quate means to properly account for the everchanging value of standing forest.

There exists regional growth models of *Pinus radiata* forest for most areas of New Zealand. By selecting the appropriate model, checking and modifying it to suit the particular forest, the current value of a forest can be calculated.

To do this good records must be kept on an annual basis of the volume, type and value of all produce removed, together with percentage assessments of the various age classes in the forest. These figures must be used to check and, if necessary, modify the computer model being used, remembering always that it is the forest that is right, not the model.

In the past, great emphasis has been placed on how early a forest can be liquidated. I believe that this has been so that financiers can get the cash in their hands and decide where it should be invested next time round. If we look back to the '80s we will see that much of it would have vanished into high-flying companies no longer listed on the stock exchange. Forests deserve more consideration as to when they should be cut to give the maximum return to those who invested in them, which should particularly be the case when the investment is for superannuation purposes.

Let us take an example using the generalised yield table and assumed product values as shown in table 1.

A forest at age 25 shows a value of $89,615. If this is harvested and re-established, and allowing for the year lost in between crops, the second crop at age 20 has a value of $66,355. Had the first crop been allowed to grow on to age 46 it would be worth $199,840, a gain of $43,870 over the two crops and without the cost of re-establishment. Similarly a 36-year-old crop is worth $155,825 compared with the 25-year-old and a 10-year-old growing crop at $89,615 + $20,610 = $110,225 again without the cost of establishment. So there is a gain of $45,600 by carrying the crop on to age 36.

The challenge to all foresters and to consultants in particular is to have accepted that they can establish forest values in this manner and that they can account for the changes that take place each year. This will include:

- Annual volume growth
- Change in log type volumes
- Changes in areas by age classes
- Volume harvested by log types and age classes
  - actual compared to tables
- Volume losses through other causes e.g. fire, windblown etc
- Changes in market prices by log types.

Using these factors, they must show to the owners how the value changes have come about from one year's statement to the next. There must be no mumbo-jumbo but a clear statement of pluses and minuses taking last year's figures to the next year's statement.

Such an accounting shows clearly the changes in value that take place and the interaction of each of the following factors:

- growth in volume
- change in products
- reduction through harvesting
- loss from other causes
- change in market value of the various types of product on stump for that particular forest.

The investors are entitled to such an annual accounting. The industry for its own protection should account in this way to counteract "fly by night" promoters and to establish a track record of the performance of the forest manager. It will also enable the investor to compare the actual results with that forecast by the forest manager.

All this must be checked by a reputable forest consultant. The reputation of forestry as a sound investment will depend on how well the forest manager and the consultant do this job. The investors are entitled to such an accounting from the industry.

J.E. Henry

TABLE 1

Sales Value on stump –

Pruned logs	$425 per cubic metre
Unpruned logs A	$220 per cubic metre
Unpruned logs B	$190 per cubic metre
Unpruned logs C	$160 per cubic metre
Pulpwood	$80 per cubic metre

Yields per hectare

Age	Total Recov. Volume m 1.b/ha	Log Types Pruned	Unpruned A	Unpruned B	Unpruned C	Pulp	Value $/ha
10	108	18	11	10	38	32	20610
15	211	34	21	19	74	63	39560
20	353	57	36	31	124	106	66355
25	480	77	48	43	167	143	89615
30	611	109	86	88	165	164	121485
31	636	115	93	100	166	163	127935
35	727	133	121	148	165	159	150385
36	748	137	128	160	166	156	155825
40	825	151	159	208	159	149	176035
41	842	154	164	220	160	146	180610
45	905	169	181	258	157	140	196985
46	916	172	183	264	157	140	199840

Response to M.D. Wilcox commentary:

'Priorities for research on alternative wood species ... '

Sir,

There were disturbing implications in this paper. There are three possibilities that have been overlooked, and two prospects that need further justification than given in the paper.

1. *Cryptomeria japonica* (sugi) and *Chamaecyparis obtusa* (hinoki)

These are the two main Japanese plantation softwoods. I have designed silvicultural schedules for sugi to keep maximum stocking to produce a 10.5 or 12.5 cm square timber from two short logs. That is, one or two pieces per tree. So instead of pushing diameter growth to the limit, the idea, under New Zealand's growth conditions, would be to restrict it severely. The silviculture is almost exactly the opposite of the radiata clearwood regimes, but the rotations are about the same. The work is in a rough stage, and needs further input if anyone wishes to provide help. There is less data on hinoki, but reasonable leads on Lawson's cypress which would be an acceptable substitute. Again, the principle is to keep stands dense to suppress branch sizes; it may be possible to grow the hinoki-style crops from topped (and pollarded?) trees; there are examples in the shelterbelts around the Central North Island. Clearly, the work would benefit from sawing studies of appropriate material. The spacing of shelterbelts around kiwifruit orchards gives some ranges for trials. It would be easy to establish pruning trials. Pruning would be designed for Japanese preferences to provide a clear face on one to three surfaces of the square. I would anticipate the usual chorus to these proposals.

This is an application of **plantation concepts, growing designer crops for a specific market.** The Japanese market would be the main target, but the Imperial era led to considerable plantations of sugi in Taiwan; and to a lesser extent in South

Korea (where there are severe climatic restraints). So the species are known in these two additional markets. I am aware of the Japanese production potential and its costs and problems.

