

**Reference:** Nelson, C.S., Lowe, D.J. and Tonkin, P.J. 2015. The working life of John McCraw (1925–2014): a remarkable New Zealand pedologist and Earth scientist. *Journal of the Historical Studies Group (Geoscience Society of New Zealand)* 50: 2-29. [Note that the text and figure formats, and the pagination, in this pdf reprint differ slightly from those in the published journal article].

## **The working life of John McCraw (1925-2014): a remarkable New Zealand pedologist and Earth scientist**

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Emeritus Professor John Davidson McCraw (MBE, MSc NZ, DSc *Well*, CRSNZ, FNZSSS) (Fig. 1) passed away at age 89 on 14 December 2014 leaving a legacy of exemplary leadership, education, administration, research, and outreach in the Earth sciences discipline in New Zealand. He is survived at this date by son David, daughter Jill and son-in-law Neil Bennett, granddaughters Rebecca, Kate, and Joanna, and great grandson Harrison. John's younger brother Ralph lives in Cambridge (New Zealand). John's wife Joan (née Megget) died 20 years earlier and they are buried together at Newstead Cemetery in Hamilton.

A short obituary for John McCraw appeared in the *Geosciences Society of New Zealand Newsletter* in March 2015 (Nelson et al. 2015), while a fuller one that included memories of John from several colleagues and former students was published in the February 2015 issue of *New Zealand Soil News* (Tonkin et al. 2015). Here we present a re-edited version of much of that material, in many places adding to it, and we also include a full bibliographic listing of John's published articles over a period of 67 years from 1946 to 2012.



**Fig. 1.** Professor John McCraw at his desk in the Department of Earth Sciences in the late 1970s. Photo: Peter McIntosh, University of Waikato.

## **EARLY YEARS**

### **Education**

John was born on 13 March 1925 in Dunedin, the older of two sons to Robina and John McCraw, his mother a fulltime housewife and his father working for the Dunedin Water Department as supervisor at the Sullivan's Dam. The family lived in the last house on the gravel road up the Leith Valley, which was surrounded by native bush land. John loved exploring the immediate countryside on foot or by horse, which he often rode to school, and he recalled cutting a trail beyond his house up onto the boggy flat-topped hills where he collected many moa gizzard stones and took keen interest in the local plants and landscape. His mother fostered this interest in natural science, encouraging him to join Dunedin's Junior Branch of the Royal Society of New Zealand at the age of ten. He was educated at Otago Boys' High School where he was at odds with the school's tradition as John was not sports inclined and thought the teachers ruled by fear and sarcasm. In 1943 he went on to the University of Otago of the University of New Zealand, undertaking a science degree where his interests were fostered in geology by Professor Benson and, in 1945, in botany by the new lecturer-in-charge, Geoff Baylis. John recalled that Dr Baylis greeted his first students resplendent in the uniform of a naval lieutenant having recently been demobilized. For his MSc degree John chose geology with a thesis study in the northern Takitimu Mountains (McCraw 1947b), nearby the thesis area of his classmate Douglas Coombs (Coombs 1947) who went on to become Professor of Geology at the University of Otago from 1956 to 1990.

### **An introduction to soil surveys**

In the latter part of John's undergraduate training he, like other students, came under the War-time Manpower regulations and was directed into essential work (McCraw 2002b). James Raeside (District Pedologist in Timaru office of the then Soil Survey Division of the Department of Scientific and Industrial Research (DSIR); soon (1946) to become DSIR Soil Bureau), himself a graduate of Otago, contacted Professor Benson with a request for two students to work on a high priority soil survey of Geraldine County in South Canterbury. Professor Benson chose his two top students, Doug Coombs and John McCraw. The two worked through the summers of 1943-44 and 1944-45 staying at the Crown Hotel, then a dry boarding house, in Geraldine, and operating from bicycles, with their soil augers strapped to the handlebars (McCraw 2002b).

The Geraldine survey was one of a number of soil surveys in Canterbury, eastern Otago, and Southland assessing soils suitable for growing linen flax. Britain had lost its main supply of linen flax when countries such as Belgium were overrun by the Germans. So the call went out for linen flax to be grown in New Zealand. Mosquito aircraft still had a fabric body covering made of linen flax. The New Zealand Government started a crash programme to cultivate linen flax and in a remarkably short time built some 20 to 25 factories and a research station at Washdyke outside Timaru. Crops were being harvested at the same time as the factories were appearing. When John was experiencing his first soil survey, the whole of South Canterbury was blue with the colour of the linen flax in flower. It was during this time working as a student soil surveyor that John first met Ian Baumgart (pedologist). Ian's university training had been interrupted by several years in the New Zealand Army as a gunner surveyor on Norfolk Island. After completing his degrees, Baumgart was sent to Timaru to work on the Geraldine County survey, where he learnt the rudiments of soil surveying from 'vacation worker' John, who recalled Baumgart had a cheerful personality and they called him 'bouncing Baumgart' (Tonkin 2014).

John returned to university in Dunedin to complete his MSc degree and, during this time while working part-time in the Dunedin Botanical Gardens, was again approached by James Raeside to participate in another urgent soil survey project mapping the Maniototo Plains for a proposed irrigation scheme. This survey was so urgent that the soil survey team of Raeside, Eddie Cutler, Alan Pullar and two field assistants had to work through the winter months with extreme cold and frozen soils. However, John declined Raeside's request to assist in favour of completing the write up of his MSc thesis (McCraw 1947b).

## **SOIL BUREAU (DSIR) YEARS**

### **Timaru office of Soil Bureau**

In 1948 John joined the Timaru office of DSIR Soil Bureau (McCraw 2002c). At this time a soil survey of the Plains and Downs of Canterbury was complete and his first job was hand colouring some the draft maps of this and of the Maniototo survey. The hand-coloured draft Maniototo maps were being rushed to urgent meetings in Wellington by James Raeside. At the same time Eddie Cutler was finishing a soil survey of the Lower Clutha and John and Alan Pullar teamed up to survey South Canterbury and North and Central Otago as part of the four-mile reconnaissance soil survey of the South Island. Central Otago was the big gap and they started at Middlemarch and worked their way up country.

John was allowed to come home once a week and he caught the Central Otago train at about 2 pm on a Friday afternoon and stepped off that and onto the Express train at Dunedin and got home to Timaru at about 2 am the following morning. He had to leave on the midnight Express on Sunday night to catch the train on Monday morning back up to Central Otago again. This was a great concession. James Raeside worried about how he was going to cover all the associated expenses. John and wife Joan were recently married whereas Alan Pullar was not and so he was quite pleased to stay in a local pub because this meant he did not have to pay board. John McCraw noted that during this time "James Raeside taught me how to write a scientific paper and how to present a talk at a conference" (McCraw 2002c).

### **Alexandra office of Soil Bureau**

At the end of 1948 the Timaru office was closed with James Raeside moving to Washington, USA, as Scientific Liaison Officer for the New Zealand Government, Eddie Cutler eventually moving to Dunedin, and John was to go to Gisborne and Alan Pullar to Central Otago. However, Alan Pullar and James Raeside had a deep-seated resentment toward each other emanating from the role of Bomber Command toward the end of the Second World War bombing of the German city of Dresden. Flight Lieutenant Pullar had been a navigator in Bomber Command (Vucetich 1977, 1982; McCraw 2002c). As a consequence, Raeside decided to send Pullar as far away as possible to Gisborne and by early 1949 McCraw was established in Alexandra in Central Otago. This was a pivotal point in each man's subsequent career, with Alan pioneering the mapping of tephros and their use in soil stratigraphic studies (with colleague Colin Vucetich – see Lowe et al. 2008) and John developing a life-long interest in Central Otago.

