The Possibilities of Sylvicultural Practice
in the Forests and the Extent to which Present
Legislation Already Provides for Such.

Resume of remarks by H.R. Wickenden at the Annual Meeting, 1926.

The possibilities of sylvicultural practice and the legislation which affects them cover a wide field.

I will assume that this discussion is to be restricted to that which is actually being carried out and which will have direct effect on the future wood supplies of the timber industries.

The subject is thus restricted to sylviculture which:

- (1) is applicable on a large scale.
- (2) is readily understood by the class of woods labour which does the work.
- (3) is commercially feasible.

Large Scale Operations:

Whatever work is done must be applied extensively. Four to five hundred square miles may be cut over each year in one province alone. It is therefore urgent to carry on operations in such a way as to insure some kind of reforestation, even though it may not be the very best. We can improve later. It may be difficult right at the start to determine a course which will enable us to rotate operations and to return for a timber crop on each area every sixty or seventy years, but there is no doubt that doing something which tends to improve conditions will bring us nearer to regulated operations and a tentative rotation. This at least implies a "sustained yield". Any attempt is better than "laissez faire" methods.

Generally speaking, we could classify forest operations as either extensive or intensive.

I usually consider working methods as being

extensive when they are applicable on a large scale and require less attention from technically qualified personnel. In "extensive" work groups of trees or whole areas are considered in cutting operations. Intensive methods, on the other hand, are those which must be applied in a smaller way, requiring higher trained personnel. For intensive methods the cutting is usually carried on according to rules referring to the individual tree. Each tree is taken as a case by itself. Most of the selective cutting systems fall in this group. Strange to say, the diameter limit system, crude as it seems, is logically an intensive regulation, because theoretically one should apply the measure to each individual tree to determine if its diameter is greater or smaller than the diameter limit.

Necessity for Simplicity in the Cutting Methods Applied:

The woods labour at present available in North America is for the most part untrained in the carrying out of any refined cutting system. We have not reached the stage where each tree receives special attention. The best that our workmen can do is to cut an area uniformly. We are therefore compelled to adopt the simplest system.

The lack of trained labour necessitates extensive methods and operating by "area" rather than cutting by selective or "tree by tree" methods. Tree Group or "Area" operations are better understood by timber land owners and loggers, and can therefore be carried on with the good-will of everybody.

The first and simplest step towards orderly cutting should be the systematic logging of stands or regions in the order of their maturity. Overmature stands are to be cut first. They usually contain plenty of volunteer growth and actually need clear cutting more than any other treatment. Clear cutting is simpler

than "diameter limit" cutting, and cheaper to carry on. More timber can be obtained for the same outlay in roads, camps and other overhead. Occasionally, when the volunteer growth is insufficient, seed trees of the most desired specie must be left. This is a "technical" phase of such operations, but it is more than compensated by the above-mentioned advantages. In forest operations of the Wayagamack Pulp & Paper Company, Limited, the above principles have been found to be readily applicable.

A Working Plan has been prepared for certain forests. The system adopted will be applied to the remainder of the timber lands. The operations are directed to the salvaging of forests damaged by fire or other causes. We have not had any extensive cutting in forests which require seed trees to regenerate, but what has been done proves conclusively that the results will be very satisfactory. Marking of seed trees has been carried on more or less experimentally in order to determine the costs of this work.

Frequent reference is made nowadays to the necessity of marking every tree that is cut. I should like to point out that in the case of clear cutting with seed trees it is far simpler to mark trees that are not to be cut. The number of seed trees left may vary from ten to forty per acre depending on the density of the stand and the conditions of reproduction.

We have treated only Northern Mixed Wood forest in this manner. The Birch is not utilized at present and actually serves as a wind break for the seed trees. I believe that provided fire did not interfere a cutting system of this kind would tend to change the nature of the forest and diminish the hardwoods even though the hardwoods are left standing. There will be a gradual transition of the forest to a more pure coniferous forest

of Spruce and Balsam. I am led to this expectation from having observed the following. Seedlings of Spruce and Balsam growing under the old Birches are able to get full insolation for several weeks each spring and early summer before the Birches have time to leaf out. This gives them a full period of normal light each year so that they can endure their otherwise relatively shady position. The Spruce and Balsam thus creep up to the old Birches. These latter eventually die from old age. On the other hand, the Birch reproduction which is very intolerant of shade cannot grow readily because it does not leaf out quicker than the parent trees and gets no period of full insolation. Young Birches naturally do not grow before their leaves are out, neither can they grow in the shade. The leafing out of the old trees therefore automatically interferes with the growth of the Birch reproduction right at the start of the growing season and checks it.

The work of marking out seed trees in the above-mentioned mixed forest type is carried on by a crew of three men. The leader is usually a man with training in this particular work or an experienced forester. A strip of one or two hundred feet is traversed at one time. The leader walking in the middle can see the seed trees which are being left by the two men. He records the species and diameter of the seed trees as a check on the amounts of timber left for this purpose. This, of course, is not essential to the work.

The typical seed tree left is a Spruce six to ten inches in diameter with a well developed crown and top leader (which shows that it is a growing tree). Such a tree will be most likely to stand until the next crop is harvested and should produce timber of large dimensions which may have a much greater value at that time than now.

