Corewood: docking the dog's tail
Part I, An alternative road map

"We also need disagreement, we need to be challenged, or our doctrines dry up and become mere 'received ideas' — ideas held without passion, without clarity or strength. He who knows only his own side of the case knows little of that. His reasons may be good, and no one may have been able to refute them. But if he is equally unable to refute the reasons on the opposite side, if he does not so much as know what they are, he has no ground for preferring either opinion. The rational position for him would be the suspension of judgement... He must be able to hear them [contrary ideas] from persons who actually believe them, who defend them in earnest and do their very uttermost for them. He must know them in their most plausible and persuasive form; he must feel the whole force of the difficulty which the true view of the subject has to encounter and dispose of, else he will never really possess himself of the portion of truth which meets and removes that difficulty." (J.S. Mill On Liberty, p. 35)

Thinking on wood quality is as much a cultural as an intellectual exercise, whose outcomes are decided by mood, sympathy and fashion, rather than by the logic of the argument. One has only to reflect on the passion with which some foresters argued, in the early 1980s, for a final stocking of 200 sfha to recognise that such an argument is never purely intellectual; indeed it is salutary to remember that when Fenton modelled such low stocking it was to test an extreme, not a mean. It is legitimate to finger the bankruptcy of popular thinking which despairs of producing products from ever younger wood; which believes that product quality is irrevocably determined by the quality of wood being processed; which is so precious about its forests as to rail against their early felling. And, when cornered, and here I am being grotesquely unfair, has no solution but to plead for higher densities and longer rotations. It is absurd to describe fast growth as radiata pine's Achilles' heel (Macalister, 1997). Another particular absurdity is the determination to set rotation age (growing costs) and wood quality at each others' throats as totally incompatible; and when obliged to choose, to resent economic imperatives.

Profits and the money machine
There are always dreams/myths which need addressing, such as the hard-sell returns in forestry, that the world is short of timber and prices will inevitably rise. The same claim was made for oil. Why not then a period of falling timber prices? If we expect an inflation-free environment then prices in highly-skilled, value-adding sectors such as ocean yachts, boutique manufacturing, specialist consultant services, and resource management lawyers will rise while others must fall. We experienced the cost-plus mentality of State log sales in the 60s and 70s, at a time when poorly-focused, large organisations sought economies of scale, but at the cost of lost efficiencies as regimented production lines rewarded the skilled and unskilled equally and impartially. Today we have the price-minus dictate of the market, commending high production volumes and low unit costs. Further, modern "intelligent machines" capable of variable output require highly-skilled workers who are paid accordingly. In an inflation-free market price matters far more, as people are more price sensitive and the price signals are clearer. The alternatives to driving costs down in the broad market are a withdrawal into value-added processing — but, almost by definition, niche markets could take only a fraction of New Zealand's wood production — or to flee to low-cost producing countries, e.g. the foresight of CHH's COPEC investment in Chile.

Ponder the story from Chile (Cown, 1997) that "the processing industry (corporate) is dynamic and demonstrably ahead of New Zealand in investment with several large new ventures planned and under construction... Sawmills and remanufacturing plants contain the very latest North American and Scandinavian sawing and optimising equipment and are built for market flexibility and economy of scale". Although labour costs are low, fierce competition and the need for processing equipment appropriate for the desired product market justifies investment in technology. Across many industries companies are undertaking aggressive productivity improvement programmes and cost reduction exercises simply to avoid deterioration in operating margins. Accordingly, Chilean companies will be better placed to seek profit through volume growth both at home and internationally. Associate membership of Mercosur provides access to, and competition within, a market of 200 million people; and Chile is the next in line to join NAFTA, opening the door to the whole of North America. This disturbance of local monopolies or oligopolies by new entrants — whether local or from Mercosur countries and the 35% real appreciation in value of the peso against the dollar over the last six years, as measured by the wholesale price index, mean that in many sectors manufacturers are now price-takers.

Meanwhile New Zealand industry languishes, with our existing technologies no longer able to produce the return on capital that was possible when first introduced. Part of the reason for under-investment is psychological. Most New Zealanders, I suspect, are uncomfortable with intellectual assets which determine the maximum utilisation of our physical resources. Hence the attractions of farming, fishing and forestry, a reflection of the nation's dispossessed émigré history. One perceived attraction of forestry is that it is based on and generates physical assets which are harder for other people to pinch, and that appeals to the evicted Irish as much as to Maori. Further, there is a public perception that trees can be sold with much effort, guaranteeing a small fortune to dreamy-eyed, lazy investors. Paradoxically, the long-term investment in growing trees by overseas interests is ideal for a country which is short of capital. Our own savings should be recycling rapidly through the economy in more immediately productive ways — in wood processing, to generate the technology-driven surge in innovation and capital spending that lifts productivity and sustains economic growth. Paul Fowler, the new CEO of Fletcher Challenge Forests, has observed that none of FCF's plants "with the exception of the new Taupo moulding and Kawerau laminating plants are anywhere near world standard — either in their use of technology and optimising equipment..." (Macalister, 1997a), so there is much catching up to do.

