

seedlings were present, one of which had been decapitated some time in the past, probably when the lawn was mowed. This seedling had developed a new leader which at the time of inspection was about 2 inches long. The seedlings had an average height of 4 inches.

The large *Araucaria imbricata* at Tapanui Forest Headquarters also produces sound seed but there were no seedlings round this tree, in all probability these seed are taken by rats etc.

It would be interesting to know if natural regeneration of this species or other *Araucarias* has been observed elsewhere in New Zealand.

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CORRESPONDENCE

The Editor,
New Zealand Journal of Forestry.

Types of *Pinus radiata*.

Sir,

In Vol. V, No. 1 of the New Zealand Journal of Forestry Mr. Owen Jones in his paper "Some Re-establishment Problems" points out that *Pinus radiata* is a markedly variable tree, with several distinct types or races. With this I agree. The rather rough type of tree with crooked stem and heavy side branches fairly common in the Central Plateau plantations in New Zealand, is much less frequent in those in South Australia. However, there is appreciable variation in types in the latter. The better general type occurring in South Australian plantations may be accounted for in part by restricted growth due to the lower annual precipitation and to the winter rainfall climate; also to the more intensive management practised in South Australia. Early thinnings are possible, since material down to 4 inches diameter, and from some plantations to 3 inches diameter, is saleable. Thus many defective trees can be eliminated early in the rotation. It may be pertinent to add that the rate of growth on reasonably good sites in this State is very satisfactory.

Mr. Owen Jones stresses the importance of collecting seed for preseedling or production of nursery stock from a selected types with certain desirable characteristics. Professor Champion (1) states that it is necessary to select standing crops of good type and to conserve and manage them expressly for seed production. Do any such exist in New Zealand? Something may be gained by collecting seed from trees of the desired type in a stand containing many types, but it is almost certain that some pollen from trees of undesirable types will be carried to the female cones of the mother trees, and, in consequence, at least a proportion of the progeny will vary from the desired type.

A positive means of obtaining planting stock true to a desired type is by vegetative reproduction. In this way stands of a given type may be obtained from which seed true to the type may eventually be obtained, particularly if the mother stands are isolated from other plantations. Of course, it would take many years to build up mother stands capable of yielding satisfactory quantities of good seed.

An investigation into the vegetative reproduction of *Pinus radiata* is being carried out by the Commonwealth Forestry Bureau at its Experiment Station at Mt. Burr Forest, South Australia. Cuttings made from the tips of side branches of young *Pinus radiata* have been successfully rooted in the open ground, and a satisfactory percentage strike obtained, but only from trees not exceeding five years in age. Herein lies the disadvantage of the method. The cuttings must be grown on, and further cuttings struck from those first rooted and these grown on, and so on until the parent trees are old enough for their characteristics to be definitely determined. If they are not those desired, all the cutting stock must be discarded for the purpose in view. It could, however, be used in the establishment of ordinary plantations of mixed type. Plantations established at Mt. Burr with vegetatively reproduced stock are making satisfactory growth to date, but are only a few years old. It remains to be seen how growth will be maintained. This method of obtaining mother stands has possibilities, but is laborious.

Can vegetatively reproduced stock be obtained from older trees? The work of a number of horticultural investigators shows that propagation by cuttings of trees and shrubs is usually satisfactory only when the material used is from young trees. But Thimann and Delisle (2) found that in some conifers, notably *Tsuga canadensis* and *Picea pungens*, cuttings from old trees rooted well if treated with growth substance, but failed to root without this treatment. Much progress has been made in recent years in stimulating rooting by treatment with certain chemical substances. Recent work is reviewed by R. J. Garner (3). It was found that growth in plants is controlled by chemical substances which recall the hormones in the animal organism. The main group of these phytohormones consist of substances which cause cell elongation. Three compounds of the group, the auxins, have been isolated. The fact that one is a well-known organic substance B-indolyl-acetic acid, capable of laboratory synthesis, has made possible its widespread investigation as an agent for promoting rooting in cuttings. With a number of plants a much higher percentage rooting was obtained with those treated than with those untreated, differences being as great as 90% treated, nil untreated.

It is possible that treatment with growth substances will enable cuttings from older *Pinus radiata* to be rooted, and thus eliminate the necessity of rooting and growing on series of cuttings from each selected parent tree; or, at least, to reduce the number of series. The writer intends to investigate the subject.

An example of the economic benefit to be derived from the production of a certain type of tree is seen in South Australia, where logs from uninodal trees, from which knotless lengths exceeding seven inches in diameter and two feet in length can be cut command up to double the price of the ordinary mill log. The former are used for cutting match splint and plywood sheet both of which must be clear. In the average mature plantation there is only a small percentage of suitable uninodal trees.

In New Zealand much will be gained if the crooked, heavily branched type of *Pinus radiata* can be eliminated in favour of the straight, cylindrical type with small branches.

I am, etc.,

Kersbrook Forest, South Australia.
28th February, 1946.

E. Y. CUTTEN.

References:

- (1) Champion, H. G., 1945. Genetics in Forestry. *Empire Forestry Journal*, Vol. 24, No. 1.
- (2) Thimann, K. V. and Delisle, A. L. 1939. The Vegetative Reproduction of Difficult Plants. *J. Arnold. Arbor.*, 20.
- (3) Garner, R. J. 1944. Propagation by Cuttings and Layers. Recent work and its application. East Malling Res. Stat., England.

The Editor,
New Zealand Journal of Forestry.

Sir,

With reference to Mr. Cutten's enquiry, so far as is known there are no *P. radiata* stands of good type conserved and managed expressly for seed production in New Zealand, though such procedure would undoubtedly be desirable. For really satisfactory results it would further be necessary to have such a stand in each main tree-growing district, so that seed could be obtained from trees adapted to local conditions and environment. In the past unfortunately seed collection has often been haphazard, little or no consideration having been given to the type of the mother trees from which the seed was obtained. As misshapen and inferior trees are often prolific seed bearers, and as collection is often easier from them, it is readily understandable why the resultant stands in many cases have failed to come up to expectations. Planting stock too has in a number of instances been sent far afield, and used in districts where climatic conditions vary appreciably from those under which it was raised.

As Mr. Cutten points out, cross fertilisation between good and bad trees is inevitable in stands which contain a mixture of types. This difficulty is naturally accentuated where the small material