80. *Structural Utilization.*—The following observations upon the use of insignis-pine framing-timber are recorded for public information:—

(*a*) In several instances the problem of non-availability of long lengths, principally 18 ft. and 16 ft. of No. 1 Dimension, for ceiling joists and rafters has been solved by the use of No. 2 Dimension with double the normal number of 8 in. by 2 in., 6 in. by 2 in., or 4 in. by 3 in. runners, &c., to strengthen the complete assembly.

(*b*) The erection of green-timber framing is to be strongly deprecated as likely to result in sag and decay. It is essential that all framing-timber should be dried to approximately 20 per cent. moisture before use, and the Forest Service opposes the current belief that timber dried to only 40 per cent. moisture can safely be used.

(*c*) Kiln-drying of framing-timber gives the most satisfactory results.

In a number of houses in the Hamilton area, insignis pine has been used extensively during the last thirty years. The ages of the houses inspected ranged from seventeen years to over thirty years. In addition to weatherboarding, flooring, interior woodwork, and wall and roof framing, insignis pine was used in two instances as floor joists (6 in. by 1½ in. in one house). The very satisfactory service being given by this timber should help to dispel doubts as to its suitability. Instances of the successful use of insignis pine in the South Island are also numerous.

Locally grown Douglas fir, too, has been used during the year for wall framing in a number of Christchurch houses.

81. *Mill Studies.*—Several mill studies were made to ascertain the production from logs of a number of species. Two totara studies, one in a Rotorua district mill and the other near National Park, concerned primarily sleeper production and the incidental timber sizes obtainable from the residue of the logs. Another short investigation covering the sawing of small matai logs revealed a low percentage of heart grades.

The most comprehensive study continued over a period of three weeks on all classes and species of logs produced from State Forest No. 96, near Mangapeehi. A total of 559 logs, comprising 169 rimu, 268 matai, 66 totara, and 56 kahikatea, and containing 30,654 cubic feet., were sawn. The product was graded and analysis made to show grade percentages by log classes for each species. Conversion factors and other valuable information on bark thickness and log scaling and classing were also obtained as a result of this study.

82. *Utilization of Minor Timbers.* The extensive use of timbers previously rated as minor is indicated by the rising production figures reported elsewhere. Indigenous hardwoods are chiefly affected, but attention is focused also upon numerous locally grown European and Australian hardwoods, and upon Douglas fir, macrocarpa, and other exotic softwoods. The industries and timber-uses most affected are:—

(*a*) *Furniture:* Tawa, taraire, and rewarewa retain their importance as good-quality figured woods, but preservative treatment of all three woods is essential if they are to give satisfactory service.

(*b*) *Ship and Boat Building:* The scarcity of kauri has brought numerous inquiries for tanekaha and yellow-heart white pine. Irregular supplies of the durable red and hard beech, with their good bending and good wearing qualities, have forced users to seek locally grown elm, and to give consideration to preservative treatment of woods of poorer natural durability *e.g.*, mangeao and tanekaha. For canoes of Canadian pattern the Forest Service has recommended silver beech for ribs, red and hard beech for strakes, &c., and spruce, kohekohe, or white pine for paddles.

Investigations were made into the premature rotting of kauri planking in a small ship after a very short period of service, two other older vessels being similarly affected. These instances emphasize that types of construction such as the "three-skin" method which expose timber to extreme decay hazards should be avoided, since the middle skin (diagonal sheathing) is particularly subject to rotting when condensation water from an adjacent hold or fresh water from other sources penetrates to it. The sea-water permeates a short distance into the outer planking and rot extending from the affected