

IAN RODERICK MCLEOD MBE 26 July 1931 – 12 September 2020

QUIET ACHIEVER – GEOLOGIST AND PIONEER LEADER

Ian McLeod's first exposure to geology was in 1945 through his spur-of-the-moment decision to choose it as his matriculation elective, rather than geography. Inspired by his geology teacher, and fascinated by the subject, he majored in geology at university and so embarked on a lifelong career in the earth sciences.



Ian was born in Rockhampton, Queensland (Qld), in July 1931, and did his primary schooling there and in Brisbane to where his parents moved in 1940. He did his secondary education at Brisbane Grammar (1945–1948), completed his BSc at the University of Queensland (UQ) in 1951 (with distinctions in geology in all three years), his BSc Hons in 1953 (on the geology of the Monsildale district, Qld, with First Class Honours), and his MSc in 1955 (on the geology of the Somerset Dam Igneous Complex, Qld), while working part-time in the Geology Department as a demonstrator and research assistant throughout the years 1953–1955.

Most significantly, Ian's experience at UQ was not solely an academic adventure in the exploration of science but was also a time of outdoor adventure exploring the wild mountainous landscapes of southeast and north Qld in company with similarly intrepid members of the University of Queensland Bushwalking Club (UQBWC), including, notably, his geology classmate Jon Stephenson (who had co-founded the Club in April 1950, and of which Ian was President in 1955). Their first major, and truly epic adventure together, with four other Club members, was to the huge granite massif of Mt. Bowen on Hinchinbrook Island in north Qld in early January 1953 (i.e., at precisely the wrong time of the year, being in the middle of the monsoon, but the only time available to them). They were dropped off by boat on the east coast of the island below Mt. Bowen, and in two separate groups of three, with McLeod in one group and Stephenson in the other, they made consecutive (probably the third and fourth) ascents of Mt. Bowen (1,121 m), by very different routes; and, variously, ascents of several of Bowen's satellite summits, including the first ascents of three of these, one of which was the formidable tower-like pinnacle known as the Thumb (climbed by Stephenson's group). Amongst the numerous difficulties they encountered during their 11-days on the island were "36 inches" (more than 0.9 m) of rainfall during the last nine days, flooded creeks, and (enabled by a spring tide) "surf [enlivened by floating logs washed down by the Herbert River] rolling a hundred yards into the jungle", forcing them inland from the coast through "pack-deep mangrove swamps" (wary of crocodiles) and "dense Jungle" in order to reach their arranged contingency pick-up destination (i.e., in the event of bad weather and rough seas) at the south end of the island. These and other wilderness- and contingency-survival experiences and climbing skills gained during their time at UQ stood both Ian and Stephenson in good stead for the even greater adventures and challenges of their subsequent individual fieldwork careers, notably in Antarctica (and in Stephenson's case, also in the Karakoram and the Sub-Antarctic).



The January 1953 UQBWC Hinchinbrook Island team. From left to right: Geoff Goadby, John Comino, Ian McLeod, Jon Stephenson, David Stewart, and Geoff Broadbent. Photo: John Comino collection, courtesy of Rankin Publishers.

In January and February of 1955, during the UQ summer recess, Ian and several other students with geological training from the UQ were employed by the Tasmanian Hydro-Electric Commission (HEC) to map the geology of the Mt. Fincham area (Map Square 3780) of the western Tasmanian wilderness, supported by fortnightly airdrops. This is a rugged and thickly vegetated region centred on the Engineer Range and taking in the Franklin River on the east and the King River and Andrew River valleys on the west. Many years later Ian realised that that work was of relevance to the HEC's long-term plans to build a dam on the King River, the King—Andrew catchments divide, and possibly the Lower Gordon River.

