For the Sake of Argument

Planning for intensive forest management must use price/size gradients.

From my observations on field trips to the Central Interior of BC and Ontario this summer, it seems as if too little attention has been paid to the issues raised in Dec. 1967 by John Osborn when he argued in this column "Plant them wide, George". John presented sound arguments and good data to show that planting white spruce at 8×8 feet gave economically superior results. He demonstrated that any loss in yield per acre by comparison with closer spacings could be abundantly compensated by planting more acres. In these times of reduced budgets the need for getting maximum value from scarce resources provides a compelling stimulus, yet many Canadian foresters continue to plant their trees at comparatively close spacings. Part of the reason may be the advice of traditionally minded foresters who have felt that planting of a minimum of 4000 to 5000 seedlings per ha is essential to ensure "good results", and their failure to plan for integrated production of pulp-logs and sawlogs. Others may lack data from spacing trials and have legitimate concerns about the impacts of wide spacing on tree quality. Most suffer from a lack of good examples and sustained research on cost and benefits from various management regimes.

A recent projection of growth of Douglas-fir in the UBC spacing trials to age 60 on a very good site can be used to illustrate some dimensions of the argument. Under the assumptions made, planting of 1329 trees at 9×9 feet yielded $945 \text{ m}^3/\text{ha}$ of merchantable volume, planting of 747 trees at 12×12 feet yielded $869 \text{ m}^3/\text{ha}$, and planting of 478 trees at 15×15 feet yielded $751 \text{ m}^3/\text{ha}$. Obviously, as Osborn (1967) showed the cost of growing the extra wood at closer spacings is exceedingly high. Use of the "extra" trees planted at the 12 and 9 foot spacings

on additional area could greatly increase yields from the limited supply of growing stock. Planting of 1.78 times the area at 12×12 could increase yield by 601 m^3 ; planting of 2.78 times the area at 15×15 could increase yield by 1143 m^3 in comparison with use of 1329 trees at 9×9 feet. But what about the effect of wider spacing on wood value? Recent analyses suggest any impacts are likely to be acceptable but great improvements could be made by pruning (Smith and Kennedy 1983). More importantly, the 12×12 trees would be 2.5 cm larger in dbh and the 15×15 3.8 cm larger than those at 9×9 . Even these modest increases in average size should create value gains large enough to compensate for volume losses in comparison with 9×9 spacing or to add to the values gained from using the 1329 trees at wider spacings.

Estimates of the effect of price/size gradients on price of stumpage for sawlogs from 9 Regions were assembled by Sutton (1973) who found that prices for 25 cm dbh trees ranged between 2 and 14 dollars (NZ) per m^3 and increased 32 to 200% up to 50 cm dbh. Pruning nearly doubled the gain in stumpage values between 35 and 50 cm dbh. For the United Kingdom, estimates of value increase from $\$9.18$ per m^3 at 15 cm dbh to $\$17.48$ at 25 cm dbh and peak at $\$20.83$ from 40 cm dbh trees (Busby and Grayson 1981). The increase in value between 15 and 40 cm dbh is 127%. Recent values for Douglas-fir stumpage in the Pacific Northwest States increased from $\$6.00$ per m^3 of 25 cm dbh second-growth trees to $\$32.49$ for 50 cm dbh trees, a gain of 442% (Ritters *et al.* 1982). Although impressive, such estimates of stumpage differentials may not reflect the full increase in value which results from reduced harvesting and milling costs and premiums for width and length in large trees.

A few Canadian studies have illustrated the importance of price/size gradients to forest managers. Premiums for size and quality were illustrated for Douglas-fir,

western hemlock, and western redcedar by Smith *et al.* (1961). Economic incentives for management of white spruce and red pine were summarized by Love and Williams (1966). Dobie (1966) thoroughly documented the effects of many determinants of value for Douglas-fir. He found that value increased from $\$1.48$ per m^3 for 25 cm dbh trees to $\$11.92$ per m^3 for 50 cm dbh trees (a gain of 705%).

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