Prior to moving to Alexandra, John spent the summer of 1948-49 living at home in Dunedin during which time he completed the reconnaissance four-mile soil mapping of eastern Otago and the Otago Peninsula – working from the kitchen table. The soil surveys in Central Otago were initiated as part of a programme of the Fruit Research Section of Plant Diseases Division of DSIR investigating dieback in orchards (McCraw 2002d). The first orchard soil survey had been done by Alan Pullar in 1947. When John and wife Joan moved to Alexandra, a place to stay was their first problem. This prompted John, in those post-war years of

shortages in building materials, to build his own house from sun-dried mud bricks. Over the following years anyone who came to stay at the McCraws, including John's Soil Bureau colleagues, was given a task to assist in the building of the house – which went on for years.

The Soil Bureau's Alexandra office had a succession of pedologists working with John, initially on the orchard surveys and subsequently on the land use and irrigation surveys in Central Otago. Des Cowie came down from Wellington in 1951-52 to help with the Alexandra orchard survey. He started in Soil Bureau as a cadet and he had just finished a BSc in geology from Victoria University College of the University of New Zealand in Wellington. Des must have arrived quite early in the piece because he slept for a while in John's unfinished house in what he called the sunroom, which was not plastered, comprising just mud bricks. Soon after, Bill Ward, another new geology graduate out of Victoria and a soil cadet, arrived and the two of them worked on the orchard soil survey with John. When Des went off to the Soil Bureau office in the Manawatu, Bill stayed on. Shortly after that Mike Leamy, another soil cadet out of geology at Victoria University College, arrived and in 1955 they all started on the Ida Valley soil survey. John recalled that this was just after his return from a visit to CSIRO Australia in 1954. The three worked through 1955 then Bill was transferred to Soil Bureau in Christchurch and Mike returned to university to complete his MSc degree.

During the 1950s, Alexandra developed a reputation as an intellectual microcosm with agricultural scientists in the Department of Agriculture (Terry Ludecke, John Widdowson, and Brian Molloy), soil conservation staff in the Otago Catchment Board (Graeme Anderson, Alan Mark, Peter Wardle, and Brian Douglas), as well as the DSIR soil scientists. John was also involved in a number of local community groups and became a renowned member of, and eventually the Chief Officer of, the local Volunteer Fire Brigade. Much later, he was to write a book about his experiences as a fireman (McCraw 1991). John and Mike Leamy were involved in the establishment of the now-famous Alexandra Blossom Festival and John was one of the drivers behind acquisition of the local swimming pool complex. Toward the end of his time in Alexandra, John was elected to the Alexandra Borough Council.

John McCraw was involved in a number of detailed soil surveys, principally the Alexandra survey of the lower Manuherikia and adjacent parts of the Clutha Valley (McCraw 1964) and of the Ida Valley (McCraw 1966a), as well as high country surveys in conjunction with the Otago Catchment Board which included Upper Shotover (McCraw 1956a) and Lower Shotover (McCraw 1966b) catchments, the Arrow Valley, the Nevis Valley, the Fraser River basin, and the Crown Terrace. John had soil scientists on exchange from the United Kingdom and Australia working with him in Central Otago. These included Brian Avery, a senior pedologist from the Soil Survey of England and Wales who was on an exchange and spent several weeks on the Upper Shotover catchment and the Crown Terrace surveys. On exchange from the CSIRO Australia were Geoff Dimmock from Tasmania, who began the Upper Manuherikia survey in 1958, and in 1961 Cliff Thompson from Queensland who carried on with this survey. The Upper Manuherikia survey was eventually completed and published by Gary Orbell who arrived in Central Otago in 1963 (Orbell 1974). John also co-authored the "Soils of South Island" review article as part of the three-volume set "Soils of New Zealand" (Raeside et al. 1968).

### **Central Otago landscape**

In addition to the soil surveys, John had a keen interest in the landscapes of Central Otago and the interpretation of some of the unique features such as the upland and lowland tors

(McCraw 1965a), the periglacial patterned ground of the mountain tops (McCraw 1959a), the pattern of soils from basin floor to mountain uplands (McCraw 1962a), and the soil pattern on the alluvial fans of Central Otago (McCraw 1968a) (Fig. 2).



**Fig. 2.** (Left) John McCraw standing in a depression at the base of a schist tor on the Old Man Range, Central Otago (Obelisk tor in background). (Right) John in front of a stone-and-earth banked solifluction terrace on the Old Man Range. Photos: Philip Tonkin taken in 1969.

### **Soils in Antarctica**

Given New Zealand's jurisdiction over the Ross Dependency in Antarctica, Norman Taylor, Head of Soil Bureau in Wellington, posed the query in the late 1950s as to the nature of soils, if any, in Antarctica. With a big international soil conference looming in Madison, USA, in 1960, Taylor saw considerable merit in being able to present a map showing the soil types in a part of this frozen continent. In the summer of 1959-60, John McCraw and Graeme Claridge (Soil Bureau, Taita, Lower Hutt) were tasked with conducting the first study of soils in Antarctica, soon after the successful ending in 1958 of the Commonwealth's Trans-Antarctic Expedition in which Sir Edmund Hillary led New Zealand's support team that included the setting up of Scott Base.

John and Graeme flew south from Christchurch for 14 hours in a Super Constellation, their plane was "talked down" onto the ice field because of poor weather conditions, and this was followed by an uncomfortable one hour bull-dozer ride to New Zealand's Scott Base headquarters. Following reconnaissance trips to Cape Royd and Cape Hallett, the two then spent one month describing and mapping the "unusual" soils in the ice-free Taylor Valley, one of several "Dry Valleys" in the Ross Dependency (Fig. 3). The soils were unlike anything experienced in New Zealand, lacking humus-rich topsoil (no vegetation), salty and carbonate-bearing (upward water movement due to intense evaporation and sublimation), and frozen ground after a few tens of centimetres of digging (permanent permafrost conditions). Nevertheless, a soil map of the valley was produced, along with documentation of many other local landscape features (McCraw 1960a, 1960b, 1962b, 1967b, 1967c; Claridge 1965, 2002, 2010), and Norman Taylor was proudly able to broadcast the initial findings about Antarctic soils at the 1960 international meeting in Madison. John, on his return to Alexandra, had several American visitors just back from the ice and one was Lincoln (A.L.) Washburn, an international expert on periglacial landforms who stimulated John's developing ideas about such features in the Antarctic Dry Valleys and in Central Otago. Graeme Claridge continued to have a strong research connection and associated publication record on Antarctic soils for 40 years after the pioneering 1959-60 soil survey, chiefly with Iain (I.B.) Campbell (Claridge 2002).



*Fig. 3. Graeme Claridge (seated) and John McCraw standing outside a makeshift shelter made from a large packing case at New Harbour, Taylor Valley, Antarctica, in the summer of 1959-60 (see Claridge 2010). Photo: Soil Bureau, DSIR.*

### **New Zealand International Soil Conference 1962**

In the years leading up to 1962, the staff of Soil Bureau became involved in the selection of sites to represent the diversity of New Zealand's soils in preparation for an International Soil Science Society Conference to be held at Massey University, Palmerston North, in November 1962 (McCraw 2002e). John was occupied in the selection, preparation, and sampling of sites in Central Otago and in Southland and, at Norman Taylor's request, he was sent to Northland to organize the preparation of pre-selected sites accompanied by Harry Woodyer-Smith, a friend of Taylor's from early soil survey days. The preparation of these sites took John a couple of weeks and some fortuitous good luck, as when a Maori road worker came by as John was labouring to clear a slumped section and offered to get the county grader driver to run his blade along the cutting and do it for him. However, John did not get to see the prepared Northland sites as he was leading a South Island tour with Professor Tom Walker (Lincoln College).

Coming back from Northland, John called in on John Bruce in the Hamilton office of Soil Bureau. McCraw had been advised he was soon to be transferred to Hamilton. Returning to Alexandra there was a rush to tidy up the projects nearing completion, finalize tour arrangements for the 1962 conference, and generally leave things in good order. Some projects, including the Ida Valley work and papers on the Antarctic survey, were taken north.

