Session I
Paper (c)

LIMITED SCALE LOGGING IN CANTERBURY

R. R. Miller
Manager
Canterbury Forestry Foundation

INTRODUCTION

Canterbury has never been highly regarded by forestry interests as an area with high potential for commercial forestry development. North Canterbury received the lowest priority ranking at the 1981 Forestry Development Conference (4th) along with Taranaki, Manawatu/Wanganui, Wairarapa/Wellington and the West Coast.

The hazards of wind and fire, the low rainfall and slower growth rates have deterred large forest companies from investing in Canterbury and limited the scale of State forestry. At a recent seminar run by the Canterbury United Council (May 1985) to discuss forestry development in the region the position of the Forest Service was made very clear :

- no new State plantings in North Canterbury
- logged areas will be replanted only provided economic evaluation stands up to Treasury criteria (there is now a name for this; it is called a 'de-investment' policy).

The consequence of this is that the small forest grower (farmers, small companies and local authorities) have been, and will continue to be responsible for much of the planting carried out in the region.

The nature of the forest industry in Canterbury is probably unique and clearly qualifies for the term "limited scale".

The 55 registered sawmillers in the region and the logging industry which supplies them have developed around a forest resource which is widely dispersed, often in small holdings and of uneven age distribution.

Logging operators, like the sawmillers, are competitive and have developed their operation to suit the particular characteristics of the region.

This paper outlines the features of the forest resource in Canterbury, the wood users and the kind of logging industry which has developed to efficiently supply them.

