NOTES

INDIGENOUS TREE RINGS

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The very slow growth in diameter of indigenous species when compared with radiata pine is well known. An occasional kauri, totara, and rimu has been found which under forest conditions has grown at a comparatively fast rate, with ring widths up to ¼ in. apart, but these are exceptions. One of the difficulties in calculating the growth rates of indigenous species is that the annual nature of the growth rings has never been satisfactorily proven.

Several workers have examined young trees that have been grown in gardens or parks comparing the number of completed well defined rings against known age. These have been found to correspond reasonably closely, but not exactly, with the age of the tree. For instance, James Stewart (1905), commenting on a cross section of planted rimu obtained from the Auckland Domain, stated: "In several of the rings, especially in the ten larger, there are quite evident traces of subgrowths, two, three or even four in one year". In 1936 R. D. Campbell (formerly Conservator of Forests, Auckland), obtained a cross section of a young kauri from Brigham's Creek (near Riverhead). It had been planted in 1902 when 6 in. high. He stated that "the well defined rings *seem* to coincide with that information". In the same year C. T. Sando (1936), published the following information about a kauri: " . . . a section of a 'ricker' taken at ground level was recently counted and showed 46 complete rings. By grouping, the age was estimated at just over 30 years and it was afterwards ascertained from the owner that it was 34 years since planting from the bush when the seedling was only 6 in. high". W. D. Francis (1928) writing of Australian araucarian conifers stated that "it appears highly probable that two, three, or even more rings may be added to the woody cylinder in one year". A recent research note in *Scottish Forestry* (Glock, 1961) stated: "Forest border trees in Texas, both broadleaf and conifers, showed very frequent false rings which could not be differentiated from true annual ones. Irrigated trees showed 15 sharply defined rings in four years' growth."

When analysing stems of forest-grown indigenous conifers of unknown age, it has been general practice to accept each complete ring as being representative of a year's growth in circumference. However, the above evidence suggests that there is good reason to believe that false rings occur quite commonly in indigenous conifers.

One rule of thumb that has been used is that if a thin band of summer wood lies close inside a thick band of summer wood, it is part of a false ring; but if a thin band lies immediately outside the thick band, the thin one constitutes a separate annual ring. This

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rule operates satisfactorily when applied to fast grown indigenous and exotic conifers that have wide rings. There is a comparatively wide band of spring wood and a sharply defined boundary between the summer wood and the next season's spring wood. Radiata pine of known age in Russell Forest show as many as three complete false rings in some seasons, but there is little doubt as to their false nature, because the final summer band is thicker and has sharply defined outer periphery. An exceptionally fast grown rimu (15 in. d.b.h.; 61 ft high; estimated age 57 years) from Russell showed exactly the same features.

Where rings are very narrow, however, it is more difficult to apply this rule as it is very difficult to differentiate between true and false rings; both are very much alike in width and sharpness of boundary. On the other hand there is often a quite striking regularity of paired or triple rings, each "set" being separated from the next by a wider band of spring wood than occurs within the "set" itself. It happens too regularly to be a coincidence and is found in tanekaha, kauri, rimu, totara, and kahikatea in Russell Forest.

Table 1 shows the difference in age for five species from Russell (all from one compartment) when annual growth is recorded by grouping rings and when it is recorded by counting each complete ring as a year's growth. The ages shown are the average of approximately 25 stems over the range of diameters. All stems were obtained from naturally regenerated unthinned stands.

TABLE 1: AGES OF FIVE SPECIES DERIVED BY TWO METHODS

Size Class (in.)	*Age of Species (years)*											
	Kauri		*Tanekaha*		*Rimu*		*Totara*		*Kahikatea*	
	G	*S*	*G*	*S*	*G*	*S*	*G*	*S*	*G*	*S*
2	27	35	33	43	22	30	27	37	19	24
3	26	39	33	47	31	38	30	38	—	—
4	31	52	42	54	39	49	43	51	22	31
5	36	59	39	60	30	42	41	52	—	—
6	—	—	43	66	—	—	—	—	—	—

G = Age by grouping. S = Age by single ring counts.

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