### **Hamilton office of Soil Bureau**

In 1963 John McCraw joined John Bruce in the cramped Frankton office of the Soil Bureau in Hamilton. John Bruce had been working on the soil survey of Raglan County and the field-

work was nearing completion. He had previously prepared a soil map for Hamilton City (published eventually in Bruce 1979). Time was spent acquainting John with other Government departments including the Ruakura Agricultural Research Centre, familiarizing himself with the Raglan survey, and gathering background and historical information for the Waikato survey (Fig. 4). Part of the Waipa County in the Hamilton basin had been surveyed by Leslie Grange and Norman Taylor in the early 1930s (Grange et al. 1939) and Harry (H.A.) Hughes had begun mapping the Hamilton–Cambridge part of Waikato County in 1939. John’s initial task was to bring these maps onto a new map base and prepare to finish that part of Waikato County, as yet unmapped. In addition, he had the several outstanding projects from Central Otago and Antarctica to finish. The editing of soil bulletins was an exhausting process with many revisions and retyping that went on for several years.



*Fig. 4. John McCraw alongside the reference profile of the Hamilton clay loam (New Zealand Soil Bureau 1968) at Church Road, Te Rapa, Hamilton, in 1966 (now lost to subdivision development). This multisequal, tephra-derived soil was later re-named the Kainui silt loam (McCraw 1967a; Lowe 1991, 2002c) and has its own special classification ‘box’ in the New Zealand Soil Classification (Hewitt 2010). Photo: Philip Tonkin.*

The Waikato–Hauraki region is noted for its large areas of peat and John was drawn into an interdepartmental committee on peat land development as well as numerous other local matters. He employed Mike Vennard as a technician and organized the shifting of the office into larger premises in downtown Hamilton. In 1965 John spent several months on a fact-finding tour visiting soil survey and soil research institutions in the USA, Iceland, United Kingdom, Norway, and Germany, and he called in to Malaya to see Mike Leamy on his way back to New Zealand. Time was spent compiling a comprehensive report on this tour and presenting the information to Soil Bureau staff. John was also consulted in planning subsequent soil research in Antarctica to be undertaken by Graeme Claridge and Iain Campbell (Soil Bureau, Nelson office), and by Peter Stephens from Lincoln College.

In 1966 Philip Tonkin arrived to assist with the soil survey of Waikato County and by May an outpost of the Hamilton office was established in Pukekohe with Gary Orbell beginning a soil survey of Franklin County. John Bruce left in 1967 to establish a soil survey office in Gore. In addition to the supervision of the Waikato and Franklin surveys, John McCraw had requests from the Department of Lands and Survey for one-mile soil surveys of Ohinemuri

County (McCraw 1968b) and subsequently Coromandel and Thames counties. Initially he thought the one-mile compilation sheets for the four-mile reconnaissance soil survey of the North Island could be updated to provide these soil maps, but John found that further field-work was required. In addition to these surveys, John also undertook a study of the soils on Mayor Island (Tuhua) (McCraw and Whitton 1971) and began a study of the Alderman Islands in the Bay of Plenty.

During this time John met Michael Selby, a geomorphologist in the Geography Department at the newly-established University of Waikato that first opened its doors to students in 1964 (Alcorn 2014). They often met at the Hamilton office of Soil Bureau and chatted about a variety of landscape and soil topics over a cup of tea. John offered lectures on soil classification to Michael's classes, and as well he began giving talks to the local geological group and to service groups and schools on the soils and history of the Hamilton basin (McCraw 1967a). In July 1968 Soil Bureau was again running field tours through North Island and South Island as part of the International Society of Soil Science Congress held in Adelaide, Australia, and John attended this congress, presenting a model of soil distribution on alluvial fans (McCraw 1968a).

At the end of 1968 Philip Tonkin resigned from the Hamilton office of Soil Bureau to take up a lectureship at Lincoln College near Christchurch. He was replaced by Joe Bell at the beginning of 1969 who assisted John in the soil survey of Coromandel and Thames counties (McCraw and Bell 1975). In 1968, John McCraw received a Doctor of Science (DSc) degree from Victoria University of Wellington for his soil surveys in Central Otago and for his pathfinding soil work in Antarctica in 1959-60 (McCraw 1968c).

### **An integrative Earth sciences philosophy**

In November 1968 John was selected to go on a two-week live-in administration course run by the Public Service Commission for scientists. As part of this course he wrote a paper with a plea for better and more relevant training for the growing number of people working in the physical environment such as catchment board officers, soil conservators, planners, pedologists, and civil engineers (McCraw 2002f). This request reflected John's own work experience and the training he had received some twenty years previously. He recalled that on his first meeting with Norman Taylor he knew nothing of the nature or distribution of volcanic ash (tephra) forming many of the soils in the North Island, a topic never mentioned in his geology tuition days at Otago in the 1940s.

A revised version of this paper formed the basis of advice John subsequently gave to the University of Waikato in Hamilton as it was planning the establishment in 1970 of a School of Science to teach chemistry, physics, biology, and physical Earth-related subjects. Initially the name 'environmental science' was proposed for the last topic, but criticism from the Geography professor of the day because of the absence of social aspects in the subject led John to coining the name 'Earth sciences' – a novel title in the late 1960s. The School of Science proposal was approved in 1969 and John was encouraged to apply to take up the position of the Foundation Professor in Earth Sciences. His application was successful and he resigned from Soil Bureau, DSIR, in October 1969.

## **UNIVERSITY OF WAIKATO YEARS**

### **Putting theory into practice**

John McCraw's appointment as Professor and Head of the new Department of Earth Sciences (later called Earth and Ocean Sciences from 2006-2014) at the University of Waikato led to

the development of integrated courses (papers) in geology, soil science, climatology, geomorphology, and hydrology that dealt with the physical environment as a whole and which would be especially relevant to New Zealand requirements. The emphasis was on courses and research that dealt with the surface and near-surface of the Earth, where the bulk of New Zealand's wealth is generated. Such an integrative concept was unique at the time. In fact, other university geology departments were opposed to 'another geology department' starting up, but such opposition allowed John McCraw to complete his plans because the new department was precisely *not* going to be 'another geology department' (McCraw 2002f). The idea of a broad geosciences department, rather than a conventional department of geology or soil science, is now widely embraced with, for example, even the University of Auckland replacing its 'geology' programme with 'Earth sciences' in 2014.

### **Practical skills**

John's background and practical skills were instrumental in quickly acquiring the basic teaching resources needed in a brand new Earth sciences department. Some examples relevant to those formative years are mentioned here:

(1) Immediately upon starting at Waikato, John commandeered a Land Rover belonging to the university and, with son David, travelled around New Zealand collecting rocks and materials that he sent back to Waikato in sugar bags from railway stations (Alcorn 2014). One such sack, from Westport, took three weeks to get to Hamilton. On another trip south, Philip Tonkin and his wife Jacky and infant son accompanied John and assisted in collecting rock and soil samples as well as monoliths of key soils from Central Otago. Once home, John spent hours in a boiler suit in the basement of A-block at the university breaking rocks with a sledge hammer and hydraulic wedge made for him by engineering friends in Alexandra (Alcorn 2014). These samples formed the first-year teaching collection and are still in use today.

(2) While still at Soil Bureau, John, with Philip Tonkin's help in the design, colouring, and plaster work, constructed and painted a 3-D model in his home garage of the geology, landforms, and soil types of the Hamilton Basin as a visual teaching aid for his classes – one of the first real 'soil-landscape models' (Fig. 5). The model is still used today and, despite the availability of digital diagrams and maps, is always a hit with students and with the public on university open day displays because of its simplicity and clarity as a 3-D unit.