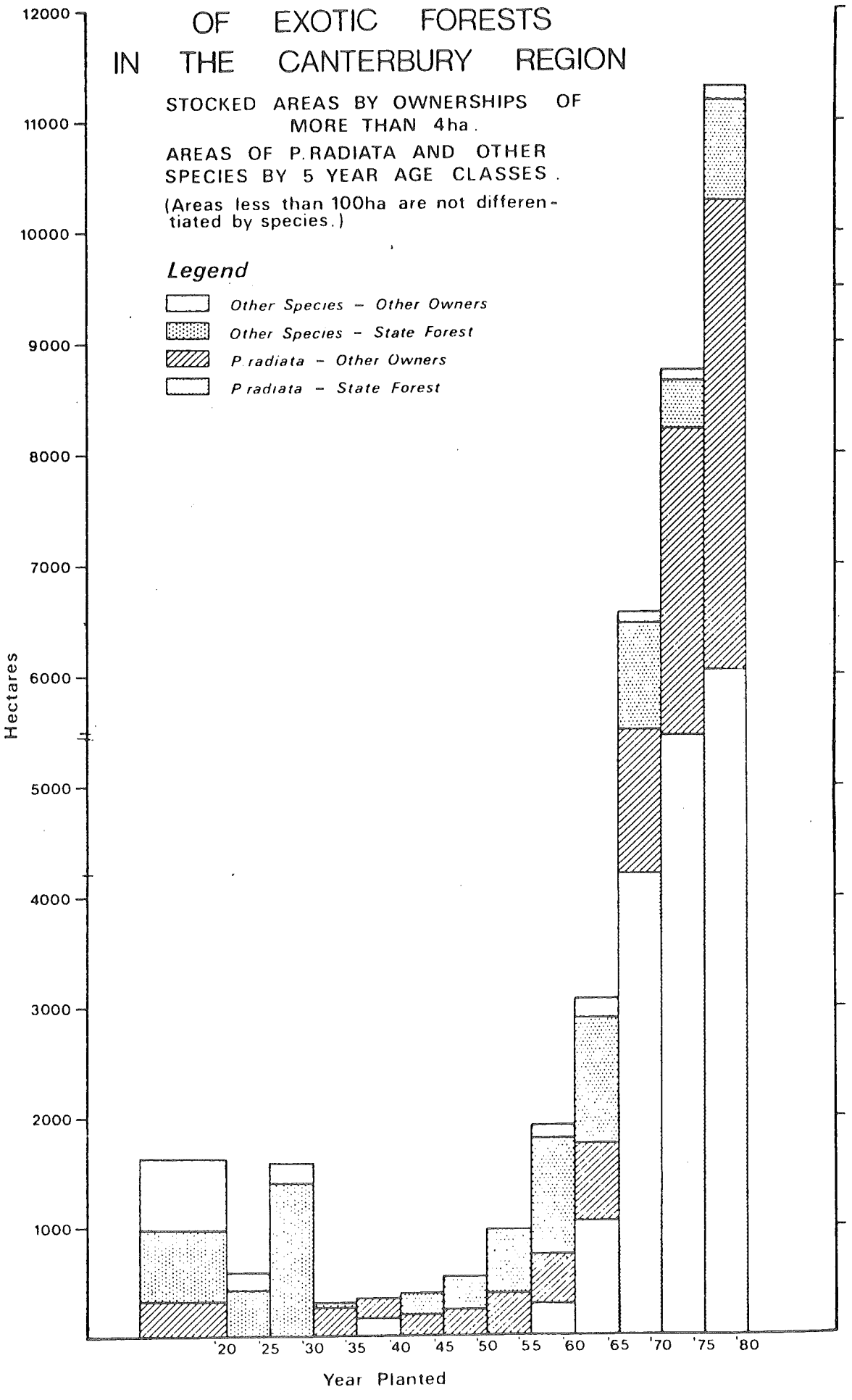
FIGURE 1

AGE CLASS DISTRIBUTION OF EXOTIC FORESTS IN THE CANTERBURY REGION

STOCKED AREAS BY OWNERSHIPS OF MORE THAN 4ha.

AREAS OF P.RADIATA AND OTHER SPECIES BY 5 YEAR AGE CLASSES.

(Areas less than 100ha are not differentiated by species.)



Source - N.Z.F.S Canterbury Conservancy

C W 12 81

THE FOREST RESOURCE

Figure 1 shows the age class distribution of exotic forests in the Canterbury Region.

The lack of resource older than 25 years is the cause of Canterbury's current severe log supply shortage. The supply of sawlogs in the region in relation to sawn timber requirements for local consumption and export is projected in Fig. 2.

Resource Ownership

Apart from the decreasing availability of sawlogs in the region during the next 10 years, Fig. 2 illustrates the significance of the private forest owner as a wood supplier. Currently 75% of the sawlogs cut in Canterbury are from this source with the State supplying only 25%.

