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PLATELET ICE

- the crystal matrix beneath sea ice

Thelma Rodgers, first Kiwi woman to winter-over

NZ's first satellite Earth station in Antarctica

What became of Aurora's jury rudder

Bratina Island & the dirty ice

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Cover photo: The view down the chamber of the platelet ice sampler following recovery of the first sample from the waters of McMurdo Sound. The instrument towers 4m above the ice and extends a total of 10m through layers of ice into the black depths of the ocean below.
Credit: Natalie Robinson, NIWA

Contents

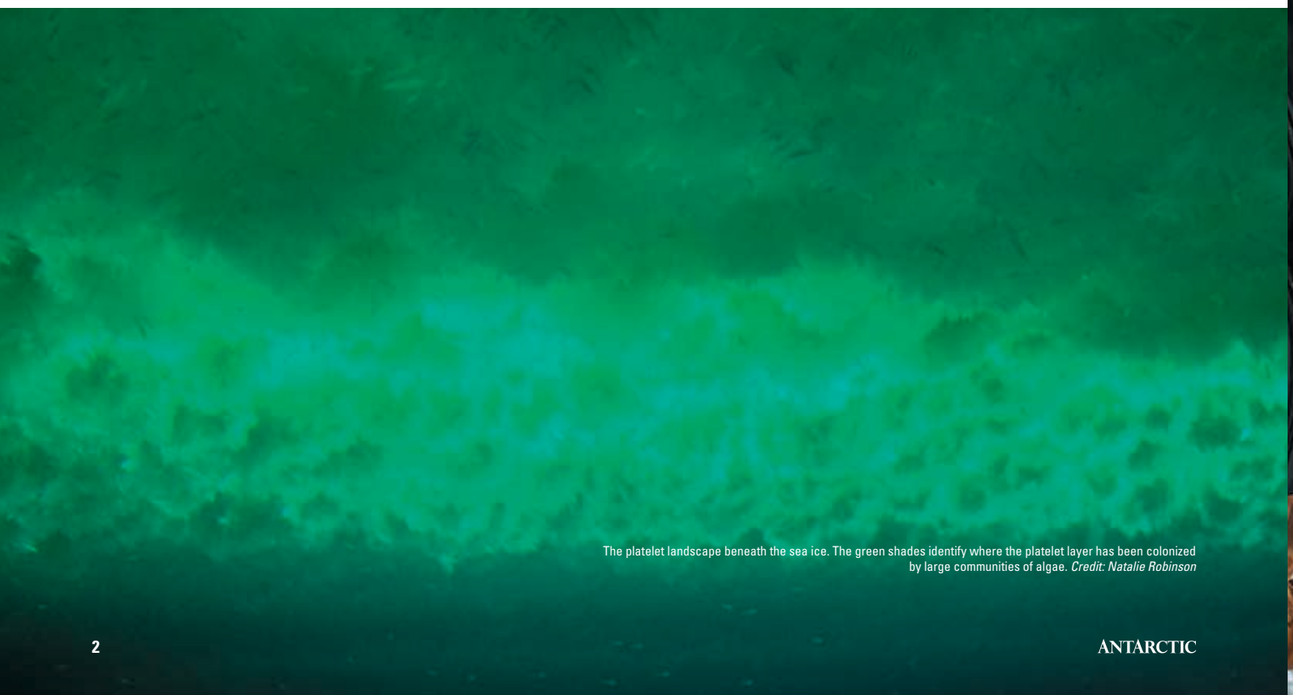
Steve Parker and Brett Grant (NIWA) with a platelet ice sampler on the sea ice of McMurdo Sound. Beyond the Hagglunds vehicle, the Admiralty Range looms in the west. *Photo: Natalie Robinson, NIWA*

A crystal matrix hidden beneath ice

Concealed beneath the sea ice in the south-western Ross Sea lies a unique, fragile, and ephemeral world which could play a critical role in the future vulnerability of the Ross Sea food web. The 'sub-ice platelet layer' originates as tiny ice seeds carried in a flow of supercooled water, which is only generated when an ice shelf is melted at great depth by the ocean. Since this ocean water is colder than its freezing temperature, these tiny ice seeds grow rapidly, until they become too large and buoyant to remain suspended in the flow. The resulting thin plates of ice float up in their untold billions from the ocean depths to settle against the base of the sea ice, accumulating to form a beautiful and complex lattice-like structure that can be several metres thick.

Liquid ocean water permeates the spaces between the crystals, providing a quiescent and protective marine environment that supports a thriving ecosystem. At the base of the food chain, the concentration of primary productivity associated with the platelet layer is higher than for any other type of ice in the ocean. Most of this is in the form of algae which attach to the surfaces of the crystals and hang down tens of centimetres into the platelets. In this way algal 'meadows' develop and perform a similar function of underpinning the ecosystem to that of terrestrial grasslands. Platelet layers also support the early developmental stages of Antarctic Silverfish – a keystone species of the Ross Sea. The fishes' eggs are laid within the ice lattice structure as it grows, providing protection from predators. Once the larvae emerge, the high nutrient concentrations of platelet layers support their early development. Hence, the platelet layers of Terra Nova Bay are known as 'silverfish nurseries'.