(3) Again in his home workshop, John constructed a large wooden and perspex model for use in laboratory classes to help students understand the concept and workings of a polarizing microscope used in laboratories for the identification of minerals and rocks in thin section slices in petrology classes.

(4) John held a personal fascination with unravelling the history of landscape development in the Hamilton basin and its relationship in particular to past changes in the nature and courses of the Waikato River flowing through the basin. To better understand the fluvial processes involved, he instigated the construction of a giant concrete-block flat-bed flume in the basement of one of the School of Science buildings that would support hydrological, geomorphological and sedimentation course teaching. By changing sediment types, slope, and flow rates in the flume the shift from meandering river to braided river conditions could be monitored, along with changes in the associated in-channel bedforms and bordering geomorphic features (Fig. 6). The flume was in use for about three decades, by which time the beginning of developments in computer-based modelling and especially the demand for



**Fig. 5.** Designed and constructed by John McCraw and Philip Tonkin in 1968 as a teaching tool to show relationships between Late Quaternary landforms, geology and recurring soil patterns in the Hamilton Basin, this idealized 3-D soil-landscape model remains in use in Earth Sciences today, 47 years later. Ruler 40 cm long. Brown (A) = Mesozoic greywacke hills; green (B) = Late Quaternary intermixed tephras ( $\leq 50$  cal. ka) and Hamilton Ash-covered low hills (Kainui, Hamilton, and Rotokauri soils); pink (C) = intermixed thin tephras ( $\leq 20$  cal ka) over coarse volcanogenic alluvium of Hinuera Formation (Horotiu and Silverdale soils); orange (D) = intermixed thin tephras ( $\leq 20$  cal ka) over fine volcanogenic alluvium of Hinuera Formation (Bruntwood soils); grey (E) = fine volcanogenic alluvium of Hinuera Formation (Te Kowhai soils); cream (F) = mainly gully sides or risers, and gully bottoms, in Hinuera Formation (Kirikiroa and Tamahana soils, respectively); pale yellow (G) = low terrace of volcanogenic alluvium of Taupo Pumice Alluvium (c. AD 250) (Waikato soils); black (H) = peat (deep to shallow: Rukuhia, Kaipaki, and Te Rapa soils, respectively).



**Fig. 6.** (Left) John McCraw in “hands on” mode preparing the mixed sand and gravel sediment in the large flat-bed flume for a controlled experiment on the evolution of different river morphologies and bedforms under changing flow conditions. Technicians Peter Codlin (left) and Laurie Gaylor (right) lend support. (Right) Testing the newly built department coring barge in the car park “wave tank”. Submerged white lines demarcate car park spaces. Technician Mike Vennard onboard with John looking on. Photos: Rex Julian, University of Waikato.

more building space for offices and laboratories in a rapidly expanding department, culminated in reluctant dismantling of the flume.

(5) During ongoing construction of the School of Science buildings in the early 1970s John (with colleague Michael Selby) suggested that one of the surrounding car park areas be dug out to form a large “bath-like” depression that might be developed as a large-scale wave tank in the future, to support hydrological and coastal oceanographic teaching and research. When not in use, vehicles could park on the slopes of the structure’s floor. The sunken car park was built, but over the ensuing years the cost of installing appropriate wave generators was always extra to the available annual budget and so the idea lapsed. However, the depression was often filled with water on open days to exhibit the department’s jet boat or drilling barge (Fig. 6), and of course it remains as a car park to the present day.

(6) Mike Vennard, John’s soil technician while in the Hamilton office of Soil Bureau, was persuaded to join him at the university in 1970, the first year of science teaching, to oversee the varied technical services required of a new Earth sciences department. John quickly appreciated the need to sort, catalogue, and display his slide collections for teaching and research purposes in a readily accessible manner, and so he and Mike designed and built slide-storage and viewing cabinets for staff use (McCraw and Vennard 1971). The cabinets were popular and survived for three decades, until digital photography and PowerPoint presentations replaced 35 mm slides as visual teaching aids.

### **Early academic staff**

In 1970, the foundation year of the Department of Earth Sciences, John McCraw appointed as his academic assistants firstly physical geographer Michael Selby (originally from Oxford University), who transferred from a lectureship in geography at the University of Waikato after beginning his academic career in 1964 as a junior lecturer for the Waikato Branch of the University of Auckland (Lowe and Kamp 2002). Michael drew up the course prescriptions as he already had good experience of such procedures in the university, and his status as a recognized author – largely on the basis of his early-career two-volume text book “The Surface of the Earth” (Selby 1967a, 1967b) – added early and ongoing credibility in helping to develop the research side of the fledgling department.

John then appointed Harry Gibbs (in March 1970) from Soil Bureau, DSIR. John wrote (McCraw 2002f):

“Harry had missed out on the Directorship of Soil Bureau, and previous colleagues thought I was mad to take Harry on in what was a reversal of our previous roles, and with the knowledge that Harry could be rather testy. What a treasure he proved to be with his vast knowledge of soils and his prodigious memory not only of soils, but of students’ names. I cannot remember an altercation with Harry, who provided me with much needed support in the difficult task we had taken on.”

As well as being an extremely fair-minded and openly respectful colleague for John (which says a lot about Harry, given their reversal in roles), providing him with sound and considered advice regularly (they used to meet to chat weekly, usually late Friday afternoons), Harry proved to be an excellent choice to take on the teaching of soils and pedology to undergraduates especially. He was soon promoted to a personal chair (1974). Although he had a reputation as a hard taskmaster, Harry’s wide knowledge, patient approach, and ‘fatherliness’ endeared him to numerous undergraduate and graduate students (Lowe 2002b). Towards the end of his life (he died in 1984), Harry reflected that he had enjoyed and appreciated having the two main facets to his career, firstly being involved with

pioneering soil surveys and developing expertise for soil-centred land use and its management during a period of great advances for about 30 years at Soil Survey/Soil Bureau, and then helping to disseminate his knowledge and experience for about 10 years at Waikato University. When he retired, he did comment a few times “I’m on the scrap heap” but he continued to teach to a limited extent in graduate papers on soils for a few years, and he published a book summarizing succinctly much of his knowledge (Gibbs 1980).

In John McCraw’s own words (from an interview in June 2010 with Philip Tonkin) about early staff appointments:

“It is fair to say that soils were always in the back of our mind in thinking about the make-up of courses with the initial appointment of Harry Gibbs. Then we made appointments to reinforce the soil concept. Cam Nelson [appointed in February 1971] with his strong [knowledge of] stratigraphy of the King Country was asked to develop geology but not traditional geology — only a smattering of palaeontology and economic geology – and then we got Ian Simmers to do climate and water (hydrology). We didn’t do biology, as it was taught to all our Earth science students by the Department of Biological Sciences across the corridor. Otherwise we were working our way through the soil-forming factors!”

“With the core established, and in the face of almost overwhelming numbers, we had to appoint back-ups. [The late] Terry Healy [appointed in May 1973] was supposed to be a geomorphologist but his interest was coastal geomorphology and he immediately began to develop and strengthen this aspect and in so doing gained the first research contract for the University of Waikato. Then Roger Briggs came in [February 1975] to provide mineralogy and petrology for geology and finally [at this stage of development] Bob Allbrook [was appointed] to provide [soil] chemistry and physics for Harry.”