With the exception of the Selwyn Plantation Board which owns 6765 ha of forest; the Ashburton County Council which owns approximately 500 ha, and several other local authorities and companies, the private resource is in small holdings - mainly farm woodlots and shelterbelts. Only 39% of the 200 members who belong to the Canterbury Forestry Foundation, an organisation which markets wood for the private grower in Canterbury, have more than 4 ha of forest (refer to Figure 3).

Despite the significance of the private owner as a supplier at the present time, the State is nevertheless the largest forest owner in Canterbury. Table 1 lists the forest estate ownership for the region as at 31.3.83.

TABLE 1 : CANTERBURY EXOTIC FOREST AREA AS AT 31.3.83

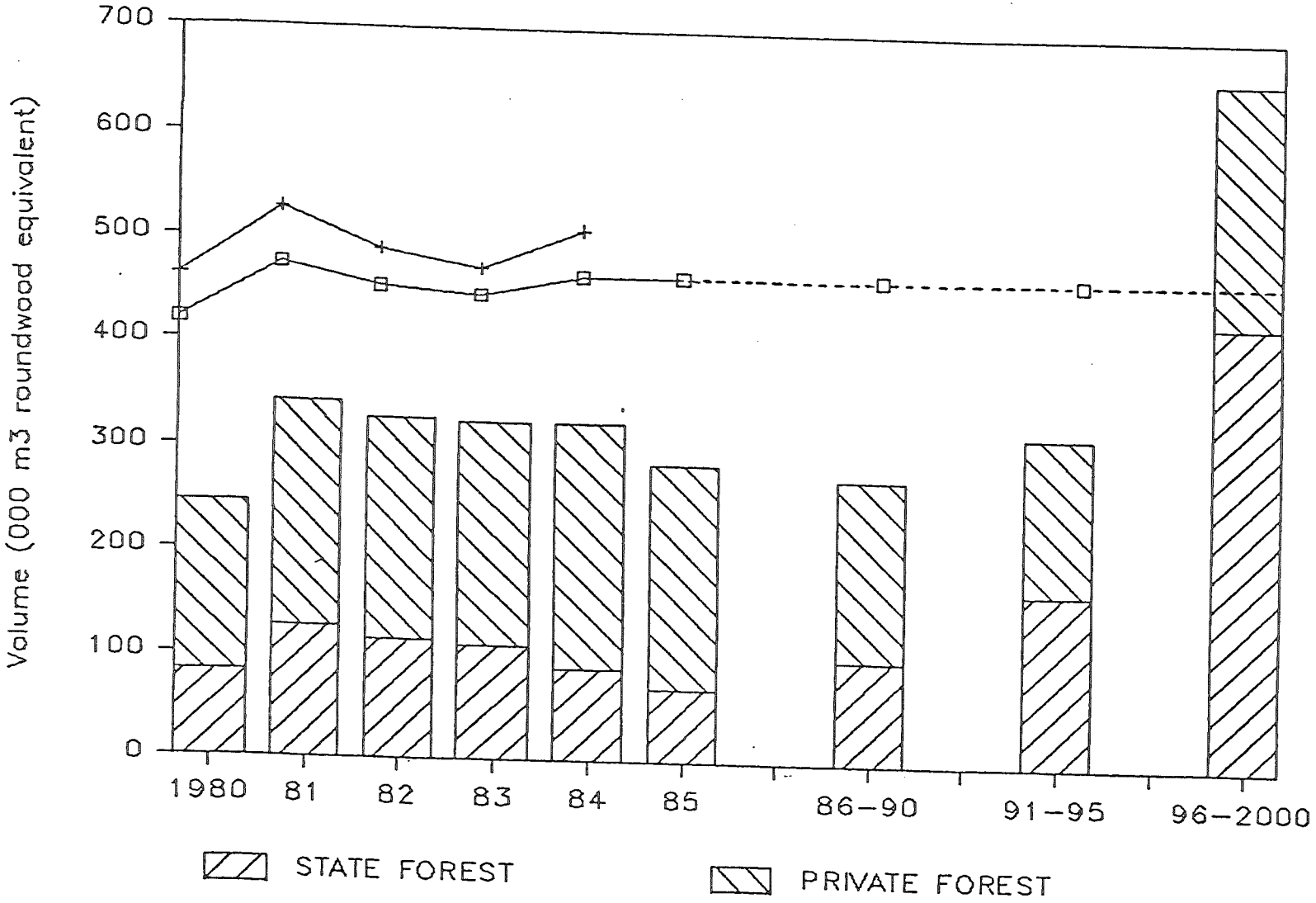
	State Forest	Private Forest	Total	Average Age
	(ha)	(ha)	(ha)	(yrs)
North Canterbury	25 431	15 141	40 572	14
South Canterbury	4 312	7 748	12 060	17
TOTAL	29 743	22 889	52 632	
%	57%	43%	100%	
% OF NZ TOTAL	6%	5%	6%	

