

completed for Mr. Hutchinson, Lecturer in Forest Utilisation, to hold a series of lectures and demonstrations at Ongarue during the first fortnight of February, 1931. The course will be similar to that held in Christchurch last year, covering the structure and formation of wood, moisture content, shrinkage, hygroscopicity, principles of drying, and commercial seasoning practice. All arrangements for the actual giving of the course are being made by those interested at Ongarue.

A further request for another course of lectures to be given in 1931, dealing more

fully with the nature and properties of wood has also been received from the North Canterbury Association.

The School of Forestry is gratified to receive requests such as the ones just quoted, regarding them as the surest proof that the work of the School is appreciated by the forest using industries as having a practical bearing upon their own problems. Its response to such suggestions is limited only by the capacity of its staff and finance, and an enlargement of this field of its teaching work is a constant aim.

Research

The programme of research carried out by the staff and students of the School of Forestry during the past year is as follows:—

I. Investigation into Growth and Yield of Exotic Plantations in Canterbury.

This project was continued as usual during the past year, measurements on the various plots being performed by student parties under supervision of Mr. Hutchinson, as part of the practical work in forest mensuration. Four more plots were added during the year, two in the thinning area near Hororata, and two at Homebush, the estate of Jas. Deans, Esq. The system thus embraces twenty-three plots in young stands planted since 1921, two plots in stands planted 1913 (the two on the thinning area), one plot in 60-year Douglas fir, and one in 30-year larch-bigtree, both these latter being at Homebush.

The twenty-three plots in the young stands have hitherto been measured annually to afford detailed information on early height growth, seedling mortality, and time taken to establish crown contact. For many of the plots these questions have been settled, the stands having already entered the pole stage for the insignis pine at least. A change to periodic measurements is therefore contemplated. Initial measurements for volume of material four inches and over were made on all stands now of pole size, and future measurements on these plots will be made at five-year intervals.

At Homebush, one plot has been installed in a stand planted 60 years ago to Douglas fir with spruce, larch, various pines, oak, bigtree, etc., the fir being spaced 18 feet apart, in a general spacing of 9 x 9. The Douglas fir has dominated the other species, which are now being removed, leaving an almost full stocking of fir on an 18 x 18 spacing. These trees are now 16in. to 22in. in D.B.H., about 95 feet in total height, and 60 to 80 feet to an 8in. top. The estimated super. ft. vol. is 56 M.B.F. per acre. The removal of the other species should make for good growth for the next decade or more.

The other plot at Homebush is in a 30-year mixture of European larch with bigtree, the spacing being 9 x 9. The larch is now 9 to 15 inches D.B.H. and 60 feet in height, and is being cut out for posts and mine props, while the bigtree, which is now 16in. to 20in. D.B.H. and 60 feet high, and is spaced 18 x 18, will carry on as a pure stand.

On the thinning area, one plot each was installed in the Corsican and pondosa pines, planted 4 x 4 in 1913. Measurements were taken of stocking and volume of material 4.0 inches and over just prior to the thinning, and again immediately after. The felled material was cut and stacked, and the utilizable volume in cords of firewood recorded. As these figures will probably prove of general

interest, they are given below. The basis of the thinning in each case was to give well-grown individuals every opportunity of expansion, which worked out roughly at giving every tree twice its present crown diameter. No attempt was made to select now the trees that would form the final crop, as it was considered a second thinning would certainly be necessary at some future time. The results are, all on a per acre basis:—

	P. ponderosa.	P. laricio.
Stocking at Planting ..	2722	2722
„ Prior to Thinning—		
Above 4in. ..	1160	990
Below 4in. ..	650	1390
Total ..	1810	2380
„ After Thinning—		
Above 4in. ..	750	610
Below 4in. ..	150	220
Total ..	900	830

	O.B.	I.B.	..	O.B.	I.B.
Total Volume—					
Prior to Thinning ..	3433	2807	..	3568	2758
After Thinning ..	2328	1849	..	1437	1186
Removed in Thinning	1105	958	..	2131	1572
Stacked Cords of Firewood	12	..		10	

Due to the large quantities of fuelwood available through the heavy storms of last January, no sale of the thinned material was possible. Under normal conditions it might have realised £1 per cord on the ground, as against a cost of thinning of approximately £13 per acre, for marking, felling, cutting and stacking.