Although layers of platelet ice are very common beneath the sea ice of McMurdo Sound, and have been regularly and consistently observed since the early explorations of Scott, it has not been possible to quantify their influence in supporting the ecosystem. This is because there was no method of extracting the crystals along with associated biology that also retained the delicate structure. However, this capability has now been developed thanks to a new project, jointly funded by NIWA and the Antarctic Science Platform, and



The platelet landscape beneath the sea ice. The green shades identify where the platelet layer has been colonized by large communities of algae. *Credit: Natalie Robinson*

The first sample in the platelet ice sampler. *Credit: Natalie Robinson*

Installing the sampler equipment on the sea ice in McMurdo Sound. *Credit: Natalie Robinson*

Platelet ice rapidly forms and accumulates on equipment and instruments suspended in the plume of supercooled water. *Credit: Natalie Robinson*

Natalie Robinson with a large single platelet crystal, approx 25 cm across and recovered through a 25 cm access hole. *Credit: Rebecca McLeod*

the unique skill and experience of oceanographer-engineer, Dr Craig Stewart (NIWA). The new sampling system was put through its paces during Antarctic field trials in the summer of 2021-22. After being brought back home to Wellington, a few modifications and updates have been applied preparing the system for a full science season in October and November 2022.

In the first stage of sampling, a Hilti drill typically used for cutting through concrete is connected to a 3m long core barrel fitted with a cutting head. This combination is used to drill through the solid sea ice, stopping before the platelet layer is encountered. At the surface, the drill itself is then removed from the core barrel and further sections of sampling tube are added in its place, making up a total length of 6 to 10 metres. The full length of segmented core barrel is then allowed to drop under its own weight, slicing through the platelet layer with an action like an apple corer. This isolates the sample, ready for retrieval by drawing it up into the hinged sampling chamber.

The first method for sample retrieval is time-consuming and labour intensive, but essentially guaranteed to work. It requires drilling a second hole and using a jointed arm with a live underwater camera feed to manoeuvre a combined bladder/plug/pump into the core barrel. The bladder is then inflated with compressed air from the surface, sealing the sample inside the tube. Seawater is pumped into the lower section of the barrel forcing the sample upwards and into the sampling chamber where it can be removed in sections. The second, preferred, method involves applying a vacuum to the top of the sampling chamber and using this to draw the sample upwards. Both methods allow recovery of the sample in sequential sections, resulting in profiling of both the physical structure and the incorporated biology of the platelet layer simultaneously.

Having successfully come through design, build, test and modification phases, the platelet sampling system will now be incorporated into field campaigns. This will quantify how how the environmental conditions of ocean, atmosphere, sea ice, and snow cover combine to control platelet layer thickness, variability, and distribution as well as the nature and make-up of associated biology. The upcoming Antarctic season will be focussed on southern McMurdo Sound, where sampling in high spatial resolution will be used to define causal relationships. There will then be opportunity to explore these relationships on a larger scale, by either shifting focus to Terra Nova Bay or exploring the Victoria Land Coast.

Looking further into the future, the ultimate aim of this work is to understand the Ross Sea ecosystem's vulnerability to climate changes via shifts in platelet layer thickness, timing, and spatial distribution. This will require combining the new knowledge gained from the observational programme with future climate scenarios drawn from numerical simulation of the Ross Sea and its global context. This is novel and ambitious work with significant potential scope for new collaborations and applications. However, significant cross-disciplinary gains have already been made in sharing language, methods, experience, and ideas. We are excited to see where this work takes us!

To watch a video of the sampling system in action, please visit https://niwa.co.nz/news/studying-a-fragile-and-alien-icy-world

By **Dr Natalie Robinson,** *NIWA*

Thelma Rodgers, the First New Zealand woman to winter-over in Antarctica

Thelma Ann Rodgers made New Zealand history when she became the first woman to winter-over at Scott Base in 1979, a time when females were beginning to visit the Ross Dependency as part of the New Zealand Antarctic programme.

Thelma (nee Bishton) was born in Swansea, Wales, on the first of December 1947, and came to New Zealand when her father accepted a job here. Even as a child, she had ambitions to travel, either to Antarctica or to the moon. Attending an all-girls school in Blenheim, she was guided into arts and languages. However, finding she was good at maths, Thelma wanted to take physics and chemistry at university, although this was not encouraged by the school. Consequently, she began an Arts degree at Canterbury University but asked to take applied maths. She was told that she would need to also take physics, and that generally 'Girls don't do Physics'. Despite the pessimism, Thelma took a Physics degree and after a few weeks settled down to enjoy both physics and maths. She was invited to take the Honours class, which she completed.

After university Thelma applied for the position of Geophysics Technician for DSIR. She went on to become an equipment expert for the Geomagnetic Division in Christchurch. Sometime during this period, she married Tony Rodgers. Later they separated but she kept her married name.