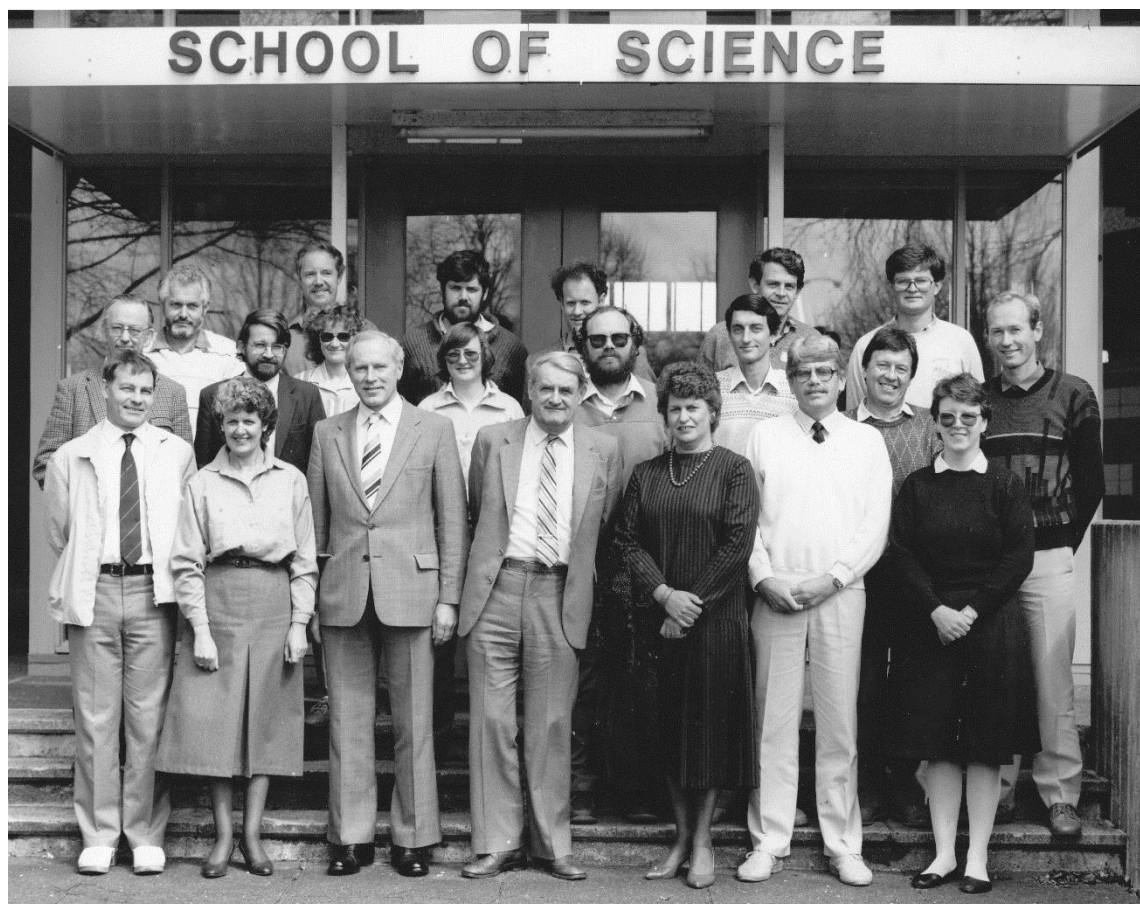
John always acknowledged the importance and influence of his early colleagues, Michael Selby and Harry Gibbs, in the success of the department’s earliest days, and how the four staff appointments soon after (noted above) enhanced its development, especially in growing the graduate school and its research ability through supervising masterate and doctoral programmes.

Other staff were appointed as student numbers grew, and courses were modified or evolved according to demand and staff interests to include geochemistry, natural hazards, coastal studies, volcanology, sedimentary geology, Earth materials, soil mechanics and engineering geology, and Quaternary studies (along with soil science, hydrology, and so on – see Balks 2002; Lowe 2002a, 2002b). At the time of John’s formal retirement in January 1988, the department comprised 21 staff in total (Fig. 7) (Earth Sciences Staff 1987).

An important aspect of the establishment of Earth Sciences within the School of Science was that it was expected that staff and graduates/postgraduates would collaborate across departments, and in fact a single tea-room for all school staff and graduates/postgraduates was (and remains) central to this ideal. John McCraw (commenting in 2010):

“Don Llewellyn, the [first] VC, was fed up with interdepartmental squabbles and inflexibility in Auckland [where he had been previously] and wanted the School [of Science] to be the paramount unit, and in it would be ‘subjects’. So for a start we were ‘Earth Sciences’ in the School of Science. Nobody, especially outside the university, understood this, so we became departments over Don’s opposition.”

One example of such interdepartmental collaborative work was the peat survey of New Zealand led by (former student) Dr Tony Davoren, and initiated and coordinated by John



*Fig. 7. Staff of Department of Earth Sciences at the University of Waikato around the time of John McCraw's retirement in early 1988. Front row (left to right): Terry Healy, Elaine Norton, Michael Selby, John McCraw, Sydney Wright, Cam Nelson, Mary-Ann Griffin. Middle row: Bob Allbrook, Peter Hodder, Vicki Lockwood, Vicki Moon, Willem de Lange, David Lowe, Richard Chapman, Peter Kamp. Back row: Laurie Gaylor, Mike Vennard, Steve Bergin, Earl Bardsley, Roger Briggs, Mike Dravitski. Photo: Ross Clayton, University of Waikato.*

McCraw, which involved students from both Earth Sciences and Biological Sciences (Davoren et al. 1978; McCraw 1979a). Another fostered by John was the close association with Chemistry, initially in the 1970s through Antarctic Dry Valley and radiocarbon dating projects (Prof. Alex Wilson and Dr Chris Hendy), followed in the 1980s and later with analytical support (Chris Hendy) of stable oxygen and carbon isotope studies of cored sediments from the Deep Sea Drilling Project and elsewhere in the Southwest Pacific and Tasman Sea regions (e.g. Nelson et al. 1985, 1986), along with the rapid development of a world-class radiocarbon dating laboratory based at Waikato (e.g. Hogg et al. 2007, 2013).

### **Earth sciences 101 and beyond**

John McCraw was a vastly entertaining and masterly lecturer. He excelled at teaching first-year students, both in the classroom and in the field, which he carried from the outset (Fig. 8). Such students are hard work, and John poured enormous effort into them, and he truly did inspire. Large numbers of students 'jumped ship' from the high-school based subjects they had known, such as chemistry, maths, and biology, into the Earth sciences major directly as a result of John's engaging first-year lectures. One thing always remembered was his advice in his opening lecture to first-year students: "To study Earth sciences you need imagination".

By this he meant the need to acquire observational and other skills, to envisage in multiple dimensions (including time), to reconstruct past events and environments using fragmentary evidence, to examine a problem from different viewpoints (and disciplines) if necessary, and to communicate in writing and orally in an imaginative and effective way. Another was his advice to fresh graduates embarking on their research: “Grasp every opportunity you can to learn. You will never have as much time as now to acquire knowledge and understanding.”



*Fig. 8. Lunchtime in the Bankwood School (Hamilton) grounds on a first-year student Earth Sciences fieldtrip in August 1975. John McCraw seated third from right, with petrologist and later volcanologist Roger Briggs (red jersey) on his left and tutor Harold Larsen to right. Technician Peter Codlin is to the left of Roger. Photo: Rex Julian, University of Waikato.*

### **Public talks**

From the mid-1970s to mid-1980s John McCraw teamed up with the late Dr (later Sir) Don Llewellyn, the university’s founding Vice Chancellor, and embarked on a remarkable mission to sell the University of Waikato’s School of Science, of which Earth Sciences formed a key part, to the wider community. For more than 10 years this duo spent several weeks each year visiting secondary schools in the upper North Island stretching from Northland to East Cape and Taranaki, visiting two schools a day to talk to senior students about current research in the School of Science and in Earth Sciences. The touring team also used these opportunities to give talks to people in business and local bodies, and to suggest possible collaborative research thereby securing the first research contracts for the university, well known today to be an essential prerequisite of many of the university’s research programmes.

