Density and Moisture Content of New Zealand Pinus radiata D. Don.—By R. V. Hughes and A. W. Mackney. Published in *Proceedings of the Australian Pulp and Paper Industry Association*, Vol. 3, 1949.

Authors' Summary—"Results are presented to show within-log and between-log variations in basic density, green density and moisture content for a total of 210 trees of *Pinus radiata* D. Don. The trees were collected in three groups at different seasons from the Maraetai area of the North Island of New Zealand.

Between-log comparisons showed basic density to vary significantly with season, the lowest value being obtained in the season of maximum growth. Green density was shown to differ significantly between tree classes, the trend being toward a lower value for the less vigorously growing trees. Moisture content values showed a wide variability with some evidence of significant differences between seasonal groups. The overall mean values were 23.55 lb./cu. ft., 61.0 lb./cu. ft., and 161 per cent for basic density, green density and moisture content respectively.

Within-log comparisons for basic density showed increases from pith to sap and from top to butt of tree with an indication of infiltration of extraneous material at the butt pith causing a rise in density in that area. Green density was shown to rise sharply to a point distant approximately 25 per cent of the tree volume from the pith; thereafter it rose slowly to a maximum of 67 lb./cu. ft. Moisture content was found to rise to a maximum at a distance of 20 per cent by volume from the pith after which it showed a decrease."

The authors who are on the technical staff of N.Z. Forest Products Ltd., have limited their study to trees approximately 22 years of age from one site class, and, within these limits, have presented a mass of very useful data in tables and graphs. Test material falls into three groups collected in late spring, mid-summer and winter. Among other comments on "Whole-log Results" it is interesting to note that the late spring group has a lower basic density than the other two groups, from which it is assumed that depletion of reserve food materials may have a significant effect on density. For the winter-felled group which contained 20 trees in each of the dominant, co-dominant and semi-suppressed crown classes, there was no significant difference in basic density between the three classes. When green density is discussed, the decreased values recorded for semi-suppressed trees are attributed to a decrease in moisture content as suppression occurs; however, the moisture content values fail to indicate the expected significant differences.

In the discussion of "Within-log Results", the basic density figures show a lineal increase towards the bark (outside the heart section) with no indication of flattening in the curve for trees up to 22 years in age. Green density values, neglecting the effect of infiltrates in the heartwood, increase from pith to bark; in the central zone the values increase rapidly to 62.5 lb./cu. ft. and then very gradually to a maximum of 67 lb.cu./ft. Moisture content values increase sharply from the heartwood (45-50 per cent) to a maximum (up to 190 per cent) at a point distant 20-25 per cent by volume from the pith, and thereafter fall gradually towards the bark to 150 per cent following the trend noted for gradual increase in basic density.

Further light on a number of the trends remarked by the authors in 22-year-old trees will be thrown by studies of older age classes from other sites. Most of the unpublished data on tests by other investigators is base on relatively small numbers of trees; it will, therefore, be appreciated that the study under review will be of great value as the background to the interpretation of test results obtained from other studies conducted with material from a wider range of sites and age classes.

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