In early 1956 Ian joined Reg Sprigg's company Geosurveys of Australia which (probably through a subsidiary company), jointly with the International Nickel Company of Canada (INCO), was exploring for nickel in the far northwest of South Australia and adjoining region of Western Australia (10 years prior to the subsequent nickel boom). Ian was deployed on this project, focused primarily on locating nickel-bearing layers in the layered mafic—ultramafic Giles Complex, whose impressive but previously little-known rocks, and extensive high-quality exposures, he described as "breathtaking". This work in Central Australia was undertaken at a time when there were effectively no roads there (except for some rough tracks developed in the 1950s for the Woomera Rocket Range and atomic bomb test-sites at Maralinga), no fences, no topographic maps, and when small groups of indigenous people, still virtually untouched by contact with Europeans, were sporadically encountered pursuing their traditional nomadic lifestyle. The fieldwork was facilitated by specially flown air-photos and almost all travel throughout the region was cross-country. The exploration included the first use of airborne electromagnetics (EM) in Australia (using technology that at that time was still being developed by INCO), with follow-up ground EM and diamond drilling. An extension of this work to the south



Ian McLeod (centre) on-board the ANARE supply ship *Magga Dan*, with the Honourable Richard Casey DSO, MC, CH (at right), Minister for External Affairs, farewelling the ship and Phillip Law, Director of the Antarctic Division and Leader of ANARE. Port Melbourne, 5 January 1960. Photo: Australian Antarctic Division archives.

beyond the Giles Complex to check out some unusual patterns on the air-photos discovered the yet-to-be-identified Officer Basin.

In late 1957 Ian joined the Bureau of Mineral Resources in Canberra (BMR; now Geoscience Australia) and was initially deployed as a geologist and glaciologist in a cooperative program between the BMR and the Australian National Antarctic Research Expeditions (ANARE; now the Australian Antarctic Division) to work in East Antarctica for a year, based at Mawson Station. He arrived at Mawson on the annual supply ship *Thala Dan* on 10th February 1958, having undertaken reconnaissance geology along the coast of East Antarctica en route at Lewis Island (Wilkes Coast) and in the Larsemann Hills near Davis Station (Ingrid Christensen Coast). But the ship spent little or no time at Mawson and took expedition leader Phillip Law, Ian, and fellow geologist (and 1957 over-winterer) Bruce Stinear on a reconnaissance trip for the rest of the month to Amundsen Bay ca 565 km west of Mawson but had difficulties making landings.

Upon the ship's return to Mawson Ian was involved with unloading operations and familiarising himself with the Base and its surrounds, and throughout March and April, together with four others, he undertook glaciological fieldwork inland from Mawson based in a sledge-mounted caravan. This involved conducting a seismic traverse across the ice-flow direction to determine ice thickness, measuring movement rates, and gathering other glaciological data. In the mid-1950s, such glaciological work on the Antarctic icesheet was still at its infancy but was also being conducted concurrently and in the prior year on the opposite side of the continent by the Commonwealth Trans-Antarctic Expedition (1957–1958) in which Ian's former UQ geologist class-mate, Jon Stephenson played a major scientific role,

Wintering over at Mawson was a busy time for everyone, including Ian. In addition to compiling, plotting, and analysing field data and writing reports, and conducting daily measurements of snow ablation rates, sea-ice thickness, doing occasional penguin counts in the local rookery, etc., numerous other camp-duties had to be done on a regular basis, including hut 'slushie' duties (daily roster) and camp slushie duties (weekly roster). These duties were very numerous, and included janitorial work comprising general cleaning of the accommodation huts and communal facilities, replenishing the snow and coal supplies to the huts and kitchen, human waste disposal from the huts and communal toilets, and waste disposal from kitchen, mess room, and camp generally, plus nightwatchman duties. But in Ian's and his surveyor colleague Graham Knuckey's case, they were also planning and making preparations for a major dog-sledge expedition to be undertaken in the coming summer, involving two sledges and two dog teams to be driven by them, and the responsibility of looking after the sledge dogs who would make it possible. This demanded much time and effort throughout the winter and spring and involved finding and fetching the dogs' food (i.e., sealing), feeding them, exercising and training them, cleaning their tether lines, and combing their coats to remove accumulated ice.



Ian McLeod with sledge dog Lewis, Enderby Land, Antarctica, December 1958.
Photo: Geoscience Australia archives.

On 27th September Ian flew to Beaver Lake in the Prince Charles Mountains to investigate establishing a base there from which air-supported reconnaissance mapping and glaciological fieldwork could be conducted, and spent time there again from mid October until early November establishing a camp and undertaking preliminary fieldwork.