Around this time, as well as serving for two terms as Dean of the School of Science (1975-84), John McCraw delivered 26 Vice-Chancellor’s invitation lectures to the public in a five-year period (1976-80), each being an illustrated, purpose-written talk at lay-persons’ level on the geology and landscape of their local district. A consummate speaker, he gave numerous popular talks involving Earth sciences to clubs, societies, schools and many other groups, including for example to Probus, Lions, Rotary, Lyceum, 60+, Forest and Bird, and Junior Naturalists. Such talks followed a practice John began in 1948 that continued for more than

60 years, by which time he had given several hundred public talks. He understandably was therefore tireless in asserting the need for research to be well communicated, and he generously funded a prize, the McCraw Prize, which will continue in perpetuity, for the best oral presentation given at the Earth Sciences' annual graduate/postgraduate conference, which has been held every year since 1987.

### **University research**

John McCraw, although very heavily involved in administration and mainly undergraduate teaching for much of his time at Waikato, was able to conduct some personal research and publish papers, including articles on soil surveying in the King Country and on land use and planning (e.g. McCraw 1972, 1973b, 1974a). He also co-authored a paper on coastal terraces and tephrochronology in western Bay of Plenty (Selby et al. 1971), and wrote a seminal paper on tephra and loess deposits in New Zealand that was published in the proceedings of the INQUA Congress that had been held in Christchurch in 1973, at which John was a plenary speaker (McCraw 1975). These tephra-based papers led to his supervision of research students who worked on tephras including Alan Hogg (now a radiocarbon dating specialist and associate professor at Waikato) (Hogg and McCraw 1983), Dr Peter Hodder (geochemist, tertiary administrator/manager, and writer/editor), and David Lowe (tephrochronologist, pedologist, and Quaternarist, and now a professor at Waikato) (see Lowe 2002c), who appreciated and enjoyed John's unqualified help and guidance. John was supportive and intensely dedicated to students (both undergraduate and graduate) and staff, and took a genuine interest in their work and well-being (e.g. see the next section, and other comments from colleagues and former students in Tonkin et al. 2015). He always gave sensible advice and, although he could be blunt, any criticism was usually tactful. Commenting on John's role in his own career, Dr Peter Hodder commented (from Tonkin et al. 2015):

“A somewhat gruff but kindly man, my recollection is that he steered the Earth sciences ship well, encouraging newcomers like me to develop their own research interests, but subtly indicating where those interests might help in the department's teaching endeavours. In addition, he contributed much to the wider university, having perspectives that went far beyond his own academic discipline. I thought this breadth of approach admirable...”

### **A down-to-earth attitude**

John McCraw always remained firmly grounded and practical, and these attributes together with his wide interests meant he was open to unusual requests or projects that did not conform. He could always “find a way” despite regulations. For example, Professor Graeme Spiers, now a professor of geochemistry in Canada, began adulthood as a dairy farmer near Te Awamutu. In Graeme's own words:

“Prof was responsible for my starting at Waikato in the early 70s. It all began when I went to a talk he gave in the local hall [near Te Awamutu] on “The Waters of the Waikato” [McCraw 1971a], and I have never looked back. Prof even made sure I was awarded a BSc *in spite of not following the rules*, so he has always been a special person in my personal and academic life.”

A second example is from Dr Peter de Lange, a botanist with the Department of Conservation, Auckland. Peter writes:

“Prof was the person who convinced me to start university from the sixth form, and he always held high hopes that I would turn from botany to pedology. Instead, it was he who gave me the MSc topic that ended up as a palaeoecological and volcanic ash-related study of Kopouatai peat bog when I had been rejected as an MSc student from Victoria University for a project based on botany.”

“Prof will always be remembered by his students for his eschewing of pomposity. He earned the epithet ‘Prof’ because he was universally respected and loved by his students, not because he expected to be known by it.”

A third example is that concerning (now retired) pharmacist and former student, Dr Brian Challinor. With John’s prompting and encouragement, Brian published his first paper in 1968 (Challinor 1968), and went on to become a globally-recognized expert in belemnites for the Southwest Pacific, Indonesian, and Antarctic regions with, to date, 26 refereed papers to his name. In appreciation of John’s ongoing encouragement, Brian named for him a fossil, *Belemnopsis maccrawi* Challinor (Challinor 1979a, 1979b). In Brian’s words:

“I first met John McCraw when he was in charge of the DSIR Soil Bureau at Hamilton in the late 1960s. I had qualified as a pharmacist in 1953 and had been in business in Huntly for 15 years or so, and had developed an interest in geology, particularly in the Jurassic beds between Port Waikato and Kawhia Harbour. I attended Waikato University as a mature student between 1978 and 1980, graduating BSc in Earth Sciences and Biology. At the time of entry I did not have the required educational standard and Prof McCraw arranged a provisional entry during which I was required to demonstrate that I had adequate knowledge to cope with the lectures. Prof McCraw at that time lectured [to] the first-year students on introductory Earth sciences and I will never forget how he made the subject so alive and fascinating. I was able to assist the Earth Sciences Department by supplying a selection of fossils from Kawhia Harbour as teaching specimens.

Prof McCraw had convinced me that I should try my hand at writing up a paper on the fossils I had found. He did so by bringing up the subject every time we met. This led to my first publication [Challinor 1968]. I later published a series of papers in New Zealand and overseas journals over the next 20 years or so. Prof McCraw assisted in many ways both while I was a student at the university and later.

In 1993 Prof McCraw convinced me (again using the same method as earlier) to submit a body of published work for examination for the degree of Doctor of Science (DSc) and this was duly awarded [by the University of Waikato] in 1994. I was the first student [who had studied] Earth Sciences [at the University of Waikato] to receive the degree. Without Prof McCraw’s help and support over the years I would not have been able to produce the work that I did. This was typical of his approach to both students and staff during the years that I knew him.”

### **McCraw Glacier**

John McCraw’s pioneering contributions to Antarctic geoscience, and his support for the research and wellbeing of staff and students of the University of Waikato’s Antarctic Research Unit, were commemorated with the naming for him of the McCraw Glacier (at about 80° S) in the northern Britannia Range, Antarctica (Fig. 9), following a Waikato expedition to the Britannia Range–Darwin Glacier region in the 1978-79 season led by Michael Selby with Peter Kamp, David Lowe, and the late Craig Law (Selby 1979). The party sledged by man-hauling on the McCraw Glacier, and mapped exposures in the surrounding area, for six days from 13 to 18 December in 1978, as well as discovering iron meteorites on nearby Derrick Peak at the junction of the McCraw and Hatherton glaciers a few days earlier (Kamp and Lowe 1982).

### **Retirement ‘fun research’**

John McCraw published about 55 refereed articles on soil science (including survey bulletins), geology, geomorphology, and geo-education in his career, and a similar number in the same and other (e.g. botanical) fields in conference proceedings, occasional publications, reports, newsletters, and the like (see Bibliography section). But, in addition, in retirement, John was to embark upon an outstanding period of popular book writing, noted below.



**Fig. 9.** *The McCraw Glacier, northern Britannia Range, Antarctica, descending from the Polar Plateau (top middle-left). Mount Selby (also named on the 1978-79 expedition for John’s close colleague, Professor Michael Selby) is the highest edifice at the back (top-right). Photo: David Lowe from Derrick Peak in December 1978.*

On his temporary returns to Alexandra after retiring, John was concerned to see that much of the region’s history was at risk of being lost, and so he embarked on what he called ‘fun research’ by researching and writing historical books about early life in his beloved Central Otago. For about 25 years, he involved himself in field visits back to Central along with very extensive literature and newspaper investigations to compile detailed information about the early gold-mining, fruit-growing, archaeology, and general history of the region. He published a total of 12 books on these topics (McCraw 1991, 1992, 1998a, 1999, 2000, 2001, 2002g, 2003a, 2005a, 2007, 2009, 2012) (Fig. 10), along with a co-authored book with his son David that provides a walking tour and explanation of heritage sites around Alexandra township (McCraw and McCraw 2007). At the time of his retirement at the end of 1987, John had suggested he might write up various papers and “perhaps one or two books” (Lowe 1988), and so he well and truly exceeded even his own expectations with regard to this remarkable output of books.



