

REVIEW OF PAPERS PRESENTED

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The trend in Institute meetings in recent years has been towards searching discussion of a single topic, the results of which have been summarized by an expert. This year the decision has been made to alter this format both with regard to the subject matter and the summing up. A group of relatively young field practitioners have presented a most interesting if somewhat disparate view of current forest practices in an area of New Zealand extending from close to North Cape to within a mile or two of Bluff. Fortunately, several of the papers discuss the developmental stages of exotic plantations and this gives me some firm ground on which to start. But first let me say that the range of subject matter is too great to indulge in detail and all you will get from me is generalities.

Two important and recent and timely FRI symposia have been widely attended by members of the Institute and foresters generally — namely, the meetings on nursery practice and land clearing — timely, because they preceded the Development Conference proposals for a rate of establishment unattained since the peak of the afforestation boom. Where will these new forests be planted? The replies to a questionnaire for the second symposium were summarized and presented by Chavasse. They showed that 60% of all planting in the next 30 years will be on land encumbered with heavy growth and half of it will be on steep, non-tractor country. There will therefore be a high proportion of difficult country to be established — increasingly so with the passing of time. Appropriately, several of the papers are concerned with these difficulties; but before dealing with them I will comment briefly on the procurement of land for afforestation. The apportioning of undeveloped land between forestry and other uses will be made on several bases — physical, political, economic and, as commonly in the past, on the accident of tenure. The forester cannot afford to be ignorant of any tool which helps to rationalize his case for land for any of its various end uses. The physical capability of the land, which is conveniently expressed in the classification discussed by Priest, is the obvious starting point and we are indebted to him for his clear exposition of the use of it in his own work and for his suggestions as to how it might aid the forester. There is little doubt that detailed land-use capability maps would greatly assist the planning of the broad Development Conference proposals. As noted by Priest, the physical potential expressed in the classification must be combined with social and economic factors in the final plan.

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Plantation establishment will move on to increasingly difficult country. What are the difficulties? Those dealt with in the papers include vigorous competing weed growth, heavy woody cover, low fertility, the move to higher altitudes and, in the second crop, the problems of re-establishment.

Difficult sites will place a greater demand on tree stock than easier country. The soft, the spindly, the poorly rooted will be of little value. Black's paper deals with attempts to "purpose grow" stock for a range of sites in Kaingaroa Forest. This term I borrow from Jaap van Dorsser whose demonstrations, at the first of the FRI symposiums I mentioned, and those of his colleagues, caused us to re-examine our nursery practices to increasingly good effect. The amount of money that can be wasted by use of inferior stock cannot be over-emphasized — Black draws our attention to the need to decide minimum stock requirements for a given site and to set about producing it accordingly. A big break-through has been the discovery (or is it the rediscovery?) of the role of wrenching in hardening stock for difficult sites; but, as Black notes, the characteristics of the growing season at each nursery determine the extent and method of manipulating growth. Local knowledge is indispensable, as we saw clearly at Milton yesterday. It is interesting to note that a recent suggestion that we grow 1½/0 to 2/0 stock at Kaingaroa and leave the 1/0 to Rotorua was subsequently found to re-iterate a recommendation of the early 1920s. The uniformity and stocking of the pre-boom stands is mute testimony to the existence of skilled nursery practice in those far-off days; but even greater skills must be developed, and the various trials we have seen and heard about are pleasing indeed.

In the past I have heard it stated that the economics of afforesting gorse country are such that it should be left alone. However, in the case of both gorse and native cutover forest, this underrates the determination of the forester who has no choice but the difficult. Necessity breeds not only invention but in these instances a consciousness of cost which may ultimately lead to cheaper establishment than that practised by those more favourably placed. Having mapped, with permission, the stocking of the forests of Cornwell's company, including the earlier gorse established blocks, I am well aware of the great gains that have been made there. The ingenuity and the dollars put into thorough preparation are without doubt handsomely repaid.

And thorough preparation is the message delivered by Day and Herrick. About a third of the future planted forest must be won from the native cutover. No one will ever be enriched by the so-called enrichment technique. The only thing remarkable about it, at first impression, is that it persisted as long as it did. But we are inclined to forget how recently the power-saw arrived and what a tremendous change it has made to the economics of lowering wood. How fortunate we are that it was not invented in 1900. I think it fair to say that Westland pioneered the current effective methods of converting native forests — again by virtue of necessity. The lesson that both of these foresters, in widely separated localities, preach is

that establishment done on the cheap can be expensive indeed. This applies in fields other than conversion and has been quantified recently by FRI economists.

McKinnon drew our attention to the necessity of estimating the tolerable basal area of beef and of acting accordingly. I tend to agree with the final view expressed by a farmer that part-time run-off is the only reasonable use of production forest for grazing. I would be very cagey of purposefully establishing grass within the stand or potential stand unless the leasing fees were certain to cover a hefty re-establishment bill.