The dog sledging journey commenced on 27th November when the last of the dogs were flown to its starting point. The two Beaver aircraft based at Mawson had been used during the previous days to lay two intermediate depots of supplies on areas of exposed rock along the planned route from Amundsen Bay back to Mawson, and to transport the men (including the third member of the expedition, radio operator Peter King), dogs, equipment, and food to Amundsen Bay, landing on the sea-ice offshore of and below the terminal escarpment of the continental icesheet, the ascent of which constituted the first obstacle of their journey.

The geology of the hinterland region south and west of Mawson (Mac.Robertson Land, Kemp Land, and Enderby Land) was almost unknown in 1958 (and much of it unknown geographically too). It includes the Prince Charles Mountains and isolated massifs and nunataks stretching from 300 to 800 km south of Mawson and has one of the highest proportions of exposed rock of any region of the continent. Consequently, the sledging expedition from Amundsen Bay back to Mawson constituted a pioneering reconnaissance mapping exercise through a region of virtually unknown topography and geology aided by very limited (oblique) air-photos. The expedition arrived back at Mawson on 21st January 1959, 54 days after it started, and having covered 650 km. Ian departed Mawson for Australia on the annual supply ship a few weeks later but managed to collect water samples and sediment samples from the hypersaline lakes in the Vestfold Hills near Davis Base when the ship visited there on 17th February, the analyses of which, together with fieldwork he and others did in subsequent years, established the stranded (negative eustatic) origin of these lakes.

Back in Australia at the BMR, chance again influenced the course of Ian's career soon after completing reports on his Antarctic work because he was moved into the Mineral Resources



Ian McLeod in the field, Enderby Land, Antarctica, December 1958.
Photo: Graham Knuckey collection.

Section to replace a recently vacated position, retaining however, until 1971, his major involvement with the Antarctic work, including responsibility for planning and executing ANARE's annual geological mapping programs, and liaising and coordinating this work with that of other countries.

A few years after Ian's first 12-month sojourn in Antarctica in 1958–59, the BMR restricted the annual summer program to just three months duration including travel time. He returned to Antarctica five times for summer fieldwork, firstly in early 1960 when he was instrumental in personally rescuing under very difficult conditions the injured pilot and passenger of a crashed helicopter, perched precariously on the 25°-sloping lip of the continental icesheet, just 30 m inboard of its 30-m-high cliff-edge on the coast west of Wilkes Base (now Casey Station). The summer of 1959–60 was the first field season helicopters were used by ANARE in Antarctica, and in both 1960 and 1961 they were used for ship-based exploration along the coast in conjunction with the annual station relief voyages. In early 1965 the relief ship was positioned 250 km west of Mawson and used as a base for survey work and geological mapping inland from the coast using helicopters and fixed-wing aircraft operating from the sea-ice. Ian participated in this work and again in early 1969, using a temporary field base at the head of Prydz Bay between Mawson and Davis. On his last trip to Antarctica in early 1970 he operated from a temporary base 250 km south of Mawson to work in the vast Prince Charles Mountains, a region in which he had first undertaken fieldwork during the spring of 1958 while based at Mawson.

Ian was awarded the Polar Medal by Queen Elizabeth in 1961. He was the Australian member of the Working Group on Geology of the Scientific Committee on Antarctic Research (SCAR) from 1964 to 1978 and served as its secretary in the period 1973–78. He was made a Member of the Order of the British Empire (MBE) in 1966 for his Antarctic work; and in 1970 he received a Bellingshausen Medal from the Soviet Academy of Science.

Ian's initial work in the Mineral Resources Section of the BMR, together with other section members, was focused on producing a summary compilation of Australian mineral deposits, together with a second edition of the *Mineral Deposits* map of the *Atlas of Australian Resources, Second Series*, (published in 1965, with subsequent impressions in 1967, 1969, and 1970). The summary compilation, *BMR Bulletin 72 — The Australian Mineral Industry: The Mineral Deposits*, was published in 1965, just prior of the late-1960s and early-1970s mineral-exploration boom and is one of the few BMR bulletins whose demand justified a second printing. Ian then supervised the compilation of the *Metallogenic Map of Australia and Papua New Guinea (1972)*, this being the Australian contribution to the International Union of Geological Sciences' *Metallogenic Map of the World*.

