

# Richard Charles Woollons

## 29 March 1942 – 19 July 2020

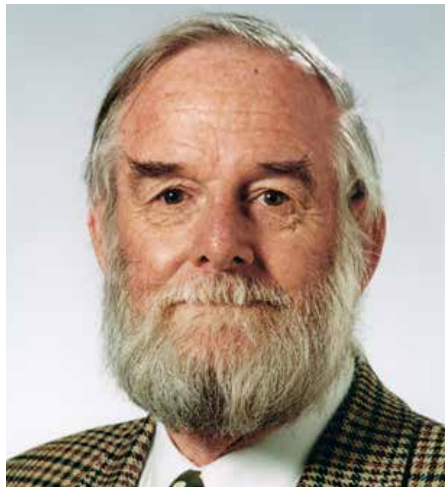
Richard Charles Woollons was born in Staines, Middlesex in 1942. He arrived in New Zealand in 1950 with his family aboard the P&O Rangitane on its maiden voyage via Panama. He was then cast into the near feral beach-bronzed tribe resident on Scarborough Hill, Sumner. He survived ... and later married the girl next door.

Like many before him and since, Richard failed his first year at university, but recovered to develop a world-wide reputation in forestry science and growth modelling. After graduating in 1968 from the University of Canterbury, he found work as a hydrologist measuring streamflow on West Coast rivers in flood, but soon found long-term employment with NZ Forest Products (NZFP) and moved to Tokoroa.

### Career with NZFP

Richard joined NZFP at a time when the Forestry Department at Kinleith was grappling with the challenges associated with keeping the newly expanded Kinleith Pulpmill supplied with wood. He was recruited by Brian Allison and Jack Henry to develop growth models and volume tables for radiata pine and various eucalypt species in conjunction with the development of NZFP's forest simulation model RMS 80. One of his first tasks assigned by Jack Henry was the evaluation of existing research trials. He soon began his own trials on establishment techniques and on the application of nitrogen fertiliser to thinned stands. He brought rigour in experimental design and analysis to a wide series of silviculture trials, including the mid-rotation fertiliser investigations that became the subject of his PhD thesis in the mid-1980s.

Richard recognised that field experimentation in forestry is an expensive undertaking and that inconclusive results can easily lead to lost management opportunities and profits. He advocated that the



objectives of the experiment should be clearly defined and that all that followed worked to minimise the likelihood of inconclusive results. This involved the use of adequate experimental design followed by 'local control' of all aspects of treatment application and experimental maintenance to eliminate as far as possible extraneous factors that might confound the results. Accurate measurement, recording and data management were essential, and close attention was needed to ensure that statistical analysis was made with due care.

He saw the use of covariates to reduce experimental errors as an essential part of this process. He considered that methods for significance testing were robust, but that the underlying statistical assumptions were not usually met. Consequently, he tended towards a conservative approach by using tests stronger than the commonly used  $p < 0.05$ . His emphasis was on the magnitude of the response and its associated error terms. He also recognised the need for the long-term repetitive measurement of trials, so that greater understanding of growth processes in stands could be made and then utilised by incorporation into various growth and development models.

Richard's involvement in growth model development extended from Kinleith to Northland as NZFP grew its forest holdings near Warkworth and Whangarei and, in a joint venture with Shell, north of Dargaville. Following his secondment to the School of Forestry in 1986, he continued his association with NZFP and Carter Holt Harvey Forests, including the development of new growth models for CHH's Hawke's Bay forests. His work for NZFP and CHH resulted in numerous publications in a wide variety of academic and professional journals.

Richard is remembered by his Tokoroa colleagues for a mild level of eccentricity and a fiercely competitive approach to the morning smoko crossword school in the Kinleith field room, not to mention office chess

and Battleship competitions. He was a member of the Tokoroa Operatic Society and a classical music enthusiast with a truly remarkable collection of LPs and CDs, and a stereo system that must have dimmed the lights of Christchurch whenever it was powered up.