II. Westland Rimu Forest Silvical Investigations.

Work on this project for the year under review was commenced in August, when the Spring Camp of the School was held for three weeks at the Experimental Station, several sections of the work being carried out by the students as part of the instructional pro-

gramme. Signal aid was rendered in this way particularly for those projects requiring considerable man-power, and the initiation of several silvicultural experiments was thus made possible. The work was then continued as usual by Messrs. Fowleraker and Hutchinson, assisted by P. S. Whitehead, during January and February.

Projects taken in hand were:—

Survey Work.—The tying in to the standard survey of the area of all the plots so far established. The making of a detailed type map of an area of cutover land, burnt slash, and pockets of young growth where it is planned later to do experimental planting of rimu. The demarcation and preparation of a topographic and type map of a forty acre plot of cutover land, partly burnt, where the progress of natural regeneration of rimu is being watched.

Growth Studies.—Re-measurements were made of seedlings and saplings on a number of plots where height growth is being recorded annually, while this branch of the work was considerably extended to include a further range of seedlings and saplings. A further sample plot for study of growth in pole and standard rimu was installed. The Perry's Bush sample plot was taken over from the Forest Service, re-measured, and the records put on a basis comparable with those on the Experimental Area.

Silvical Studies.—Data on germination of seed was secured from seedling count areas and seed reception areas previously established, while a detailed study was made of the progress of natural regeneration on a forty acre tract of recently logged over and burnt land.

Silvicultural Experiments.—The wilding rimu stock in the nursery beds was examined and measured, one bed being mossed as a protection from “mudding” in heavy rains. The saplings cleaned last year were measured against those on the control area to test response, though little was yet evidenced. A modified shelterwood cutting was carried out under a half acre of mature rimu, by which all undergrowth was removed, leaving the ground free to receive rimu seed. Counts of seedlings germinated will be made periodic-

ally. A thinning was carried out in a stand of dense kahikatea poles, and measurements of growth initiated. A small area of cutover land was planted to rimu seedlings of known age and history to test their power to develop on cutover scrub land.

III. Investigations into Minute Structure of Wood.

These investigations have been continued throughout the past year by Mr. B. E. V. Parham, the following projects having been undertaken:—

1. A detailed study of the wood anatomy of the genus *Nothofagus*, a thesis for M.A. degree. With this work went the task of elaborating a system of identification for the New Zealand species, including structural, chemical and combustion tests.
2. A study of the wood structure in *Dacrydium Colensoi* (silver pine), *D. biforme* (yellow pine), and *D. intermedium* (mountain pine) with a key to identification of the first from the other two.
3. Studies of seasoning defects in Silver Beech (*N. Menziesii*).
4. The pathological nature of "heartwood streaks" in rimu, associated with the borer *Platypus gracilis*.
5. The occurrence and probable cause of pathological heartwood in *Nothofagus* species.
6. The suitability of tawa (*Beilschmiedia tawa*) for tight cooperage.
7. Identification of numerous specimens of native and exotic timbers furnished.
8. The preparation of slides and photomicrographs of native and exotic timbers.

IV. Students' Special Studies.

Three special studies have been carried out by senior students during the past year in satisfaction of the requirement for the presentation of a report covering an advanced treatment of some section of his course.

A study of varietal differences exhibited by *Pinus radiata* in Canterbury was made by G. H. Hocking. This appears in abridged form in this issue of "Te Kura Ngahere."

An investigation of the possibility of tapping local *P. radiata* and *P. pinaster* commercially for resin was carried out by M. R. Skipworth. This also is published in condensed form in this issue of the Journal.

Working in the field of logging engineering, C. T. Sando carried out an appraisal of the Hanmer plantations. The project was intended as an exposition of various elements of cost in their bearing on royalty values, and consisted of a treatment of the same data as for different sizes of operation, and with different standard methods of deriving the indicated royalty. As the Hanmer plantation is as yet unmerchantable, and as it is composed of exotic species whose yields and market values have yet to be determined, it was necessary to assume much of these basic facts from the best of present knowledge, so that the figures ultimately derived rest upon a theoretical basis which may not be fulfilled in actuality. The study is, therefore, not published in this journal. The finished report, however, is worthy of the highest praise, being complete, detailed, and revealing a sound knowledge of logging methods, the practical factors governing logging costs, and the methods and use of costing analysis.

The full text of all these reports is filed in the library of the School of Forestry.