**Fig. 10.** *(Left) John McCraw at home in 2010 with some of his extensive book collection. Photo: Philip Tonkin. (Right) The 13 books John wrote in retirement between 1991 (top left) to 2012 (bottom right). All except “The Wandering River” (bottom centre) address historical aspects of the Otago region, especially life in the Central Otago goldfields. Photo: Cam Nelson.*

In keeping with a desire for his books to appeal to the interested layperson, his authorship name was always simply given as John McCraw, never John D. McCraw or J.D. McCraw, and without any academic or bestowed titles. In recognition of the books he published about Central Otago, his frequent visits to Alexandra to undertake research for them, and the associated book launches and popular lectures he gave, John was honoured in December 2005 with the naming of a room after him at the Central Stories Museum and Art Gallery in Alexandra: the John McCraw Research Room (Fig. 11). Happy to share his research and knowledge, John stated: “What is the good of research if it is not shared with others?”



**Fig. 11.** *The John McCraw Research Room at the Central Stories Museum and Art Gallery (CSMAG) in Alexandra was named after John in 2005 in recognition of his very major contribution towards understanding the history and physical environment of the Central Otago region. Photo: CSMAG (website).*

John’s botanical and historical interests also combined to generate various articles on Herbert Dobbie (McCraw 1988a, 1989a, 1996). John was additionally interested in the physical world of early Maori and wrote a series of articles relating Maori legends to Earth sciences (McCraw 1990, 1993a, 1993b, 1994, 1995a; Lowe et al. 2002) as well as a chapter on early Maori use of natural resources (Campbell and McCraw 2008).

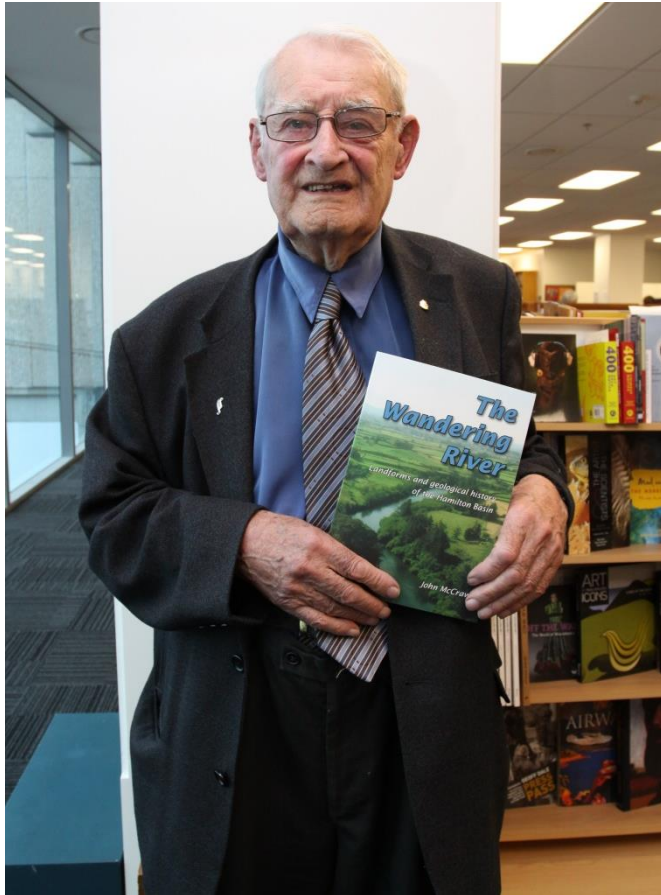
In 2011, at age 86, John McCraw published one of his final books as the Geoscience Society of New Zealand’s Guidebook No. 16 entitled *The Wandering River: Landforms and Geological History of the Hamilton Basin* (McCraw 2011) (Fig. 12). Profusely illustrated, the guide book displays his masterly ability to write simply yet accurately and with clarity, and in an engaging style. It will remain a key reference on the dynamic history of New Zealand’s longest river, the Waikato River, for many years to come. The discovery in 2015 of possible inferred faults hidden beneath the Hinuera Formation in the Hmailton area would surely have thrilled John (from an academic viewpoint) and stimulated plans for a revised edition.

### **Hobbies**

Outside his working life at Soil Bureau and the University of Waikato, John McCraw had several hobby interests that he avidly pursued:

(1) *Veteran cars*: While living in Alexandra, John developed a passion for “old” cars after attending a rally in Adelaide. He heard wind of a dismantled 1906 Cadillac abandoned in a

farm pond in Alexandra. He arranged to drain the pond using the local fire brigade's pump, salvaged the chassis, found the engine in bush nearby, and over several years set about



*Fig. 12. John McCraw on the day (12 December 2011) of the launch of his book “The Wandering River” at Bennetts Campus Bookshop, University of Waikato. Photo: David Lowe.*

restoring the vehicle to its original going condition (Fig. 13) (McCraw 1956b). The Cadillac followed John to Hamilton where it was used for various special occasions, including as the wedding car when Terry Healy, coastal geoscientist at Waikato, was married. John also lovingly repaired and maintained a 1963 Jaguar Mark II 3.4 litre saloon (Fig. 13) which he initially used around town but subsequently mainly on long trips.



*Fig. 13. John McCraw in his garage workshop in Hamilton alongside his restored 1906 Cadillac. In the background is his beloved classic 1963 Jaguar Mark 2, 3.4 litre saloon car. Photo: supplied by David McCraw.*

(2) *Workshop*: John was the ultimate home handyman with, unsurprisingly, a very well equipped workshop capable of most woodwork and metalwork chores. He built the family's first mud-brick house when arriving in Alexandra, extended their first Hamilton house to accommodate his wife Joan's mother for 8 years, developed the building plans for their second Hamilton house, and spent many weekends renovating his daughter Jill's place in Auckland and the bach at Hahei on Coromandel Peninsula. There were virtually no practical tasks that John could not turn his hand to.

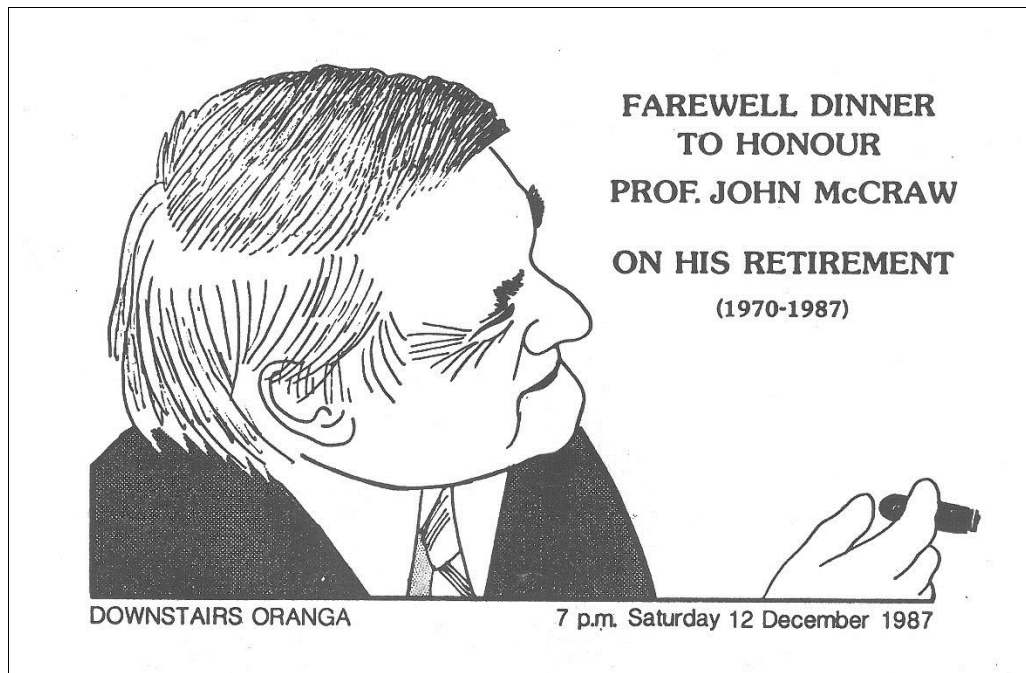
(3) *Old books*: John was an avid collector and reader of old books, especially first editions. Dr Peter de Lange: "[Prof's] house was a trap for a bibliophile, and a visit there usually involved him having to clear a path through his numerous, unstable book towers." John's home library contains dozens of volumes, many being historical books about different aspects of the Central Otago and Waikato districts, but also on a range of other topics, including Antarctica. However, top amongst his collections were early or first editions of botanical (and some ornithological) books that were mainly purchased at specialist auctions and stored at home in a special fire-proof case.