141

We have investigated the forests of the district very thoroughly to find out what happens when various kinds of cutting are carried out. We can look in the old cutting operations and find conditions that illustrate practically every known cutting system in the accidents of the past. It is usually observed that where clear cutting took place and Spruce trees were left the proportion of Spruce reproduction has been satisfactory enough. The Balsam is always predominant, however. The Spruce reproduction may not exceed one or two hundred small trees per acre at first, while the Balsam may come in as much as eight hundred to one thousand or more trees per acre. The Spruce, however, seems to have a stronger growth, and is more resistant to various calamities than the Balsam. As the stands mature it is observed that the number of Spruce trees do not decrease materially, but that the Balsam is usually very much decimated. The final proportion of Spruce and Balsam is not likely to be very different from that of the original stand.

It can be presumed that the natural stand is the one most adapted to the region and hence the most satisfactory. Incidentally, it seems more logical to grow a forest naturally suited to each region than to try to forcibly adapt the forest to the industry (rather than the industry to the forest). Because Spruce is the best wood for an industry, many attempts are made to produce clear Spruce stands (this is usually done in planting). To create clear Spruce stands on pine ground or in place of a mixed forest is hazardous.

Forestry must be "Commercial":

The commercial feasibility of any silvicultural methods adopted is perhaps the most important aspect of the present forestry problems. The only silviculture which will have any

importance is one that fits in with other industrial processes and becomes one of them.

It is to be remembered that due to an original abundance of overmature forests which have been subject to various calamities and also of fire damaged timber, the cutting of the forest has had the nature of a wood-mining operation or of a salvage operation, wherein the best is salvaged first and the inferior timber left. That is to say, the cutting operations proper have been fairly unrestricted. Silviculture necessarily imposes restrictions. The transition to silvicultural methods should therefore be gradual.

To offset any extra cost imposed by actual silviculture, one should try to lessen other operating costs. Clear cutting does lessen operating costs because it tends to concentrate operations. Fortunately, old mature stands generally need clear cutting -- a harvesting -- more than anything else. The logging operators generally appreciate the possibility of carrying on cutting in place of diameter limit cutting. The leaving of seed trees is usually readily provided for and is the only silvicultural phase of such a system. Mature forest usually contains much suppressed reproduction -- the almost complete removal of the old stand acts like lifting a blanket off growing grass. The whole proposition usually strikes everyone as being practical and commercially feasible. The "raison d'etre" of the forest, from a commercial standpoint, is its possibility to create revenue. In the "forestry business, therefore, nothing is practical unless it pays -- within as short a time as possible. If the returns are deferred to a period far in the future, the safety of the placement must be great. The high fire risk precludes for the time the making of investments in forestry work

which will only give returns in the distant future. The field of action in silviculture is accordingly restricted.

It often seems that silvicultural experiments (which no doubt are very desirable) are being made to appear as though they were of great magnitude. Plantations covering some hundreds of acres as compared to the thousands of miles of timber limits which are and always will be depended upon to supply the mills are like kitchen gardens as compared to the Western wheat fields. The amount of thought and action to be given to the small experimental area on one hand and to the big timber limits on the other should be more proportionate to their size. In a discussion of this kind, I feel that the arguments apply to square miles or hundred square mile units, not so much to acres. It must be borne in mind that these square miles are covered with billions of trees: therefore, when speaking of present day commercial wood production the "a million seedlings" proposition is irrelevant. Such a proposition may be actual fifty or one hundred years from now.

It seems very wrong to expect that (as we have heard in yesterday's discussion) "expensive or not" the industries will soon have to pay "whether they want to or not". It is simultaneously admitted that the cost of logging is high as compared to the value of wood products. If so, how can we advise increasing such costs? I do not expect that anything will be practiced on any extensive scale unless it pays. Our problem is then to find methods that pay. "Paying" should be understood to mean that which either increases the revenues or increases the capital values of the property. (An increase in capital value implies that the immediate selling price or market price of the property is increased).

The economic side of the forestry question has

been lost sight of far too much. To advocate methods which are unsound financially may have a tendency to discourage those who have capital from placing it where it could be used to develop the forest and its industries.

Effect of Legislation:

I have not touched the question of legislation affecting silviculture. This side of the question would undoubtedly have been made clear by Mr. Piche had he been with us as expected. Briefly, the forest legislation of the present day must necessarily be as Burke once said: "An incongruous mixture of coercion and restraint"--it must restrict the uncontrolled cutting and induce the proper planning of operations to utilize the forest crop and secure regeneration. The Province of Quebec has adopted a very favourable measure in the policy of accepting Working Plans to replace the diameter limit cutting regulations. There are, however, certain phases which still need serious attention, such as the uncertainty of tenure and of stumpage charges, etc. The amount of money which can be expended to develop a future crop cannot be determined until these matters have been satisfactorily dealt with.

It often seems to me that in allowing enthusiasm to lead them away from their common sense, foresters have created wrong impressions on those who control the forest industries and must consider the commercial aspect of any question first. This has done more harm to the cause of forestry than anything else I know of.

There is much to be gained by taking one's place in the rank and file and doing work the value of which can be immediately appreciated. Chances for demonstrating improvements in

logging operations and incidentally in silviculture must be taken when they present themselves. The economic situation of the times almost entirely regulates the kind and the amount of silvicultural work which can be done.