

Some Observations on Exotic Afforestation in the South Island.

(C. H. Reece.)

Concerning the afforestation of our waste lands, are three outstanding problems, the selection of species, the purity of species selected and the silvicultural methods to be adopted—all must be built up on the foundation of the experience gained so far in this country, for the tactics of other countries cannot be accepted in toto for our soil, climatic and economic conditions. If these problems are to be solved it will not be by those who work for pecuniary ends but by the enthusiast and it is New Zealand's good fortune that she can still put forward such men, amateur and professional. At the present moment, such work lacks consolidation—knowledge is wrested from nature only to fall back into oblivion because no system of record has been initiated. Should it not be possible to draw up a standard form for distribution to workers in this field, upon which could be set out the facts so urgently required? Such a work undertaken by the universities would bring in a ripe harvest and earn the thanks of future generations.

We have advanced a good distance in the search for suitable species although much still remains to be done—the world offers many valuable trees not yet tried out in our plantations. Results to date go to prove that from an economic standpoint the most valuable species for the South Island are insignis pine (*Pinus radiata*), *Cupressus macrocarpa*, and the Douglas Fir in the order set down. The main feature, and that which sets it at the head of any list is the wonderful rapidity of growth of the insignis pine—it will grow twice the bulk of timber in a given time of any other tree. This qualification, together with the fact that the timber is a useful building commodity and a good firewood, will probably keep the insignis pine at the head of the list. One fact must, however, be borne in mind—this tree produces a low-priced timber which cannot stand the addition of heavy cartage and therefore it should be planted only on the poorest land and within easy distance of railway.

Selection number two gives us a totally different class of product. The timber from the macrocarpa is probably unsurpassed in its durability in the ground, and when sawn and dressed it has largely the appearance and qualities of kauri. How far this great timber

will go remains to be proved, but experiments to date give every indication that the future demand for such material will be absolutely unlimited. The macrocarpa will not succeed everywhere as it requires a deep free subsoil, but where such is available and of use only for tree-planting, this species should be freely used.

The Douglas Fir has been placed third on the list despite its general suitability to our conditions and the valuable timber which it is at present producing in this country. Large areas are now being planted with this species and some magnificent plantations will result.

It is not advisable to go far beyond these three species at present, for although many others have been tried out, the results have in no case equalled these. Experience will ultimately prove the worth of other trees but we are sadly lacking in records of knowledge gained in the past. Are we to carry on in this desultory manner?

Many pages could be written upon the variations of the three species mentioned above, and such will occur with every tree we may plant. It is therefore necessary to adopt some practical system for keeping the desired type pure. Problem number two therefore resolves itself into two:—How to discover the best type and how to keep it pure when once obtained? Here lies the opportunity of the enthusiast, for the closest observation and the most painstaking methods will have to be adopted ere a solution is reached, and each species offers fresh opportunity. The *Pinus radiata* is showing great variability under the saw, the macrocarpa displays a similar desire to wander from the straight and narrow way in its diversity as regards durability, and the Douglas fir is particularly noticeable for its vagaries of growth—which latter, however, are thoroughly understood in its native land. It appears that it would be possible to segregate the desired type of any species by the formation of "seed plantations." Here the trees would be planted sufficiently far apart (according to species) to admit of their fruiting close to the ground and the plantation would be located sufficiently far from other trees of the same species to defy any possibility of cross-pollination. This idea has been put forward on a previous occasion—so far without success.

The third problem, which, by the way, is possibly the greatest and most important of all, is the form that silviculture is to take in this country. So far this side of afforestation has been almost entirely neglected and to-day there is no definite policy laid down for the would-be forester to follow. A direct result of this condition, is the production of matured timber trees so full of knots that

they are useful only for firewood and packing-case timber. Now an observant person will notice that quick-growing trees in a plantation do not shed their side branches before reaching maturity, and the natural conclusion is that these offending branches must be removed by artificial means. The man who succeeds in pruning such trees economically will have achieved the greatest success that has been the lot of any forester the world over. The question of pruning away a portion of the live branches has come under discussion very much of late, but observations made throughout the South Island are not convincing. The macrocarpa strongly resents such treatment even to the extent of dying out. The insignis pine and Douglas fir show a great decrease in growth and a strong tendency to throw out bunches of growth which must prove almost as detrimental to the production of clean timber as the branches themselves. This important branch of silviculture then resolves itself into the question of accurate spacing to produce the desired crown cover and the removal of suppressed branches to a height of, say, from twenty-four feet. If such a butt log were produced throughout our plantations, we could then afford to consign the tops to the firewood-merchant and the box-maker.

I commend these three problems to those men of the community who have "tree sense." The requirements are urgent, the work most worthy.

Wood Technological Notes.

(C. S. Barker.)

EDITOR'S NOTE.—Owing to Mr. Barker's sudden departure for England, the following paragraphs were arranged by Mr. Hutchinson from laboratory records as outlined by Mr. Barker. The descriptions are therefore not as detailed in form as would other have been the case.

1. Anomalous Tissue in the Wood of N.Z. Podocarps:

In a brief item in the 1927 issue of *Te Kura Ngahere* a description was given of an anomalous tissue encountered in the stem of rimu. This tissue takes the form of abnormal masses of thick walled irregularly shaped, indefinitely arranged cells, filled with a brownish content. These masses were encountered on both butt and top sections of rimu trunks, were of unknown but seemingly considerable height, or transverse length, and on transverse sections were easily dis-

cernable to the unaided eye as a small dark mass or core of tissue at the centre, or pith, with several fine dark lines radiating outward from the centre for an indefinite but considerable distance. The description was illustrated by three microphotographs which, unfortunately, were very poorly reproduced.

Since writing the above, further observations of anomalous tissue have been made in the course of examination of other indigenous podocarp timbers.

(a) Miro.

Macroscopic examination of this timber frequently reveals a number of small black specks or fleckings sometimes appearing on the transverse section as tangential groups of two or three, occurring scatteringly throughout the heartwood. Micro-sections through such flecks reveal anomalous tissue, similar in general nature to that described in rimu, but not localised in the pith and radiating outward therefrom, as was the case described for the latter species.

In transverse section the phenomenon shows as a group of from one to three or four tangentially adjacent areas of large, irregularly shaped and indefinitely arranged cells mostly filled with a brownish or darker content. The area thus affected is roughly circular, though ending on one radial side rather flatly against a row of radially appressed tracheids such as form the ill-defined growth zones in this species. In the opposite radial direction, the tendency is for the affected area to taper off in a long narrow point, finally losing itself in normal tissue. (Mr. Barker's notes do not state which radial direction is toward the pith and which toward the bark. From the slides it is not possible to say definitely, though apparently the tapering point is towards the bark. F.E.H.) Around these areas of affected tissue the medullary rays bend somewhat in most cases, though some rays seem to lose their identity in these areas, or to commence from them.

The tangential section reveals the most characteristic view of these areas of abnormal tissue. Each area is revealed as a fusiform mass of indefinite height, bearing a most striking superficial appearance to the large rays of oak for instance. They are frequently vertically aggregate, with thin sinuous strands of normal tracheid between the sections of anomalous tissue. The individual cells in the affected area are loosely grouped, indefinitely arranged and mainly circular in outline. At the upper and lower extremities of the fusiform groupings a spiralling inward of the outer cells and of the more or less normal though misshapen adjacent tracheids is sometimes evidenced,