(Source: ref. 1)

Terrain on Which the Resource is Located

The State resource is in 10 forests scattered through the region. Two of the forests - Eyrewell and Balmoral are on the plains

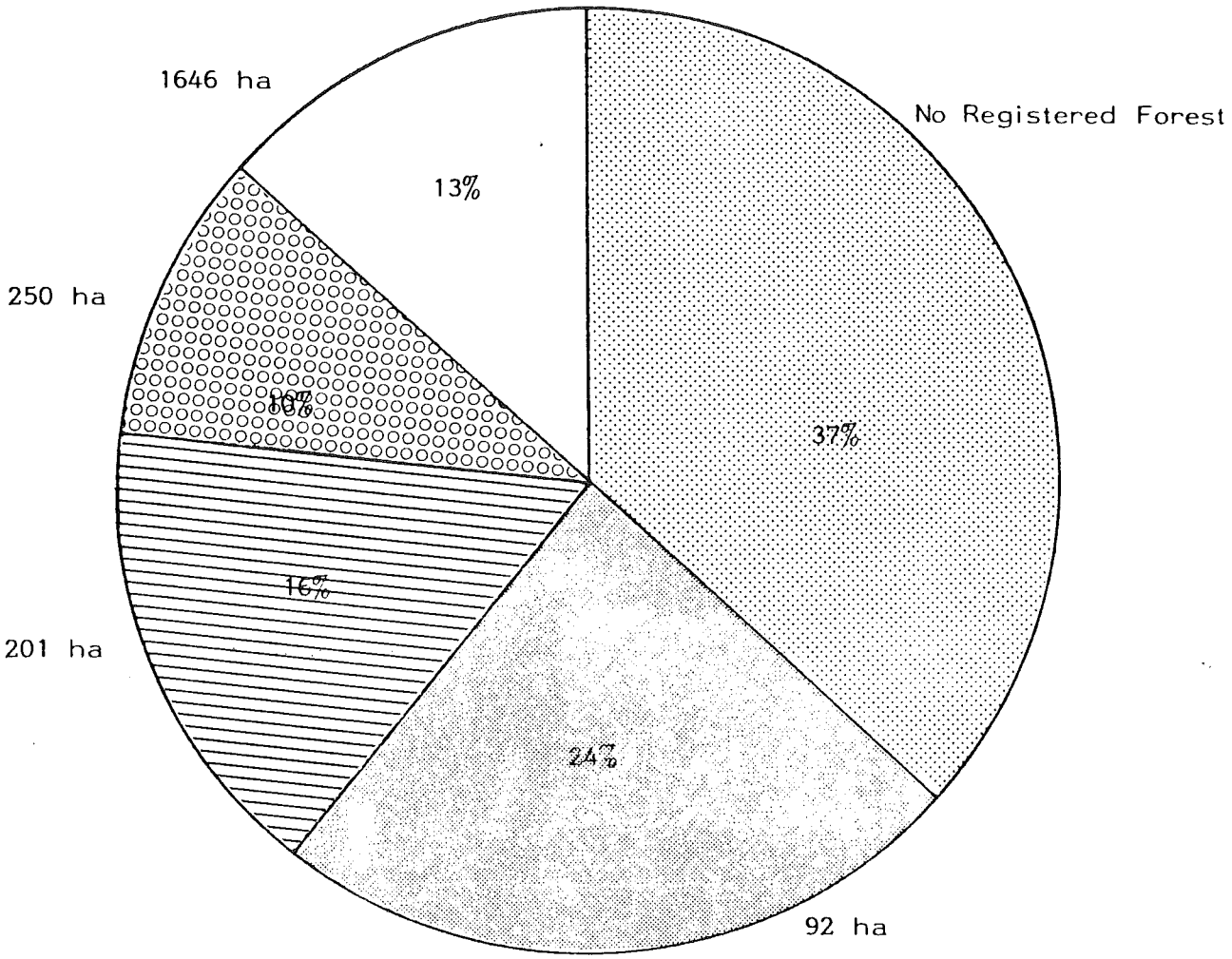
SAWLOG SUPPLY—DEMAND IN CANTY TO 2000



Source : Canterbury Forestry Foundation 1985

FIGURE 3

ANALYSIS OF C.F.F. MEMBERSHIP BY SIZE OF FOREST OWNERSHIP REGISTERED WITH THE C.F.F. AS AT 30.9.84



Total area registered = 2189 ha

No registered forest

10.0 - 19.9 ha

Less than 4 ha

Greater than 20 ha

4.0 - 9.9 ha

while the remainder are planted on downland and hill country areas - 6 in N. Canterbury and 2 in S. Canterbury.

The private resource is widely dispersed and tends to be evenly distributed among the plains, downlands and hill country.

Table 2 summarizes the approximate resource distribution between the plains and downland/hill country.

TABLE 2: RESOURCE LOCATION IN CANTERBURY

	State Forests	Private Forests	Total
	(ha)	(ha)	
Plains	12 453 (42%)	11 444 (50%)	23 897 (45%)
Hill Country/ Downlands	17 290 (58%)	11 444 (50%)	28 734 (55%)
TOTAL	29 743	22 889	52 631

(Source : Interpretation of Ref. 1)

The hill country/downlands resource is predominantly on easy slopes. The N.Z. Forestry Council (ref. 1) describe only 96 ha (less than 1%) as being hauler terrain. This compared with the national total area of 293 000 ha or 31% of the resource. While the Council's estimate of Canterbury steep terrain may be optimistcally low, it is clear that almost all future logging can be carried out using skidders.

Cable logging will have a very limited role in the region for the forseeable future. This is an important cost-saving consideration since skidder logging tends to be only half the cost of hauler logging.

Access to the Resource

Canterbury has a well-developed roading system and most of the resource is easily accessible. The Forestry Council report (ref. 1) classifies all of the region's forests as being roaded, compared with 40% of the total exotic resource in New Zealand which is considered to be unroaded.

Road construction is usually not a problem in Canterbury. Metal is mostly readily available and the soils in fact are often stony and free-draining, especially on the plains.

Logging of farm woodlots and shelterbelts in most cases can be carried out without road construction. Logging trucks drive across paddocks or use existing farm tracks. Wet ground conditions are generally only a constraint during the winter months and operators will try and schedule their hill country or wet blocks for logging in the summer. During the winter trucks

will often load up early in the morning when the ground is frozen.

The minimal roading which is required for logging in Canterbury is a significant cost saving for the industry.

Quality of the Resource

Virtually none of the private forests and only a small proportion of the State wood currently being harvested in Canterbury has been pruned or thinned. There is a wide variation in log size and log quality with the sources of supply ranging from an 80 year old topped shelterbelt to a 25 year old untended plantation with a stocking of 1500 spha.

Neither log buyers nor logging contractors are particularly discerning when it comes to relating price or cost to log quality.

Stumpage prices are not noticeably lower for a sale of smaller logs and premiums are not usually offered for large logs or pruned logs for that matter.

Log buyers tend to work on average costing for 'run of the bush' logs. An attempt by the Canterbury Forestry Foundation to introduce a grading system for unpruned sawlogs has largely been unsuccessful with buyers often preferring to tender a single average sawlog price.