His favourite toy at Kinleith was the IBM 360 mainframe computer which replaced older CDC equipment in 1978. At the time this was said to be the largest IBM computer in the southern hemisphere. It came with gaming software to entice new users, including a version of Dungeons and Dragons at which Richard became rather skilled. It also frustrated him greatly due to the frequent 'upgrades' in job control language which required regular recompilation of his beloved growth models.

### Australian collaboration

In 1972, Richard spent a year at the University of Melbourne where he studied Theoretical Statistics under the tutelage of Professor E.J. Williams, which stood him in good stead for the development of his career. He also became an avid Collingwood AFL fan.

In Australia, he introduced the use of optical dendrometers for the assessment of stem profiles since part of the volume response to fertiliser in thinned stands could be attributed to changes in stem shape. Collaboration with Hugh Waring and Wilf Crane confirmed that this phenomenon occurred over a range of Australian sites. He was also able to explore the utility of multivariate techniques to examine forestry problems.

He collaborated with Peter Snowdon on the development of hybrid models wherein indexes of annual growth derived from process-based models using soil conditions and meteorological data were incorporated into stand projection models used to predict stand growth. In New Zealand, he developed some of these concepts by incorporating soil, topographic and broad-scale meteorological trends into his models.

### School of Forestry

Richard started his PhD at the University of Canterbury School of Forestry in 1986 at the age of 44 – with the degree conferred in April 1989. In 1990, he was appointed Visiting Lecturer and in 2001 he became Senior Lecturer. After he retired in 2006 he became Adjunct Associate Professor.

Richard and Graham Whyte were a magnificent team, jointly supervising up to 10 postgraduate students at various times. Richard was a formidably competent biometrician who created immense value for the forestry sector during his career. He helped make the first growth and yield model in New Zealand, and no statistical problem was ever too boring or difficult to

escape his attention. He contributed to the idea of using reverse Weibull distributions to model and project sample plot diameter distributions, and also single-handedly crafted two-stage representations of mortality modelling to finally allow us to have reasonably well-distributed residual patterns with mortality models. He had a wide network of like-minded research colleagues and collaborators, and his work is greatly appreciated internationally. During meetings he would pass the time by solving complex equations, and whatever the statistical issue he could effectively communicate excellent advice. Many researchers owe their proper analyses of experiments to him, and large numbers of students learned biometry and forest mensuration through his excellent teaching.

Every discipline has its hard subject – and with forestry the mantle of teaching biometrics fell to Richard. Funnily all students – both undergraduate and postgraduate – were a bit intimidated and in awe of what was required. He enjoyed the 'apocryphal' tale of the lecturer who asked first-year students to look at the two people sitting either side of them and then advised that one of the two will fail his course. The purpose was to electrify the idle and the somnolent, and demonstrate that mastery required a commitment to study.

In forestry, virtually every student had to turn to Richard whether for the dissertation or their thesis to turn their fluid ideas into a decent rigorous piece of work. ... and, in the process, they got to appreciate his passion and warmth – and empathy. Richard offered his help willingly to undergraduate and postgraduate students, colleagues at UC, and others in need of good statistical advice.

Richard possessed a laconic, abstract kind of humour that often invited you into his world of mensuration, but was also extended to his tenure on the biscuit committee at the School of Forestry. The School possessed a wooden box which staff were required to keep flush with biscuits. Birthdays, promotions, papers published, holidays, marriages, anniversaries and assorted other events were all deemed by the biscuit committee to be reasons for donating biscuits. 'Grappling' to reach underlying chocolate biscuits was strictly forbidden. He was always positive, ebullient and engaging, and is greatly missed by his colleagues. He was an enthusiastic and regular attendee at UC Staff Club events and a keen choir member.

Richard is survived by wife Anne, née Ferguson, son Andrew (Australia), daughter Jenny (England), and grandchildren Jamie, Max, Oscar and Felix.

*Obituary written by Peter Snowdon, Jeremy Fleming, Devon McLean, Barry Poole, David Evison, Euan Mason, John Walker and Bruce Manley.*