The frenzy of the late-1960s–early-1970s mineral-exploration boom escalated Industry demand for information on mineral resources (together with some free lunches for Ian and other BMR staff), prompting Ian to develop an interest in methodologies for storing and retrieving geological information. This interest resulted in him moving in 1970 to the BMR's Information Section, responsible for the public provision of information about the Organisation's activities and geoscience in general. His initial task there was to prepare a brief for a consultative study into the needs of a BMR-wide information storage-and-retrieval system. This was at a time when computing technology involved only mainframe systems, punch-card input and continuous-feed line-printers. However, given the way that computing technology evolved in the subsequent decades, and with the benefit of hindsight, it is fortunate that this project did not proceed.

Ian's greatest contribution to Australia's growth as a nation came when he was appointed Head of the BMR's Mineral Economics Section in 1974. This Section was responsible for the compilation, analysis, and publication of information on Australia's mineral assets, and for the provision of expert advice to both government and Industry. Its work was critical to the development of Australia's mineral resources and to the policy and regulatory framework that the mining industry operates within today. As well as leading the Section, Ian was the commodity specialist for tin.

Ian's role in the BMR continued to evolve, and by 1985 he was responsible for the coordination and broad supervision of the groups within the wider Mineral Resources Branch which undertook special studies of the industry and gave high-level technical assistance to senior BMR management. These specialist studies included the compilation and analysis of mineral

commodities and resources, the development of related databases, and the publication and provision of information to Industry and the public.

Although Ian retired at the end of 1990, his extensive knowledge of Australia's mineral resources continued to be in demand and for a time he worked as a consultant to the BMR and to the German Federal Institute for Geosciences and Natural Resources before finally devoting himself to various other new and life-long interests. The life-long interests including bushwalking, cross-country skiing, and the enduring conservation of the Canberra Alpine Club's (CAC) heritage-listed Mt. Franklin Ski Lodge in the Brindabella Range. Ian and his wife Beverley had been members of the club since first moving to Canberra, and Ian was elected an honorary life-member in 1997 for his service and dedication to the club and its management. (The ski lodge was subsequently destroyed in the 2003 bushfires and was replaced by a large corrugated-iron interpretative shelter with a locked room accessible to ACT Parks and Conservation, SES, Fire Service and the CAC, to serve as a base for future emergencies. In his capacity of "Franklin Officer" of the CAC, Ian was responsible for organising assistance by Club members in the building of the new shelter.) Ian's role as an Officer of the Club brought him in close contact with ACT Parks and Conservation, and his knowledge of the Brindabella Mountains was legendary, combining his love for geology, the bush, and the solace of the wilderness.

One of Ian's new activities in retirement was that of 'volunteer explainer' at Questacon in the National Science Centre in Canberra, where he always delighted in helping classes of students visiting from all parts of Australia solve and understand its puzzling exhibits and demonstrations. He continued this work for many years and earned the status of Emeritus Volunteer. A later interest that started in 2016 was his participation in a collaborative project between the Geoscience Australia Library and the Antarctic Geoscience team to scan and transcribe the library's legacy collection of Antarctic geological field-notebooks in order to make them discoverable and accessible for open online access. This exercise involved 57 citizen-scientist volunteers over five-and-a-half months, followed by validation of the transcriptions by retired geologist Ian Barwell. A series of short films featuring interviews with the original geologists who bring the content of the notebooks to life through reminiscences of their work in Antarctica accompany the transcribed notebooks (see: <https://ecat.ga.gov.au/geonetwork/srv/eng/search>).

Ian's career spanned an exciting period in the nation's history and in the exploration of Antarctica. The exploration of Antarctica was still at an early stage in the 1950s and 1960s, and the minerals industry in Australia grew from being a minor player to becoming a major part of the economy during those and subsequent decades. He had the satisfaction of knowing his work met a need, and that he had opportunities to work in places that were little known both geologically and geographically. In addition to his membership of the Working Group on Geology of SCAR throughout the 1960s and 1970s (and its secretary from 1973 to 1978), Ian was also a member of several other committees concerned with Antarctica and the mineral industry, including the Australian National Committee on Antarctic Research, and the International Strategic Minerals Inventory Working Group. He was also a Foundation (and lifelong) Member of the Geological Society of Australia.

