

- (3.) The development of new-type butter-boxes in which other timbers of low value are substituted for the high-priced and elusive white-pine.
- (4.) Investigation of the New Zealand beeches as to their best use as containers for tallow, hides, sausage-casing, &c.
- (5.) Investigation into the broad field of new uses for wood, and its application. It is only by the development of ready markets that we can hope to utilize the vast amount of wood which is at present thrown aside in the manufacture of timber.
- (6.) Investigation into the possibilities of built-up timber. For instance, the Southern Pacific Railway Company are at the present time testing a built-up railway-sleeper in Nevada. This sleeper only uses 10 per cent. of the wood volume of the solid sleeper, and it also saves 15 per cent. in the number per mile. This sleeper is preserved before use. In its construction short lengths and widths are used, and the whole is bound together with 1 in. wood dowels. There are many other outlets for inferior qualities of timber, and it should be the duty of the Forest Products Laboratory to thoroughly investigate the value of the low grades.
- (7.) At the present time there is a great lack of definite technical knowledge as to the mechanical and technical values of wood in New Zealand. One of the first problems should be to make a thorough study of each timber-species as to identification, mechanical properties, physical and chemical characteristics and properties.
- (8.) Air seasoning and artificial drying.
- (9.) Agencies destructive to wood.
- (10.) Wood-preservation.
- (11.) The possibilities of gum-bleeding; extraction of kauri-gum in swamps, &c.

The advice of the writer is that this Service in its forest research should co-ordinate its work with that of investigators in other parts of the Empire—such as Canada, British Columbia, Australia, India, South Africa, and Great Britain—and with that of other countries—such as Sweden, France, Germany, Italy, United States, Philippines, Malay States, Japan, Hawaii—and of those countries in South America that are carrying on forest research.

In conclusion, it is suggested that wherever it is possible to co-operate in this research work with the Lands Department, Department of Agriculture (Biological Section), or Department of Public Works, steps to secure such co-operation should immediately be taken.

NOTE.—The existence of a Forest Products Laboratory in the execution of a modern forest policy is a very important and essential one in countries such as Canada, India, Australia, United States of America, and New Zealand, where means of fully utilizing the rapidly diminishing supply of timber must be secured. India, five years ago, established a Forest Products Laboratory with a commencing appropriation of £70,000; to-day the Indian Government is spending £400,000 in expanding its field of influence. Western Australia recently appropriated £500 to assist in the erection of a laboratory at Perth University. Canada has a well-equipped laboratory which has justified its existence; while the Forest Products Laboratory of the United States has attained international fame through its good work. This institution has saved millions of dollars to the manufactories of that country. In British Columbia a Forest Products Laboratory has been established in co-operation with the University of British Columbia. During the war much valuable work was done in timber-testing and aeroplane-stock investigations.

INVENTORY AND CLASSIFICATION OF THE FOREST RESOURCES, FOREST LANDS, AND SOILS OF NEW ZEALAND.

An outstanding and immediate need at this stage in the development of a Dominion forest policy is for *exact information as to the present forest and timber situation*, so that fact may replace opinion and the exact truth may be known. Assuring progress towards a solution of the forest problem cannot well be expected until the starting-point itself shall have been determined. Present information is fragmentary, widely scattered, and theoretical. There must be a definite assembly of the facts appertaining to—

- (1.) The past, present, and future consumption of wood by the nation in all its localities and by all its industries.
- (2.) The extent and value of the indigenous forests.
- (3.) The protection and climatic values of forest areas in all districts.
- (4.) The means of meeting future demands.
- (5.) Rate of growth (accumulation of new wood-fibre), and the value between growth and consumption..

Your investigator advises that provision be made and funds provided by the legislative body for a definite and thorough-going stock-taking of the forest resources, forest lands, and forest soils of the Dominion by this Forest Service in co-operation with other interested Government services. The following information to be collected:—

- (1.) Reliable statistics as to the past, present, and probable future wood needs of all industries and communities.
- (2.) Distribution, accessibility, and extent of all the standing forests and forest lands on Crown, Native, and private areas.
- (3.) The general rate of growth of all species.
- (4.) General means of natural and artificial regeneration.
- (5.) The forest-fire protection standards for each region.
- (6.) A general classification on modern standards of the forest soils—their relative suitability for forestation or for agriculture, extent and area.
- (7.) The relative value of all forest lands for (a) national and local supply, (b) public safety, (c) public health.