

84. *Box-testing*.—No tests of any consequence were carried out during the year with containers for export of produce. To meet a deficiency in wooden bacon-cases, plywood cases were designed and gave very satisfactory tests in the drum-tumbler machine. Revised nailing schedules for soap-boxes were prepared, and specifications were drafted to cover the nine principal local-trade fruit-cases whose retention was considered necessary by the Fruit Case Committee. Local shortages in timber-supplies make it necessary to eliminate cases that have little re-use value and to substitute where practicable cases that are suitable for a number of products. Technical assistance was continued with moisture-content testing and inspectional work to ensure that specification requirements were met for munitions and other supply containers for the Armed Services.

85. *Wood Technology*.—Fundamental studies of the physical properties of the wood of exotic-forest trees have been concerned primarily with loblolly pine and ponderosa pine from Whakarewarewa Forest and insignis pine from Kaingaroa Forest and Golden Downs Forest :—

- (a) Loblolly pine cross-sections from three trees from which bolts for standard-strength tests were also cut showed specific gravity variation ranging, for instance, in dominant trees from 0.361 at butt level to 0.300 at 4-in.-top-diameter level. Analysis by zones from bark to pith shows a small decrease in specific gravity until a more resinous heartwood zone is reached in the butt log. There were no marked differences in longitudinal shrinkage from the pith to bark, nor is this shrinkage excessive.
- (b) Ponderosa pine cross-sections from one tree showed little variation in specific gravity with height in the tree, but rather high values for longitudinal shrinkage, and further study is imperative.
- (c) Insignis pine butt sections and 4 in. to 5 in. top sections from three trees (Kaingaroa Compt. V.8) averaged 0.411 specific gravity (based on weight oven-dry and volume green) in the 11-in.-diameter butt sections and 0.331 in the top sections.
- (d) Detailed analysis of the physical properties of twenty-eight insignis-pine trees from Golden Downs have been completed. Variation of properties with height in tree and from bark to pith is covered by specific gravity (green and air-dry bases), ring width, and latewood determinations. In line with the consistent decrease in specific gravity from butt to top are the volumetric shrinkage, linear shrinkage (radial, tangential, and longitudinal), and latewood percentage. Ring width and green moisture content increase from butt to top.

Miscellaneous tests included specific gravities of several exotic hardwoods, such as : black locust, 0.646 ; ash, 0.571 ; and elm, 0.486. Numerous moisture-content tests were made for wood-using industries.

Thirty-two Solomon Islands woods were tested for specific gravity (weight oven-dry, volume green) and shrinkage. Relating these woods to well-known New Zealand woods on the basis of this basic specific-gravity determination, it is noted that nearly half of them are medium-density woods in the rimu-tawa range, eight woods being lighter than kahikatea and seven heavier than tawa. In the last-mentioned group of woods several had the desirable property of slight shrinkage (relative to their density).

Microscopic examination of woods was primarily concerned with identification of lesser-known woods for new industrial applications, but was also related to botanical and soil investigations. Studies of failures in service included a brashy fracture of a hemlock ladder style, serious failure of wooden parts of ailerons in fighter aircraft (from which subsequently the rot fungus was cultured), and the decay of kauri in three-skin ship construction (see paragraph 82). Routine identification of over fifty specimens was carried out. Additional material has been received from the Pacific islands and microscopic examinations are proceeding. Considerable interest in the Pacific woods and their properties is being shown by industries requiring decorative woods and veneers.