The future situation is expected to be quite different, however. State forests are being intensively tended and many of the private growers are attempting to keep their woodlots pruned and thinned (even if not on time). Logging operators who are used to cutting trees into 'sawlogs', 'chipwood' and 'posts' will be forced to produce a much wider range of log types. This will mean more work, greater expertise required, and presumably higher logging costs.

MARKET CONSTRAINTS

Sawmilling is the major forest industry in the region and will remain so for the foreseeable future. Most of the sawmills are small, the average log intake being 6 000 m^3 per annum. Only 11 of the 55 sawmills cut more than 10 000 m^3 p.a., the largest sawmill uses approximately 38 000 m^3 p.a. These 11 larger mills however consume 60% of the total sawlog cut.

Canterbury is a timber deficit region (refer to Fig. 2) and has always been so except following the severe wind blows which periodically knock down plantations. The deficit will increase during the next 5 years largely as a result of the last big wind blow in 1975.

In the past the deficit has largely been made up with native sawn timber imported from Westland. However, changing attitudes to native forest utilisation will mean supplies from Westland will drop to very low levels during the next few years.

The sources which will replace West Coast timber are hard to identify particularly as most other regions of the country are

also facing shortages during the same deficit period that Canterbury is facing. Measures adopted by local sawmillers and timber merchants to augment supplies in recent years have included :

- Increased imports of sawn timber from Nelson and Southland (although for the year ended 31.3.84 these two sources supplied less than 10% of Canterbury requirements)

- A shipment of sawn timber from the Bay of Plenty loaded as deck cargo on a newsprint boat

- Expansion of logging activities and sawmilling by Christchurch sawmills into South Canterbury where the sources availability is less critical than in North Canterbury. This has meant increasing cartage distances for log supply, not uncommonly over 150 km. In a recent sale of unpruned sawlogs in South Canterbury a stumpage price of $36 per m^3 was negotiated with a buyer who had to cart the logs 180 km by road to the sawmill. This implies a log cost at mill of approximately $75.00/ m^3.

- In recent months a group of Christchurch sawmills have arranged to jointly purchase 60 000 m^3 of sawlogs per annum from private woodlots in Southland with the logs being railed up to Christchurch.

The emphasis within the region has increasingly been to seek log supplies from the small grower at greater and greater distances from the mill.

Implications for the Logging Industry

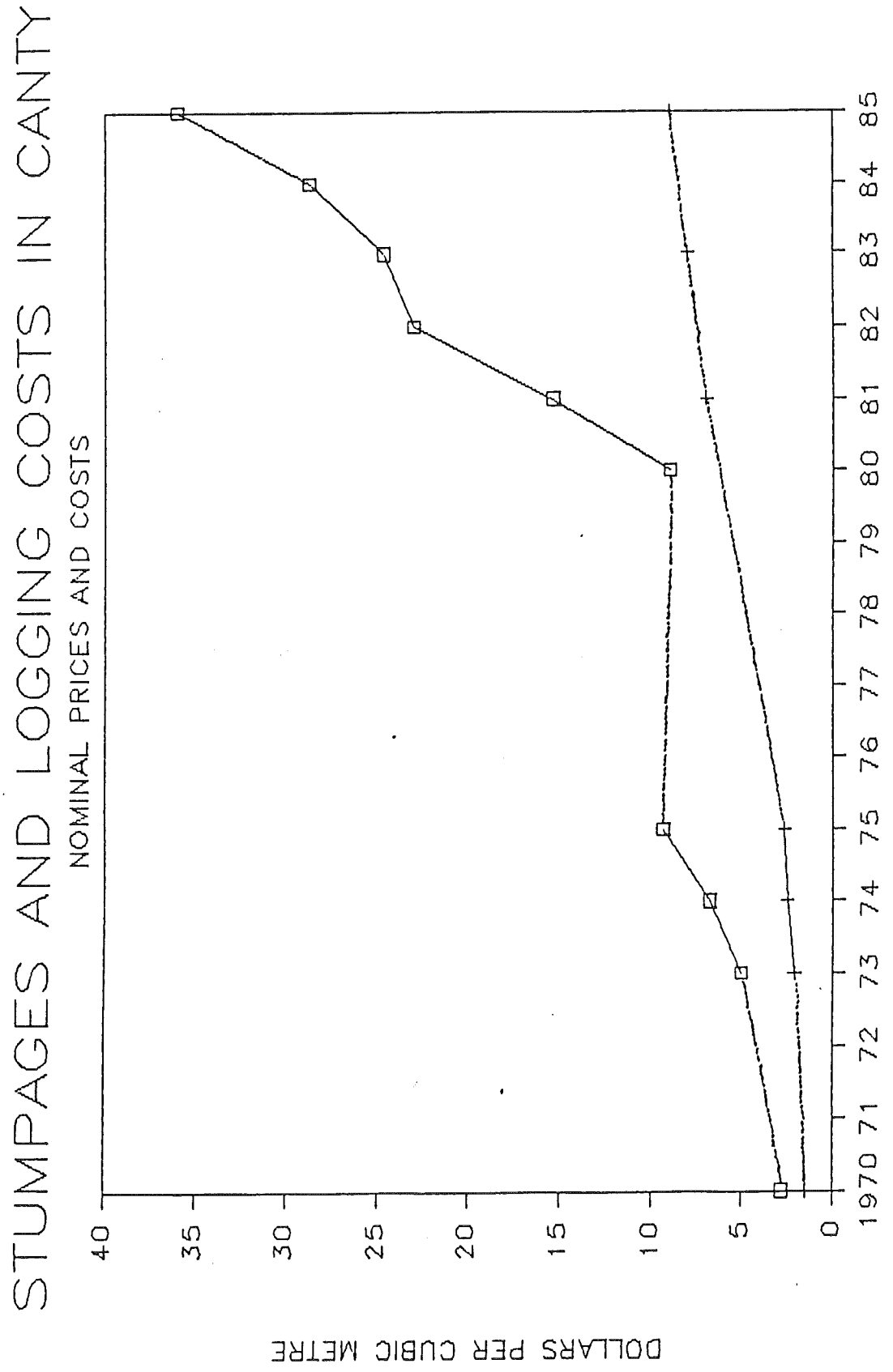
Most sawmills buy from the private grower at stump. They employ their own logging contractors but because of the small size of many mills their requirements are often not sufficient to employ the contractor full time. Contractors tend to be small independent operators- often just 1 or 2 men with the minimum of capital equipment (usually a second hand skidder and a couple of chainsaws) who hire themselves out to whichever sawmill is looking for contractors.

