New technology and its implications

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'man's life is thought' – W.B. Yeats

With robots, automation and self-driving cars constantly in the news, most readers are well aware that the above phrase from Yeats' sonnet is as applicable now than when he wrote it 80 years ago. New technologies affect forest management and wood processing every bit as much as in other industries. The defect-processing work station in a finger-jointing line that used to require half a dozen workers and manually operated cross-cut saws is now carried out by image processing combined with an automated, optimising saw processing timber at high speed. Mechanisation of harvesting is at last being increasingly applied in New Zealand, although there remain plenty of opportunities for improvement, particularly with regards to steep country operations and to stem defect recognition linked to optimal log-making.

This issue touches briefly on some new technologies as they affect New Zealand forestry. Olivera and Visser discuss how modern forest processors have the capacity to record data obtained from sensors, global navigation satellite systems and an on-board computer to report on position, stem sizes, logs cut and time. This aids the machine operator and also can report on production rates, machine productivity and inventory reconciliation, with the potential to generate forest productivity maps and enable precision forestry.

In their paper on robotics in forestry, Parker et al. point out that while many forestry tasks have already been mechanised, as the work cycle becomes faster operators become the bottleneck to increases in productivity. They discuss what is happening in other industries, where manual control has been superseded by remote control, teleoperation and automation. In New Zealand, a remote controlled system has been fitted to an excavator-based feller capable of working on steep terrain so that the operator need no longer be present on the machine itself.

Dash et al. describe the deployment of high-resolution data to support site-specific tactical and operational decision-making for precision forestry. An inundation of data from the exponential growth of sensor technology requires methods to extract information relevant for forest management. They discuss area-based analysis, airborne and terrestrial laser scanning, individual tree analysis and the potential of unmanned aerial vehicles.

The Internet of Things presented by Hock et al. is the integration of three technologies: smart and very cheap sensors; autonomous networks that record and manage data; and analytical capabilities in storage and data mining. The authors state that the internet and other communication technologies are increasing the availability of information on demand, creating an increasingly complex and competitive business environment. They discuss what value this technology adds to forestry.

Three further papers round out the issue. Manley has developed a model to predict the value paid for a forest from the discounted stumpage revenue from the transactions of 27 New Zealand forests sold in 2011–2013. The model's inputs are average age, species mix, total recoverable volume, harvest cost, distance to port and the proportion of pruned area, combined with model parameters of log price, pruned log price differential, unit transport cost and discount rate.

Satchell assessed the profitability and the physical properties of growing *Eucalyptus nitens* for sawn timber from a small sample of 15-year-old trees grown near Rangiora, Canterbury. The species is very easy to grow on the right site, and a cool climate with reasonable but not excessive soil moisture. There, on a relatively short rotation, it can produce large volumes of sawlogs yielding high quality timber.

The final paper by Ellis demonstrates the large variation in the Japanese Agricultural Standard (JAS) volume/tonne ratio. Failure to understand how variability in this ratio can affect the $ value of a sale can seriously undermine all the work in growing the crop. The forest manager will estimate growth and yield in cubic metres, but for the log export market, logs are sold measured to JAS. Harvesting and cartage are usually paid on tonnes, while port services contractors are paid on JAS. Weight estimates, JAS volume scaling, true volume-to-weight conversion, and truck tare weights affect JAS/tonne ratios.

To finish on a less optimistic and sobering note, the four lines that follow those quoted from Yeats in the first line of the Editorial are:

And he, despite his terror, cannot cease
Ravening through century after century,
Ravening, raging, and uprooting that he may come
Into the desolation of reality.

I am sorry to say that pages 21 and 22 of Sally Strang, Kit Richards and Peter Weir's article 'National Environmental Standard for Plantation Forestry', November 2015, *New Zealand Journal of Forestry*, were inexplicably transposed between the author's sign-off and delivery to the printer. The editorial staff apologise for this mistake. A correctly sequenced version of this important paper can be found on the NZIF website.

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