

## VOLUME TABLES AND MILL STUDIES.

Timber-volume tables are being prepared for the main commercial species, and, on account of the varying tree-growth conditions in different parts of the Dominion, separate tables are necessary for each conservation region. Tables for rimu and kahikatea in Westland, and for rimu in Southland, have been completed, and will prove invaluable in reducing timber cruising-costs, as well as in other ways. A large number of tree-measurement data have been obtained by the field staff, and to sawmillers who have by their co-operation given every facility to the forest officers entrusted with this field-work the thanks of the Service are due. As technical staff becomes available, the delay in the compilation of curves and tables from the field data will be speedily overtaken.

Data in connection with mill studies have also been obtained, and the final tables will be of great benefit to buyers of standing timber. In New Zealand it has always been the rare exception rather than the rule for sawmillers to make accurate investigations into the actual quantity of sawn timber ultimately produced from the standing-tree—investigations of a necessarily slow nature. In other countries the conclusions obtained from mill studies have invariably led to the installation of better appliances for the saving of waste in all phases of conversion from the tree to the board. If this result is obtained in New Zealand the work will have been worth while, for closer utilization must be the slogan with which to combat our vanishing supplies.

## 2. FOREST-PRODUCTS INVESTIGATIONS.

The average New-Zealander usually looks askance at the secondary timbers of the Dominion. That prejudice is probably due to lack of knowledge regarding the exact properties of these timbers. Only by research and experiment may their true value and suitability for various uses be demonstrated. For this purpose the mechanical, physical, and economic properties of the whole of the secondary timbers are being investigated by the Forest Service in co-operation with the Engineering Department of the Auckland University College. This is the beginning of the work. Once established, these properties enable the value of any timber for any purpose to be judged. If at all suitable, samples of the product are constructed, and tested in the laboratory and in actual service. Where the results are satisfactory the information is broadcasted to the public. A bulletin dealing with the use of each timber will be issued. Two have already been completed and will be published shortly—viz., Bulletin No. 3, "Utilization of Tawa"; Bulletin No. 4, "Utilization of Silver-beech."

A special pamphlet dealing with the utilization of silver-beech was prepared by the Forest Service for the Southland and Otago Co-operative Timber Company (Limited), from whom copies are obtainable.

Several timbers were tested for the manufacture of wooden matches, and white-pine was found very suitable for this purpose. Had the work been instituted five years ago an industry might have been saved to New Zealand, for in 1917 a complete wooden-match-making equipment which formerly used imported wooden splints from Russia was transferred from Wellington to Melbourne. It is to be hoped that the excellent qualities of the white-pine will ensure the re-establishment of the industry within the near future.

The Imperial Institute tests (1921) dealing with the manufacture of wood-pulp and paper from New Zealand timbers were supplemented during the year by a further series of tests carried out by the Forest Service in co-operation with Messrs. Boving and Co. of London. These tests demonstrated beyond all doubt the exceptional value of rimu and white-pine for the manufacture of the highest class of papers. The investigation is of far-reaching importance: in a typical group of fifty-three sawmills in Westland there are available per day 164 cords of sawmill waste, the greater part of which can be turned into wood-pulp and paper. The proposal warrants the consideration of financial interests both in New Zealand and abroad.

Rata has been proved superior to, and mangeao at least equal to, tallow-wood and spotted gum for cross-arm construction. Other timbers, including red-beech, hinau, and various hardwoods grown on Forest Service plantations, are being tested. An interim report—Circular No. 6, "Test of Cross-arms"—dealing with the result of this work, is available for distribution.

Mr. H. D. Tiemann, M.E., M.F., Physicist and Dry-kiln Expert to the United States Forest Service, visited New Zealand during the year and investigated the utilization and kiln-drying of New Zealand timbers. As a result of his visit several kilns were redesigned and their operation much improved. Mr. Tiemann's report, entitled "The Better Utilization and Kiln-drying of New Zealand Timbers," will shortly be available as Bulletin No. 2 of the Forest Service. It draws attention to the huge loss due to the use of imperfectly seasoned timber which is so susceptible to dry rot and attack by borer, &c. This destruction may be avoided by the use of timber thoroughly air and kiln dried. In kiln-drying every timber requires different treatment, and before any substantial progress can be made it will be necessary for the Forest Service to instal an experimental kiln for the purpose of determining definite drying schedules for use by commercial kiln operators. It is hoped to commence this project during the coming year.

A series of tests and experiments to discover effective methods of preserving posts, poles, and outdoor-construction timber against decay was commenced during the year. Satisfactory methods for the treatment of a large number of timbers have been developed. The treatment of hardwood poles is a problem of great importance, and a satisfactory solution is already in sight. Many telegraph and power-transmission line poles for which a life of sixteen to twenty years was claimed are now being replaced at the end of an eight-year period due to the decay of all sapwood. The suggestion has been made that the difficulty can be avoided by chopping off all sapwood,