While the country available for new planting will become increasingly difficult, further major problems will also arise in dealing with re-establishment. Sites which were easily established in the first rotation will not be so easily re-established. Micro-climate may be changed by the surrounding forest and by dense logging slash. Page gives a comprehensive account of the problems of re-establishment on a large forest — problems biological and administrative. Those who consider the technical problems of plantation work to be somewhat mechanical or even *infra dig.* compared with those encountered in managing our God-given resource should note the ecological complexities to be unravelled even in the relatively simple field of seeding-methods for establishment of clearfelled cut-over, the crudest of systems. And, unless we very quickly have more nurseries, nurserymen and labour, these will be of more than academic interest for some time yet, as Page noted. Efficient plantation management is not simple.

Both Armitage and Page emphasize the need for preparation of sites in re-establishment. The economics of various clearing methods including fire, which was well discussed, justify considerable research. The use of hard 1½/0 radiata pine, to overcome difficult site problems was mentioned by both speakers. Page was enthusiastic about cuttings and there is the distinct possibility that they are physiologically frost-resistant and will extend the range of radiata pine at higher altitudes. Armitage cites the possibilities for propagation by cuttings of trees less demanding in their requirements of nutrient on his poorer sites.

Two of the papers are concerned with greater objectivity in moulding forests for the future. Tustin is a member of a highly active FRI group which is tending to turn established ideas upside down and in the process generating some soul-searching, with regard to objectives, by forest managers. This close scrutiny of silvicultural practices can only do good and is overdue. Trotman is a field forester caught in the cross-fire generated by various new ideas and by the mass of material appearing at the FDC, slightly bemused, and valiantly attempting to distil this material and translate it into field practice. On the one hand, the field forester is told that two-thirds of our wood supply in 1995 will be required for domestic consumption, half of which in turn will be in pulp products; on the other, that the breakeven stumpage for growing pulpwood is twice the ruling rate and would be regarded as unacceptable to industry. He is informed that in the long run all

of the costs of any economic activity must be exceeded by the returns, that because of the influence of wood costs on the final cost of paper of all kinds attention must be given to means of keeping stumpages down, that relatively large increases in stumpages would have very minor effects on overall costs, and that, to use Trotman's own phrase, economic criteria form the major considerations in afforestation. I can only conclude in my bewilderment that economics should be a mandatory part of any forestry curriculum if the simple forester is to sort the real from the phoney.

In the establishment of the older forests on which industry is currently dependent, the problem so far as the state was concerned was relatively simple — namely, a requirement of more wood to meet predicted shortages. The tailoring of this requirement to a fixed end use was — in the case of Kaingaroa, anyway — probably not quite so fortuitous as it has become fashionable to claim. Several papers stress the need to now go further and to grow forests for a particular end use. Trotman considers that this is *the* most important consideration in species siting and selection. Tustin has his *species* firmly fixed in mind and is concerned mainly with manipulating *the tending schedule* to this end. Trotman ends up with a plea for a firm date for a utilization plant so that he too may adjust his tending accordingly. The problem we have here, compared with earlier days, is a surfeit of knowledge. We know that it is wise biologically and financially to thin plantations — particularly of radiata pine. We know that the physical aims of producing boards, framing timber, groundwood and chipwood are not necessarily compatible. We do not know as much as we should about the economic aims in manipulating the crop, but this is rapidly changing. In the field of utilization, which is where the money is, we have lived in the shadow of the old crop. The wood for industry has come largely from this source. Total landed costs of input and processing have been weighted accordingly. The cost of the small and relatively expensive thinning input has not been really felt. Rotations have been governed by the priority for quitting the deteriorating stands of the boom days. The relative security of a massive reserve of older stands is rapidly disappearing. The surpluses are being pecked away and the hard thinking about aims, which produced the submissions for the development conference, must be continued at the regional and the forest level. The papers at this conference indicate that the younger generation of foresters is doing just that.

Wilkinson, Trotman, McKinnon and Armitage have quite unapologetically plumped for radiata pine — even on sites formerly considered difficult. It seems to me that, in answer to the Minister's plea for diversification, they and field men generally answer, "If we are to plant extensive areas of other than radiata pine and Douglas fir then *firmly* direct us to do so but, more important, clearly indicate to us *why* we are doing so." This is a fair, in fact a vital, question to ask those top-level planners who have yet to translate the eventually approved NDC targets into concrete regional programmes. Tell these

men what is wanted and I do not doubt their ability to produce it. You can form your own conclusion from the cross-section you have heard at this meeting.

To conclude, I would like to thank each of the contributors for the time put into preparing his paper. For many it is their first public appearance, which in confronting a group with the cumulative learning of this assembly is something of an ordeal. I believe the return to the forest as a topic, to the younger group as speakers, and to the far south as a venue has been highly successful.