Most contractors are faced with having to log a lot of small blocks and chase work throughout the region. This results in extra costs and reduced productivity.

Cartage costs are becoming an increasing component of the cost of wood because of the increasing lead distance from mill to wood resource.

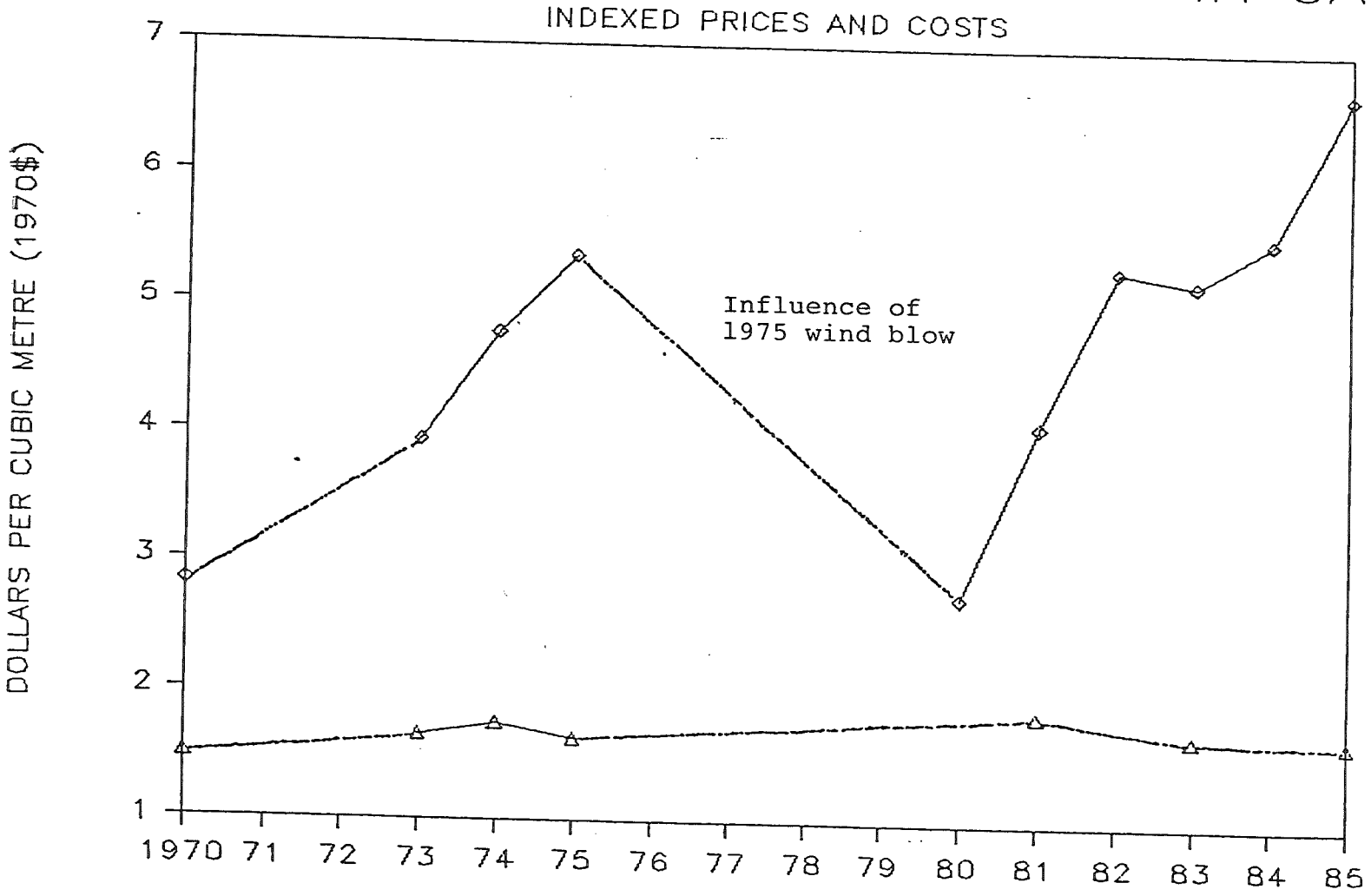
Logging contractors are particularly vulnerable to market downturns. In 1982-83 when the sawn timber market slumped in N.Z. sawmillers tightened their belts, laid off men and cut production. Their logging contractor was the first to be affected.

