

Reviews

FOREST RESEARCH IN NEW ZEALAND, 1963

Forest Research Institute, New Zealand Forest Service.

IN this report for the period 1963 one is again struck by the formidable programme being undertaken by a limited research staff in a very extensive range of forestry activities.

The Directors review and branch reports are outlined in two sections. Administration, policies and the broader implications of the year's work are presented in the former. The increasing importance of the electronic digital computer as an essential tool for forestry research is pointed out. It is significant that in New Zealand as elsewhere the impossibility of fully containing the numerous variables which are involved, for instance, in silvicultural, provenance and genetical analysis without the aid of the computer, is realised. Easy access, however, must be readily available to enable the computer to be used properly as a research tool and as yet, it is pointed out, this is not the case in New Zealand. It is felt that the heavy investment to date in forest research easily justifies the acquisition of one. The necessity for other up-to-date equipment, such as the electron microscope, is also recognised.

Adequate facilities are regarded as of prime importance, even more so than attractive salaries, for the retention of a good research staff. Though £140,000 was allocated for a new forest products research laboratory, that professional vacancies remain is blamed on the lack of proper facilities at the Institute.

Exchange of ideas and personnel with other countries has paid dividends to the Institute but grants for approved research at New Zealand Universities are felt to be inadequate to carry out many potentially promising investigations.

In the branch report of annual progress one is struck by the great importance of *Pinus radiata*, and by the enormous investment in the species. That in every field of research the species assumes such an important place, indicates the extent to which forestry in New Zealand depends on *P. radiata* and the energies which will be directed towards its preservation.

Pruning and thinning dominated the silvicultural scene and a symposium was held during the year at the Institute. The most significant achievement was the analysis of permanent sample plots data from thinned stands of *P. radiata*. Large numbers of punch cards are being used to bring the plot calculations up to date. A universal method was derived for the prediction of increment and yield under different thinning regimes. All increments were plotted against height as an independent variable, instead of age, so that the final yield table for any particular locality or site was based on the actual

height/age relationship without any attempt to harmonise such curves for different sites. Total and final crop yields were shown not to differ greatly under a variety of thinning treatments. There is a suggestion that *P. radiata* may be grown on a short rotation with associated pruning treatments and Douglas fir on a long one. The subject of pruning treatment is still open to question. It is held that pruning the first 18 ft. log is practicable, but that pruning the second 18 ft. log is not. It is felt that a 7-8 inch knotty core is far more realistic than one of 6 inches as a very drastic pruning schedule is needed to achieve the latter.

In the economics of management it is realised that pruning costs can pale into insignificance as compared with thinning and so the possibility of thinning to waste in difficult areas (i.e. without recovering the material) is discussed.

Costings showed that the establishment of Douglas fir is 50-100% more expensive than *P. radiata*.

Local volume tables were constructed and tested for different species and were found satisfactory. Mature hardwood volume tables were also produced, with sets of diameter/volume tables for 23 exotics. Crown closure/basal area relationships were investigated with the aid of aerial photographs. Large numbers of variables caused the abandonment of further thinning treatments on spacing trials—though thinning was applied to one considered uniform enough.

The first exotic forest survey was completed. Three tables show distributions of areas by conservancy, species, age classes, etc. *P. radiata* features most prominently, covering 65% of total area. The area planted in the last 10 years was 12% of the total, compared with 52% in 1926-35. 431 volumetric plots have been measured for accurate computation and maps and data of the surveys have been photographed.

An economic survey for land use was carried out in the Bay of Plenty in a 25,000 acre area.

Genetic studies have been carried out on *P. radiata* and other species, especially with regard to open pollinated families but a general lack of well designed experiments is felt. It is believed that hybrid vigour contributes more than do additive genetic effects, to the great phenotypic variation in vigour of *P. radiata*. Studies in mating patterns have also been carried out. Pruning of seed orchards to increase flowering was found effective.

Provenance research concerned *P. pseudostrobus*, *P. patula* and *P. montezuma* and 30 Douglas fir provenances. Analysis was greatly simplified by use of the computer in assessing 6 year old field trials in *P. nigra* and Douglas fir.

Growth of exotics on soils unsuitable for agriculture, especially the volcanic ash soils of North Island was studied. N. and P. deficiencies were investigated.

Entomological research involved investigations into the tortricids

and *Sirex*, showing Douglas fir to be more susceptible to the former than *P. radiata*. Insect damage to Eucalypts was examined and assessments of wood borers were made. Mycology mainly concerned nursery diseases. 6 Methyl bromide chloropicrin was found to be an effective soil sterilant reducing loss in the nursery.

Saturated solutions of 15 lb. amonium sulphamate crystals per gallon is an effective poison to control weeds and 2, 4, 5—T and 2, 4—DP are shown to be promising selective weed killers in *P. radiata* plantations, and 2, 4—D for Douglas fir.

Indigenous forest research with emphasis on the podocarps with regard to their susceptibility to animal damage, viability and shade tolerance, is being undertaken.

Animal research into living habits and population dynamics is under way. Watershed surveys, climatological and geological studies in forest terms are being carried out. Reafforestation investigations with reference to *P. contorta* as a pioneer are continued.

In the field of timber products and wood chemistry, shrinkage, the study of microfibrillar angle and heartwood formation in *P. radiata* is being assessed. Pole properties of *P. ponderosa*, seasoning, drying and wood preservation are all under review. Wood density of Douglas fir has been investigated. A study of steam effects on *Notofagus fusca* (Red beech) was initiated. 36 wood rotting fungi were isolated. Wood chemistry dealt mainly with analysis of wood cellulose in *P. radiata* and to a lesser extent with lignin extracts in Douglas fir.

The Report concludes with an account of Institute services—biometrics, library and publications. A list of professional staff is included and publications by staff, undertaken during the year are reported.

The Bulletin contains 4 tables and 16 photographic plates and is very comprehensive in its coverage of the year's work. Some indications of the research budget compared with the total State forestry budget would have been interesting. Perhaps a better dispersion of photographs and more illustrated diagrams would have aided the digestion of the very wide range of information.

G.G.