(4) *Gardening*: John was a very keen gardener. Inspired by the countryside alpine plants around him as a boy he made an alpine garden in his home backyard in Dunedin, and during high school and university years had vacation jobs in Donaldson's Nursery in Dunedin and at the Dunedin Botanical Gardens, where he learnt much about roses. Later in life he turned attention to collecting and growing rhododendrons in his Hamilton garden gully, where there are over 100 varieties (all catalogued and named) sourced mainly from the Taranaki and Manawatu regions in North Island. John also specialised in irises, camellias, and ferns, including a favourite, *Leptopteris superba* (Peter de Lange in Tonkin et al. 2015).

### **Public service and awards**

John had a 70 year association with the Royal Society of New Zealand (RSNZ), beginning as a member of the Junior Group of the Otago Branch in 1935. He was an active member of the early Waikato Branch, was president of that branch from 1965-66, and was a member of the separate RSNZ Geology and Quaternary national committees during the years 1975-82. John was a foundation member of the New Zealand Society of Soil Science, and co-founder and chairman of the newly formed Waikato Branch of the Geological Society of New Zealand in 1968. Other membership and office-holding positions held by John include the National Water and Soil Authority (1976-85), the UNESCO Man and Biosphere Programme (1971-76), the Abbotsford Landslide Commission of Inquiry (1979-80) (Gallen et al. 1980), the Friends of Waikato Museum, the Friends of Hamilton Gardens, Patron of the Waikato Geological and Lapidary Society, and Advisor to the David Johnston Science Scholarship Trust. He was chairperson of the Rabbit and Land Management Task Force (1988) (McCraw 1988c), and of the Public Consultation Committee of the Hamilton City Council Pollution Control Scheme (1994-96).

John McCraw served on the Council of the New Zealand Society of Soil Science from 1965 to 1968 and was given the Norman Taylor Memorial Lecture Award in 1978, presenting his views on an aspect of Earth sciences, namely the regolith that was generally overlooked, in his lecture entitled "No Man's Land" (McCraw 1979b). Following his retirement at the end of 1987 (Fig. 14), John was appointed an Emeritus Professor of the University of Waikato (1988), and his wider service to Earth sciences was recognized by the award of Member of the Order of the British Empire (MBE) in the Queen's Birthday Honours of 1992. He was elected one of the inaugural Fellows of the New Zealand Society of Soil Science (FNZSSS) in 1995.



**Fig. 14.** Front cover of invite card for John McCraw's retirement function from the University of Waikato at the end of 1987 showing a caricature of him in "typical conversational pose" with cigar in hand, a habit he forwent during retirement. Sketch by Frank Bailey, University of Waikato.

Elected a Companion of the Royal Society of New Zealand (CRSNZ) in 2005, an award which recognizes "achievement at a high level of eminence in the promotion and encouragement of science and technology", John was, without doubt, a most deserving recipient (Nelson 2005). In 2008, John received a special Otago Community Award from the Central Otago District Council for his essential role in the preservation of knowledge and understanding of the history of Alexandra and the surrounding districts.

### **Epilogue**

John McCraw was an Earth scientist who began working as a pedologist with Soil Bureau, DSIR, then became the Foundation Professor of Earth Sciences at the University of Waikato in Hamilton, inspiring a new generation to study and work in Earth sciences, a discipline he introduced into the tertiary education system in New Zealand. In retirement, he was an author and historian with a special emphasis on Central Otago as well as the Waikato region. Throughout his career, marked especially by meritorious leadership, accomplished administration, and commitment to his staff and students at the University of Waikato, John McCraw also contributed widely to the communities in which he lived through public service organizations and as a public speaker. He received a number of awards including an MBE, fellowship, and companionship, and, uniquely, is commemorated also with a glacier, a fossil, and a museum-based research room named for him.

The Earth sciences programme today as an integral part of the School of Science at the University of Waikato is stronger than ever. In the past few years several new staff have been appointed, both academic and technical, giving the largest-ever Earth sciences team of about 30 staff (Fig. 15). As well as research-led teaching, Earth sciences has strong research groups, at the cores of which are doctoral and masterate students, and postdoctoral fellows, to carry on the work envisaged by John McCraw all those years ago. This thriving continuation



**Fig. 15.** Staff of Department of Earth and Ocean Sciences at the University of Waikato in late March 2014. John McCraw in front row towards far right, alongside the most recent staff appointment at the time, Dr Beth Fox (lecturer from 1 April 2014) to his left. The five chairs of the department (CODs) who succeeded John McCraw (founding HOD) are also present: Cam Nelson (8 years 1988-1995), Roger Briggs (6 years 1996-2001), Megan Balks (4 years 2002-2006), Dave Campbell (6 years 2006-2012), and David Lowe (2 years 2012-2014). Photo: Natalie Guest and Max Oulton, University of Waikato.

**Back row (left to right):** Dean Sandwell, Karin Bryan, Shaun Barker, Peter Kamp, Aaron Wall, Janine Ryburn, Cam Nelson, Elizabeth Brodie, David Lowe, Earl Bardsley, Willem de Lange, Julia Mullarney, Hazel Needham, Chris Morcom, Roger Briggs, Renat Radosinsky, Dirk Immenga, Martin Danisik.

**Front and middle rows (left to right):** Tanya O'Neill, Louis Schipper, Xu Ganqing, James Neale, Annette Rodgers, Rochelle Hansen, Megan Balks, Adrian Pittari, Vicki Moon, Dave Campbell, Sydney Wright, Kirsty Vincent, John McCraw, Bethany Fox.

of our discipline, which has always had strong multidisciplinary linkages with other sciences, is – alongside the countless students he has taught and inspired – surely his greatest legacy. As aptly observed by Professor Rewi Newnham (Victoria University of Wellington) at the news of John McCraw's passing: *Kua hinga he totara i te wao nui a Taane* – “a mighty totara has fallen in the forest” (Fig. 16).



**Fig.16.** Emeritus Professor John McCraw in “field mode” in Hamilton Basin in October 2008 alongside a road cut on Gordonton Road, near Hamilton, exposing some of the strongly weathered Hamilton Ash beds and buried soil horizons. Photo: David Lowe.

### **Bibliography of John McCraw**

The following *chronological* listing of John McCraw’s publications includes (to the best of our knowledge) all of his sole and co-authored articles both cited and uncited in the foregoing account of John’s working life. Other articles referenced in that account that do not involve John McCraw as an author are given after the bibliography.

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### **Acknowledgements**

We thank David McCraw (Hamilton) for providing background information about some aspects of his father's life, and Jenny McGhee and other library staff at the University of Waikato who assisted with checking several of the reference citations included here in John McCraw's bibliography. We also acknowledge and thank Simon Nathan for his helpful comments on the article. The Editor of *New Zealand Soil News* (David Houlbrooke) kindly permitted the use in this article of material from the obituary for John McCraw appearing recently in that newsletter (Tonkin et al. 2015).