FIGURE 4



Source : Canterbury Forestry Foundation 1985

STUMPAGES AND LOGGING COSTS IN CANTY



Source : Canterbury Forestry Foundation 1985

The large number of sawmills competing for a scarce resource results in the price paid to the logging contractor being squeezed by the sawmiller who is having to pay increasingly high stumpage prices for his logs. Figures 4 and 5 show the trends in logging costs and stumpage prices in the region since 1970. While stumpage prices have made real gains in recent years logging rates have just kept pace with inflation.

For contractors to survive in the Canterbury climate they have to be efficient.

Implications for the Forest Owner

Most woodlot and shelterbelt owners can tell either from first hand experience or from their neighbours' experience, horror stories about log buyers who ripped them off and logging contractors who took out the best logs and left behind a tangled mess of logging waste, and damaged fences.

To a large extent this is now a thing of the past in Canterbury and was the main reason for the formation of the Canterbury Forestry Foundation. Most of the rogues are now gone from the industry. In order to be assured of future wood supplies the sawmillers must now have a good reputation for paying for it and his logging contractor a good reputation for standards of utilisation and clean up.

LOGGING CONTRACTORS IN CANTERBURY

As recently as the early 70's the typical logging contractor in Canterbury owned a farm tractor, a chain saw, a pair of steel cap boots (no hard hat or ear muffs) and drove a rusty holden utility.

The only changes in 15 years have been that the farm tractor is now replaced with a Clark-Ranger 666 skidder. This is invariably second, third or fifth hand, on hire purchase, and frequently breaks down.

As background to the Seminar LIRA have surveyed logging operations in different regions. Results of their survey of 33 logging operations in Canterbury are summarised in Tables 3 to 6.

TABLE 3 : MACHINERY USED IN LOGGING OPERATIONS IN CANTERBURY

Number of Operations Surveyed = 33

	Total Units	Number of Operations with: 0 Units	1 Unit	2 Units
Bulldozers	13	20	13	1
Skidders	23	11	21	1
Loaders	13	21	11	1
Bell Loggers	2	32	-	1
Haulers	0	33	-	-
Farm Tractors	0	-	-	-

TABLE 4: MANPOWER OF LOGGING OPERATIONS IN CANTERBURY

	Men per Gang					
	1	2	3	4	5	6
No. of gangs	3	14	5	6	4	1
% of Total	9%	42%	15%	18%	12%	3%

TABLE 5 : PRODUCTIVITY OF LOGGING OPERATIONS IN CANTERBURY

	Output per Gang (truckloads)							
	1	2	3	4	5	6	7	8
No. of gangs	5	6	2	1	1	-	-	2
% of Total	30%	35%	12%	6%	6%	-	-	12%

(Note : productivity estimates available for only 17 gangs)

While some of the survey results may be considered suspect (for example, a hauler has been operating at Hanmer Forest recovering chipwood and farm tractors are still used in logging work) they are nevertheless considered to be sufficiently reliable to draw the following conclusions about the nature of the logging industry in Canterbury:

1. Most logging gangs are two-man operations

2. The skidder is the most commonly used means of log extraction - often in conjunction with a dozer.

3. With one exception haulers are not used . Any forest owner with trees approaching maturity on terrain which can only be logged using a hauler faces the serious problem of lack of suitable machinery and expertise in Canterbury.