Currently an enormous inflation risk premium is embedded in bond yields that will ultimately be squeezed out as low inflation persists. Until then, New Zealand is not ready for prosperity; the country lacks the confidence associated with an expansionary wave of investment. Witness the relative lack of enthusiasm for an application of FRI's brilliant wood hardening and green finger-jointing technologies which address crucial problems in short-rotation pine. If indeed the incremental costs of the new technologies are greater than the market will sustain then there are two options, to increase the economies of scale or determinedly target the highest value end-uses. Most likely we must hang around a while until a new entrant is willing to build a world-scale processing plant incorporating such technologies.
these stands which are viable. The only
only become old and frayed when people
impression that one does. One must accept
or pruned according to some "optimal"
of existing stands have not been thinned
scrutinise them and start asking questions.
are clues about future prices than to give the
factory. Maybe pruning retains its allure
merely adding to its substance one
uct. The improved stiffness from pith to
cambium is not due primarily to the
tics affecting wood quality is incomplete.
imation within the forest products industry of
recognized that there is a popular percep-
tion within the forest products industry of
fundamental way. However, it is important
to recognise that there is a popular percep-
tion within the forest products industry of
fundamental influence of density on
wood and product quality. A change of
perspective is needed to break an old
mind-set.
Density and rotation age
It is not my intention to set up and parade
a one-dimensional view of density, nor to
dismiss the influence of density on wood
guality. Rather one needs to appreciate the
interactions of density, as measured at a
particular point in the tree, with the under-
lying, fundamental characteristics of the
cell wall. It would be naive to accuse sci-
entists of believing that density actually
determines wood properties in some fun-
damental way. However, it is important
to realise that there is a popular percep-
tion within the forest products industry of
fundamental influence of density on
wood and product quality. A change of
perspective is needed to break an old
mind-set.
“Density only increases by about 50%
from pith to cambium in 30-year-old radi-
ata pine and so should account for an
equivalent increase in tensile strength and
stiffness. Clearly, a modest increase in
density, from pith to cambium, is not cap-
able of providing the increased perform-
ance that is frequently attributed to it.
One mistakes an accident of wood for the
essence of its character who think that by
merely adding to its substance one
achieves the improved performance nec-
essary for its acceptance as a quality prod-
uct. The improved stiffness from pith to
cambium is not due primarily to the
increased mass of cell wall material (quantity)
but to a profound change in its
guality. Rather than focusing solely on
the quantity of matter in a piece of wood (its
density), one might consider also the qual-
ity of the material in the cell wall. What
other industry would confuse increased
production with improved quality?”
Intrinsic quality is determined by the cel-
lulose microfibril angle and tracheid
length, by spiral grain, by compression
wood (Walker & Butterfield, 1995).
The emphasis on density as the over-
riding determinant of wood quality is an
historic legacy. This was justified in the
70s and 80s because density was cheap
and simple to measure, and because it was
effective. That approach has passed its
“use-by” date. As a result industry knows a
great deal about density — “Of all the
wood properties commonly measured, wood
basic density has received by far the
most attention” (Cown, 1992) — but
knowledge of the underlying characteris-
tics affecting wood quality is incomplete.
Naturally foresters are reluctant to enter-
tain other strategies, principally because of
uncertainty over the new opportunities
and because they are unaware of the limi-
tations in the old approach (“a blind man
will not thank you for a looking glass”,
Thomas Fuller, Gnomologia). The alter-
native is to develop specific strategies for
each product: correct log allocation and in
the longer term to introduce designer
trees that build on previous improvement pro-
grammes.
Variability and corewood
When 25-year-old unpruned stands in
Canterbury and Nelson are sawn to only
90mm x 35mm machine stress graded
timber, the mean stiffness of all the pieces
coming from the least stiff 10% of the
trees is about half of that from the stiffest
10% of the trees — and the ex-mill rev-
ue is roughly $100/m lower (Addis
Tsehaye et al., 1998). Further the prin-
cipal factor contributing to the price differ-
ential is the stiffness of the corewood.
This acknowledges what every sawmill
knows, that some logs are processed at a
loss. The same study found that the core-
wood of the stiffest trees is equivalent to
the outerwood of the least stiff trees.
Therefore, resist the temptation to gen-
eralise about wood quality — of say core-
wood — and develop the tools to particula-
rise. A key to shorter rotations is correct wood allocation at the skids. If
Paul Fowler’s FCF team are able to iden-
tify the 10-20% of logs which will not
provide good structural timber then many
of the objections to short-rotations evap-
orate. Certainly FCF understands the tech-
nology which has the potential to do this.
That should please everyone, with the
appropriate wood delivered to the appro-
riate end-user at the lowest possible cost.

...to be continued

References
Addis Tsehaye, A.H. Buchanan, and J.C.F.
Walker. 1998. Selecting trees for structural
timber. Submitted, Journal of Wood Sci-
cence & Technology.
justified? NZ Tree Grower 13 (4) 14-
5.
Cown, D.J. 1992. New Zealand radiata pine
and Douglas-fir: suitability for processing.
NZ Ministry of Forestry, Forest Research
Institute, Bulletin #168.
Cown, D.J. 1997. The Chilean challenge. NZ
Forest Industries 28(2)28-29.
Hocking D. 1997. A cutting response. NZ For-
Forest Industries 28(4)40.
Macalister, P. 1997. Forest fellers can’t see the
trees for the money — but the wood’s not
worth it. The National Business Review,
June 20, 1997, p 37.
Macalister, P. 1997a, FCF a new force. NZ
Forest Industries 28(2) 19-20.
Walker, J.C.F. and B.G. Butterfield. The
importance of microfibril angle for the
processing industries. NZ Journal of Forestry

John Walker,
School of Forestry,
University of Canterbury

6 N.Z. FORESTRY FEBRUARY 1998