of Iowa, advises planting the nuts of the hickory where the trees are intended to remain. If planted for forest trees and not for nut-bearing purposes alone, the same authority advises planting the nuts eight feet apart each way with plenty of larch or tamarack seedlings between to act as nurse trees to the hickory. As they grow up the larch may be cut away and sold. The price paid by the makers of carriage wheels for hickory—which is now all imported from the United States—is such as to afford a return equal to from twelve to fifteen dollars per cord. The hickory grows best on a rich deep fertile soil, and while it will succeed on ordinary land should not be planted upon sandy or sterile soil.

Among other valuable trees to plant in view of the increasing demand for their timber for manufacturing purposes are the black ash, rock elm and black cherry.

Black walnut is also extremely valuable, but it takes a long time to mature. Prof. Sargent estimates that a hundred years of growth would be necessary to make it merchantable timber, as the young wood has not that rich, dark color that gives it its great value, although it seems to us this is an outside estimate.

The hard maple, although principally appreciated for its sugar product and as fuel, is also a valuable timber tree. It is used almost exclusively in the manufacture of shoe lasts, and is exported largely to Britain, where it is manufactured into mangle rollers and other articles. One firm in Ontario exported 100,000 maple blocks for mangle rollers in a year. It is also a tree of fairly rapid growth, and if planted close will make good timber that will not be materially injured by several seasons of tapping for sugar,