Following ANARE's practice of recommending to the Antarctic Names Committee of Australia that geographic (and cryogenic) features in Antarctica be named after participants in its expeditions, four features bear Ian's name there:

McLeod Massif: A large rock exposure in the Aramis Range, Prince Charles Mountains, Mac.Robertson Land. First identified and plotted from air photographs and first visited by ANARE surveys organised by geologist-in-charge of field operations, Ian McLeod, in 1969 and 1970.

McLeod Nunataks: Located in Enderby Land; identified in oblique aerial photographs taken by ANARE in 1956; first visited in December 1958 by dog-sled party (involving Ian).

McLeod Glacier: In Oates Land; Descends from the Wilson Hills into Davies Bay. Ian was the leader of the airborne field party who explored the area in 1961 from the supply ship *Magga Dan*.

McLeod Island: A large island 2 km north of Stornes Peninsula in Prydz Bay. Ian was in the ANARE team who surveyed the region in February 1958.

Ian is remembered as an absolute gentleman and a quiet achiever, always ready to lend a hand, and someone who got things done. His welcoming smile left a lasting impression on everyone he met, and he will long be remembered by his former BMR colleagues at their monthly lunches at the Yowani Golf Club.

Patrick Conaghan and Malcolm Robertson

(May 2022; updated July 2023)



Ian McLeod in retirement (ca 2013).
Photo: Beverley McLeod

Endnotes:

This tribute and profile is based primarily on source materials supplied to the authors by Beverley McLeod, including a short biography of his professional career written by Ian McLeod dated June 2007, entries from some of Ian's Antarctic diaries, and the two portrait photos of Ian herein. Additional materials and information were supplied by former ANARE scientist Grahame Budd, and Ian's UQ contemporaries Kevin McDonnell, and Tom Brown. Details of the 1953 UQBWC expedition to Hinchinbrook Island (including some quotations from which are used herein) are sourced from primary accounts of the trip by John Comino (1959) and Geoff Broadbent (1964), and from Rankin, R. (2002): *Beyond the Horizon*, Rankin Publishers, Sumner Park, Qld, pp. 137–142, (which provides bibliographic details of all published primary accounts of the trip on p. 203). McLeod's dog-sledging expedition in the austral summer of 1958–59 is described in: McLeod, I. (1965): Sledging Journey — Amundsen Bay to Mawson, Antarctica. *UQBWC Magazine*, vol. 7, p. 37–43 (<https://drive.google.com/file/d/1AkZ7lx23MXnv7mAToy25BH0lw5ulOoi6/view?usp=sharing>). Accounts of the 13th February 1960 helicopter crash in Antarctica and the rescue of its occupants by Ian are documented as follows: McLeod, I.R. (18/2/1960): Accident to VH-THC, Official report to ANARE (three pages, including the official Press Release to media by Phillip Law

dated Saturday 13th [February], but date of accident mistakenly given as 16th February in McLeod's report (<https://drive.google.com/file/d/1aBYkcR9a5JKyExnM9xc5sMe2mlHpJVeX/view?usp=sharing>); Hudson, R.T. (1983): Antarctic Helicopter Accident. *Aircraft*. December 1983, p. 40–42 (https://drive.google.com/file/d/1G-vmkFi3heMKE_hE_qP_xkEgN4rgvDie/view?usp=sharing); Grahame Budd's (30.05.2011) unpublished retelling of the accident (<http://climbinghistoryoz.blogspot.com/2022/01/a-bad-day-at-office-summed-up-by-four.html>) is a facsimile version (but with colour photos added) of David Cook's 2009 article "A Bad Day at the Office", (*Aurora*. June 2009, p. 21–22), but of a reformatted and slightly abridged (by David Cook, in December 1999) unpublished version of the 2009 *Aurora* article in which the last two paragraphs were omitted and a postscript added. Details of the Geoscience Australia Library project to transcribe the Antarctic geology field-notebooks are sourced from: Black, J., and Carson, C. (2018): Transcribing Antarctic geological History. *Australian Antarctic Magazine*, Issue 34. In a three-part interview with medical doctor and Antarctic expeditioner Ingrid McGaughey (recorded in Canberra in June 2011), Ian recounts many details of his geological career, and with a particular focus on his work in Antarctica, This interview can be accessed at: https://amplify.gov.au/transcripts/statelibrarynsw/antarctic_expeditions//Antarctic_IanM

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