4. While the bigger operations may use a log loader (mainly in State Forest operations) most log loading is by truck-mounted Hiab.

5. Average productivity per operation is 2-3 truckloads per day or 50-75 tonnes. This roughly equates to 25 tonnes per man-day.

6. Most logging gangs operate in private forests (as one would expect from the current log supply situation in the region). Mainly the bigger gangs operate in State Forests.

TABLE 6 : DESCRIPTION OF LOGGING OPERATIONS

DESCRIPTION OF LOGGING OPERATION	NUMBER OF GANGS	% OF GANGS SURVEYED
State Forests only	8	24
Private Forest only	22	67
Both	3	9
Thinning	4	12
Clearfelling	24	73
Both	5	15
Steep Terrain	4	12
Easy Terrain	8	24
Mixed Terrain	21	64
Forests only	1	30
Woodlots/Shelterbelts only	13	39
Mixed	10	30
Own Truck	9	27
Use Separate Cartage	24	73
Contractor	-	-
Full Year Logging	30	91
Seasonal Logging	3	9
Sawmill Supply	29	88
Chipmill Supply	13	39
Plywood Supply	0	0
Post & Poles Supply	13	39
Export Log Supply	0	0
Firewood Supply	4	12

7. Clearfelling is the predominant operation; production thinning is rarely done.

8. Most gangs operate on both steep and easy terrain.

9. Log cartage is commonly left to a separate cartage contractor - most logging gangs do not own their own trucks.

10. Most gangs are able to work on year round basis.

11. Most operations are cutting sawlogs and chipwood from bush arisings. (The survey result of only 39% of the gangs cutting chipwood is not considered to be valid. A smaller number of gangs also cut posts and poles. Only 12% apparently cut firewood along with other products to augment their production.

EFFICIENCY OF LIMITED SCALE LOGGING IN CANTERBURY

By Bay of Plenty standards perhaps the logging industry in Canterbury as described above, would appear to be under-capitalised, unproductive and inefficient. Yet, apart from eventually introducing mechanised felling systems to Balmoral and Eyrewell Forests, it is hard to see how a more efficient industry could function given the peculiar characteristics of the region's forest resource and markets. An operator who gears up, for example, to cut more than 2-3 loads per day has either to be fortunate enough to land a contract to supply one of the larger sawmills cutting over 15 000 m^3 per year or supply more than one mill on a regular basis.

It is also questioned whether logging costs per unit output are any higher in Canterbury than other regions. Current logging costs in Canterbury average \$9-10/m^3 although there appears to be pressure from contractors at present to raise their rates. These costs would appear to be comparable with skidder logging costs in other regions.

In Figure 5 stumpage prices and logging costs have been indexed for inflation since 1970. It can be seen that logging costs have remained fairly constant in real terms while stumpage prices have increased sharply since 1980. This suggests that logging efficiency, as measured by cost per unit production, has improved in recent years as the resource has become scarcer, more costly to log and transport, and more expensive to buy.

In his 1983 paper (ref. 5) which looked at the economies of scale in N.Z.'s forest processing industries, Des O'Dea of the Institute of Economic Research concluded that there appeared to be no clear-cut evidence of economies of scale in the sawmilling industry. This conclusion seems to contradict the prevailing wisdom. In the logging industry in Canterbury it is evident that a similar situation exists; that is, the economies of scale or rather the 'diseconomies of limited scale' may not apply. A limited scale logging industry appears to function efficiently providing the wood-using industry with a competitively-priced raw material despite high stumpage prices and many unfavourable resource characteristics.

REFERENCES

Butler, C.; Levack, H.; McLean, D.; Sharp, J. "A National Exotic Forest Description System. N.Z. Forestry Council Working Paper No. 3 February 1985

Canterbury Forestry Foundation Society Ltd Annual Report 1984

Canterbury United Council Forestry Advisory Group July 1982 Forestry Development in the Canterbury Region

Elliot, D.A.; Levack, H.: 1981 "New Zealand's Plantation Resource Areas, Locations and Quantities" 1981 N.Z. Forestry Development Conference

O'Dea, D.; 1983 "Economies of Scale and Transport Costs in the N.Z. Forest Processing Industries. The Trade-Offs and its Implications for Mill Location with Particular Reference to Sawmills" N.Z. Institute of Economic Research paper for Conference of Forest Economists, Sydney

New Zealand Forest Service "Statistics of the Forests and Forest Industries of New Zealand to 1983".