

Hydrology Histories: David Painter

Eici l'aigo es d'or

*Old Provençale phrase meaning, 'Around here, water is gold'
(as it has been for my professional career)*

Straight out of my PhD in Engineering (Fluid Mechanics) in 1970, I was hired by Professor John Burton at Lincoln College, now Lincoln University. John, a New South Welshman (1929–2000), was both Professor of Agricultural Engineering and Director of the New Zealand Agricultural Engineering Institute. He co-opted me to take over supervision of a PhD student and three Master's students, even though I was a Research Officer in the New Zealand Agricultural Engineering Institute, not a Lincoln College academic.

John was teaching a Master's course in hydrology at that time – Ven te Chow's *Handbook of Applied Hydrology* was one of the textbooks – and I joined the class. That was my first formal instruction in hydrology. Another Australian, Dr Terry Heiler, was leader of my Soil and Water section at the New Zealand Agricultural Engineering Institute, providing practical, quality learning opportunities in hydrology, soil erosion and irrigation.

Over the years, my work focused on both soil and water. I initiated field research on wind erosion of soil in the 1970s, a topic I returned to about 35 years later. I spent over four months in France studying regional water management and agricultural hydraulics in 1972, and in 1979 spent a year at the Scottish Institute for Agricultural Engineering, carrying out research in soil compaction.

I joined the teaching department of Lincoln College in 1982; half-joined really, as both the department head and the director of the New Zealand Agricultural Engineering Institute believed they had a significant need for my time. I ended up with two half-time positions for a year, which felt like 150% full-time.

Notwithstanding my own lack of formal background in hydrology, I soon began teaching hydrology to both Bachelor of Engineering with Honours (Agricultural) and Bachelor of Agricultural Science students. Worse, I recognised a need for the engineering students to have some formation in groundwater hydrology, so soon I was teaching that too. At least that was closer to my own foundation in fluid mechanics.

I enjoyed supervising final-year projects and post-graduate students. Between 1982 and 1996, at least nine of the latter were hydrology related.

In 1990, Lincoln College became Lincoln University, and I spent a sabbatical year at the University of Waterloo in Canada and the University of Melbourne in Australia. Around that time, the Bachelor of Engineering with Honours (Agricultural) degree became the Bachelor of Engineering with Honours (Natural Resources), jointly taught by Lincoln and Canterbury Universities. I taught hydrology to students at both. Most surface hydrology teaching in New Zealand universities then was being done in geography departments, but it seemed to me important to keep hydrology in front of at least some future engineers.

I had always carried out some engineering consultancy work while university teaching, and this became full-time after I resigned from Lincoln University in 1996, some of which was hydrology related. I carried out hydrology-related and hydraulic consultancy work for the Electricity Corporation of New Zealand, the Canterbury Regional Council, Cawthron Institute and other firms and individuals.



Figure 1. Lincoln University agricultural science students carrying out a twin-ring infiltrometer test

For a 1997 contract with Lincoln Ventures (formerly known as the New Zealand Agricultural Engineering Institute), I co-authored with Dr Prue Williams and Dr Glyn Francis a report for Environment Canterbury and MAF Policy on nitrogen inputs at land surfaces and groundwater quality, a timely study initiated by my former PhD student, Dr John Bright.

In 1998 I prepared a review for the Electricity Corporation of New Zealand of hydrology research with “particular reference to inflow forecasting for Waitaki catchment”. And in 2000 I carried out statistical analysis and reported to Environment Canterbury on seasonal flood probability for South Canterbury rivers.

I supported the Bachelor of Engineering with Honours (Agricultural / Natural Resources) during the whole period it existed, from the first graduates in 1970 to those in 2025, the last year it was offered. When the University of Canterbury advertised in 2000 for a programme director for those degrees and the Bachelor of Engineering with Honours (Forestry), I applied and was appointed as an Associate Professor in the University of Canterbury School of Engineering.

I was back teaching hydrology, among other things. Both my position and the natural resources engineering degree programme were moved into the Civil Engineering Department, then renamed Civil and Natural Resources Engineering and recently further renamed to Civil and Environmental Engineering.

I find it convenient to loosely distinguish between hydrological science, applied hydrology, engineering hydrology and hydrological engineering when considering the future of hydrological education in Aotearoa New Zealand. I am best qualified to comment on engineering hydrology and hydrological engineering: the former is an applied science; the latter is a subdiscipline of professional engineering. I hope that both continue to be taught together in university engineering faculties, as the engineering depends on a sound understanding of the hydrology. It seems to me that hydrological science is best taught at university level in departments such as geographic and geologic science. Applied and engineering hydrology are best

commented on by those who practise them: I suspect a combination of Polytech and on-the-job training might be most appropriate.

I resigned from the university in 2007 and resumed full-time consultancy, which I had maintained alongside my academic employment. For the next ten years I leased an office from Aqualinc Research Ltd – my former PhD student, Dr John Bright, again being helpful – and enjoyed the collegiality while working independently. My mid-1970s research on soil erosion by wind came in handy when wind erosion became a hot topic in the Mackenzie Country in the late 2000s, and I carried out several consultancy contracts on wind erosion.

Perhaps my age was beginning to show; by the mid-2010s I was increasingly called on to carry out internal and external peer reviews of work by other consulting firms and local, regional and central government agencies. These reviews included hydrology, hydraulics, irrigation and water resource management. For a while I was active as an Environment Court Commissioner.

Between 2010 and 2015, I was a community member of both the Selwyn Waihora and Regional Committees of the Canterbury Water Management Strategy project. A 'lay' member of the committees, this was a particularly interesting and professionally demanding call on my knowledge and understanding of surface and groundwater hydrology and their real-world application in 'wicked', complex, human systems.

It is an irony that my most-cited journal paper (over 200 and counting) relates to a sabbatical research period in soil mechanics, another topic in which I have no formal training!

Just as I haven't always been a university academic and researcher, I haven't been a prolific journal paper author. However, several of my hydrology-related published journal papers, including as co-author, have appeared in the Journal of Hydrology (New Zealand). It is an irony that my most-cited journal paper (over 200 and counting) relates to a sabbatical research period in soil mechanics, another topic in which I have no formal training!

By 2017, and past my three-score-years-and-10, I was under pressure from certain persons close to me to retire. I made a genuine effort: I closed my office at Aqualinc Research; I advised all current clients of my intentions; my wife and I took an eight-week holiday in Europe. I returned to find two clients awaiting my return.

David Painter Consulting is now closed, but when the surprisingly time-demanding activities of 'retired' life allow, I ponder about non-stationary statistics application to extreme rainfall and floods (statistics being another topic I have used extensively but in which I have no formal training).

One of the features I have appreciated about hydrology in New Zealand is its 'vertical integration': field hydrologists, instrument technicians, data archivists, academics, undergraduate and post-graduate students and researchers gather at annual symposia and speak a common language. Academics and researchers don't mind getting wet and dirty in the field; field hydrologists and technicians present research papers at symposia and publish journal papers. Long may that continue.

David Painter's recollections are part of a New Zealand Hydrological Society [series](#) that documents the times and memories of New Zealand's senior hydrologists.