THE IMPROVEMENT OF SECOND-GROWTH DOUGLAS FIR
WITH SPECIAL REFERENCE TO SEED SELECTION

March 1952.

By "Sylvestris" alias Mike Stewart

Statistics of the residual volume of old-growth Douglas fir, its estimated duration and the increasing part played by so-called Second Growth are too often quoted to justify their repetition here. Familiarity with these figures should not, however, make us careless of their implications.

The more immediate effects of this transformation will be and are being felt by the processing industries and reflected in adjustments of their techniques and machinery. Forest managers, however, are also finding it more and more necessary to adapt themselves to the changing forest scene and are calculating in terms of rotations of a brevity unheard of only a few years ago.

Despite the consequent trend toward production of smaller logs, the forest products consumer still demands large clear timbers and no reduction in his demand is foreseeable. The problem thus is obvious. The supply, however great, of small knotty timbers cannot possibly satisfy a great and perhaps increasing demand for large clear logs. The clue to its solution lies in the two words, "small" and "knotty".

Many thousands of acres in the Pacific Northwest are already clothed with trees which will produce this type of timber and more arise as the result of every logging operation. In such areas good management can do something to alleviate the situation by thinning and pruning. Both of these operations have been demonstrated to have long-term financial advantages and, in many cases,
thinning also yields marketable products. With the inevitable improvements of techniques, expansion of the pulpwood industry and refinement of conversion practices, thinnings will become increasingly marketable and this vital improvement operation will take its proper place in the forest management of the Douglas fir region.

If we accept the adage that prevention is better than cure, however, it is clear that the undesirable characters of much of the second-growth Douglas fir entering the mills today should also be studied at their source, that source being the seed from which the trees grew. Experimental work has been carried out in this country to determine the effect of seed origin on progeny in both artificial and natural regeneration projects. These experiments, however, have been mainly confined to species of pine and to testing the effects of altitude and latitude of the seed origin and the extent to which fungal diseases of parents affect the susceptibility of the new crop. The importance of such studies is paramount but the results have been expressed only in terms of survival and growth, both in diameter and height. Little information concerning the tree-form and timber-producing quality of the young growth has been published, even though the former is a character which can be recognized early in life. Furthermore, the Oregon Conservation Act, an ideal instrument for the control of reforestation practices, specifies only those qualities such as width of crown and windfirmness which make for abundant and continuous seed-production, disregarding entirely the features of tree-form which have long been recognized by European foresters as vital to high quality timber production.

A recommendation of the Pacific Northwest Forest and Range Experiment Station is worth quoting in this respect. It states "Any old, misshapen trees that would not repay more than the cost of logging
should be left if they are seed-bearers'.

Tree-form includes such characters as number and size of branches, straightness of grain and fulness of crown, all of which profoundly affect the final lumber grade recovery. A large contribution to these characters is undoubtedly made by environment, as shown by their variation between trees grown in close canopy and others of identical genetical constitution grown in open parkland. European geneticists have shown, however, that certain tendencies of which the liability to limbiness is but one example, are certainly inherited. Moreover, these tendencies may be exhibited during the first few years in a tree's life. The scientists carrying out this research have produced abundant evidence from their experiments and have successfully discerned the potential wolf-trees in a young crop long before the canopy was opened. If further evidence were required, it would be necessary only to inspect any even-aged stand of second-growth Douglas fir produced as the result of leaving a seed-block or from planting. Some years after the canopy has closed it can be assumed that the growing conditions at some distance from the edge of the stand are uniform, at least as regards their effect on tree-form. Within a small area, however, it is nearly always possible to distinguish variations in tree-form which can only be attributed to inherited characteristics.

If this evidence is accepted it is clear that no delay can be justified in an attempt to improve the inherent qualities of future Douglas fir regeneration. By this means mill waste can be reduced, the progressive lowering of standards can be halted and a general increase in forest revenues can be brought about. It has been argued that American silviculture is too young for such refinements, but it would appear that some measures must be taken
before the whole Douglas fir region is covered with an inferior growing stock.

Two major modifications to existing practices are suggested. The first is a tightening of the specifications of seed trees as defined in present conservation Acts. Lists and specifications of the desirable qualities of seed trees should be provided in addition to the existing requirements which guarantee, or attempt to ensure a supply of seed sufficient in quantity and shed over a reasonably long period. Misshapen trees should on no account qualify as seed trees unless it can be established without doubt that the deformity is due to external factors such as logging damage. Coarsely branched trees and those with spiral grain should be felled to prevent their shedding seed on the area.

Collection of seed for nurseries should also be rigidly controlled and a survey of seed sources within the desired altitudinal, latitudinal and climatic zones should be made with a view to discovering superior or "elite" stands and trees, collection of seed being confined to such sources. Specifications for the qualities of these trees should be the same as for those left as seed source after logging operations.

The second recommendation is for active tree-breeding experimental work at the Institute of Forest Genetics. Danish foresters have shown that it is possible by scientific breeding methods to produce strains of Douglas fir superior in growth and timber quality to the ancestral trees. When these are established in sufficient numbers they will be used as a seed supply for all planting operations. In the meantime the Danes are already improving their growing stock and obtaining greater, clearer lumber volumes by using seed collected from superior trees.
It is here suggested that, coupled with the inevitably greater intensity of management, including the practice of thinning, and, where necessary, pruning, the above recommendations will go far toward the improvement of tree quality in second growth Douglas fir stands and the supply of larger clear logs to the mills.

Seed provenance is a subject which must sooner or later be explored fully in any program of forest management. The work of nature cannot be replaced by man's efforts but with intelligent understanding of her methods he can apply modifications to produce vastly different and often beneficial results.