A similar case could be made for growing some of the numerous Japanese hardwoods here too. There are, admittedly, abundant good temperate hardwoods in the USA, but there could be sufficient bias towards their own species to persuade the Japanese to at least install trials here. There seems likely to be a continuation of a rural labour supply in NZ, as against the falling population in Japan, which would be a mild help in evaluation.

I once wrote: "Quality log production plus some freedom of thought provides a likely source of comparative advantage ... " (NZJ For. Sci. 2(3) p.387). The prolonged ordeals over the radiata schedules, and assessing the current species, has prevented further plantation extensions until now. In fact there has been a great deal of no doubt valuable detailed work on radiata silviculture while the basic concepts of silviculture direction have been forgotten. We are now 25 years late in starting. So I at least applaud the idea of evaluating alternatives.

2. Radiata clearwood regime

These have been mentioned in another letter. Despite the research in radiata silviculture, it has not been tested fully as far as I know. It is a matter of testing the interaction between stocking, wind damage, volume, and clearwood production from trees **uninodal above the pruned section. One further log length is probably sufficient.** The drop-off in mortality has, I assume, enabled higher stockings to be retained. There is much less need to accept the restraint of a substantial log diameter if uninodals are used.

I have been sent a paper by M.J. Carson which is on this topic. I will have to work through the paper, and see what the conclusions are.

3. A lack of data

I still do not think NZ has adequate and well-designed species trials established to give growth data and material for wood quality testing. This is the best diversification measure. We resemble more the developing countries I work in, making extrapolations from bits and pieces.

4. Douglas fir again

This has been commented on in my reply to Dennis Richardson's article. "A triumph of hope over experience" (Johnson) I'd say.

5. Crops for hardwood chips

I have the corrected data on world chip trade and have been following chips since 1977 (Fiji Pine Commission days). I think it is improbable that this crop would pay off as a main crop in New Zealand. It may be sufficiently attractive for some smaller schemes. I would be interested to see the figures. It is granted that the future of Australian supplies is uncertain, but the Indonesian plans for hardwood pulp production are underway and could well affect world hardwood pulp markets. (The Indonesian plans are for hardwood pulp production, based largely on *Acacia mangium* plantations.)

6. Who are these committees and how/who do they decide on these things?

R. Fenton
77 Forrester Drive, Tauranga

Alternative species

Sir,

I can't help but respond to Paul Smale's letter "Species diversity" in your February 1994 issue.

I will not debate the radiata issue. It is a marvellous species. Its growth, ease of processing, and the range of end uses for which it is amply suited make it an exceptional investment choice.

There are, however, a few points of order and Paul should not escape too lightly.

Firstly there is the matter of biological risk, a subject we usually dismiss. The risk to a single hectare may be increased by establishing another species. However, perhaps it is the risk of losing our entire estate that we should be more concerned with. The following analysis is crude and simplistic but there is a lesson here. Supposing the risk of losing the entire radiata estate was 0.1% over one rotation. Now suppose a second species with a different set of potentially virulent pathogens has the same 0.1% risk. The risk then of the total destruction scenario is increased 1000 fold by having only radiata compared with a 50:50 split of the two species.

Secondly, are we not getting a little parochial about our superb radiata? Perhaps if we ventured to our Asian market place and examined the prices and perception of radiata 'at the bottom of the heap' versus the fine-grained softwoods (*Cupressus, Chamaecyparis*) at the 'top', our enthusiasm would be somewhat dampened and rekindled in another direction.

Further, what of our other hopeful species? Let us consider *Cupressus macrocarpa* and *C. lusitanica.*

- Between them they will grow almost anywhere radiata will grow (except the hardest sites).
- Yields for many sites are likely to be as much as two-thirds of radiata's at around 30 years and this proportion may increase on longer rotations.
- They can be harvested on a similar short rotation to radiata; perhaps even more successfully since there is no 'low quality' stem centre, thus allowing better grade recovery from smaller piece sizes.
- Stable, low shrinkage and constant radial density gradient without the heavily spiralled grain core of radiata.
- Naturally durable, etc, etc.
- Able to replace radiata in most end uses (not as pulp) and surpass radiata in many more.
- Now for appearance – "completely in another league". No further comment required.

Referring to Paul's letter. The comments " ... diluting it by research on species ... " and "Before investing large sums on research on alternative species ... " and so on leave me wondering if I have missed something. We seem to have invested comparatively little on other species research but perhaps there is some new company-led research initiative about to happen. I wonder about the gain that may result say even from a little genetic research into canker and fluting in macrocarpa.

Paul makes the point that the large 1.3 million hectare radiata estate can drive a substantial radiata research programme and this programme is diluted by thoughts of other species. However, it is the next two million hectares of commercial plantation that we appear to be on the threshold of planting that should excite us all with possibilities.

Alan Somerville

Mea culpa!

Sir,

Mea maxima culpa – but like a venal sin to an old man it was worth it! To have provoked that greyest of Grey Wolves, John Ure, to an appearance in print in a technical journal is an achievement to which few could lay claim during his professional career. And I will willingly assume whatever obloquy may be necessary to prompt a repetition.

I have no excuse (except incipient dotage) for referring to poison-thinned larch: unlike pine and Douglas fir, larch needs no such intervention to provide autumnal coloration. But there is more than meets the eye to the story of the Redwood Grove (as Neil Cooper intimates) and perhaps one day John may be prevailed upon to tell us more.

What, Sir, is *Schleichwirtichaft?*

S.D. (Dennis) Richardson

(More letters on page 48.)