Each year, it was Thelma's job to train the technicians going to Scott Base how to use the geophysical equipment, going south herself to show them how the equipment was meant to work. In 1978 she applied to Antarctic Division to run the equipment at Scott Base on her own over the winter. At her one-hour interview, Thelma recalled that she barely got a word in after the first five minutes, as the men on the panel did all the talking, mainly between themselves. But her application was successful.

Antarctica held the same attraction for Thelma as she had for caving in New Zealand. Both had an aura of adventure, exploration and limitless possibility. She was an experienced caver, and the cave system at Punakaiki on the West coast of New Zealand called Armageddon, was discovered and named by her. Thelma continued her caving in Antarctica, going down the tide crack at Scott Base, finding caves lined with ice crystals.

Thelma mentioned that the old hands employed by the DSIR in Christchurch and Antarctica, men who had been associated with the base for years, were particularly resistant to the idea of allowing women on the ice. Fortunately, there were influential individuals, such as the Antarctic Division Director, Bob Thomson, who were willing to give women a chance to work there, as the American programme was doing. Like the men on base, Thelma wore trousers to keep warm, but she remembers this was remarked upon by the men. "They thought I was a feminist, but I wasn't a feminist at all … I just liked wearing trousers!"

Thelma spent some time at Vanda Station in the Dry Valleys as a "summer holiday" from Scott Base. She was impressed by the Katabatic winds there, which she renamed "Elephantobatic", as they were so strong and steady you could lean against them.

At Scott Base she spent a lot of time with the huskies, and with dog-handler Peter Cleary, who Thelma remembers as one of the tallest people she had known. Thelma enjoyed playing with the dogs and found that if she wore skis, a couple of the young dogs would happily pull her along. She obviously had many fond memories of the huskies and recalls the day when someone decided that all of the dogs needed washing. She recalls the dogs weren't too pleased about the actual bathing, but they enjoyed being allowed to run around inside the hangar until they dried off.

Thelma remembered a trip with the dogs to the Adelie penguin rookery at Cape Crozier late in the day during the Autumn equinox. It was all very beautiful, with the full moon on one horizon and the low sun on the other and Mt Erebus towering between. Unfortunately, it was very cold, the skidoo crashed and the weather packed in, forcing a retreat to Scott Base.

Thelma found winter was an interesting time "We had wind-chill of minus 80 degrees and someone didn't realise it was so cold outside, and let the dogs out for some exercise. The dogs had a free-for-all and it was all hands-on deck, 20 dogs and 30 people struggling in the snow and howling wind, separating and collecting dogs one by one."

Thelma at the weather station outside Scott Base, 1979.

Thelma with puppies during the winter.

Thelma taking detailed readings on the QHM (Quartz Horizontal Magnetometer) in the *Absolute Hut* at Scott Base.

It was during the winter that Thelma upgraded the variometers which measure the Earth's magnetic field, that had been installed in 1957 during IGY.

Asked about being isolated from other women over winter, she considered it was no different for a woman than a man. She spent her spare time during the winter skiing, oil painting, making pottery and home-making wine.

During the following summer the ice in front of Scott Base broke out just after Christmas. Thelma remembers that Sperm Whales cruised by, and "Emperor penguins used to swim past and look like ducks. We ended up with quite a few on the front steps of Scott Base for a while, trying to work out what humans were."

Thelma had lots of comments about the local wildlife, including humans.

"There was a chap who spent a lot of time studying the Weddell seals. He actually got very fond of them and one in particular. He would lie down beside her. One day she was startled by something and rolled on top of him – which is something they do to protect their pups!"

She didn't say how badly he was squashed!

When asked what were the male attitudes to women on the ice, Thelma said that although at a superficial level the men were friendly, it was a very lonely time. She could have stayed on for another winter, but she had lost interest. "It was a long time to be alone as a woman" she said. She also found she suffered seasonal affective disorder (SAD) – which is well known in northern Europe but was not much known about in Antarctica at that time. All subsequent winter-over women have been in groups of two or more.

Thelma's time in Antarctica was followed by a visit to England that included 3 months on a canal boat.

On her return to New Zealand, Thelma retrained as an architect in the North Island. Later, in Nelson, she became deeply involved in the Wangapeka Study & Retreat Centre, assisting with its construction and, having "the knowledge of the ways of the computer", created the centre's first website. Members remember her as "A multi-talented woman with a rich life experience" and a "keen eye for space and beauty", and recognised her "multifaceted exploration of life"

Rodgers Point, on Hut Point Peninsula, was named after Thelma in 2000 by the New Zealand Geographic Board. More recently, she also had one of the new laboratories at Scott Base named for her.

Thelma died 12 October 2021 after a battle with Cancer. She was fortunate to have a close neighbour, Jean Gorman, who generously offered to make an oral recording of Thelma's Antarctic memories for the NZ Antarctic Society. This, and meeting Thelma at Scott Base in 1979, has helped me write an acknowledgement of Thelma's experiences in Antarctica, especially as the first New Zealand woman to winter-over at Scott Base.

By **Margaret Bradshaw**

Acknowledgements:
The help of Jean Gorman; Press releases from Antarctica NZ.

Bratina Island and the dirty ice - a very special place **Part 1** Discovery and naming

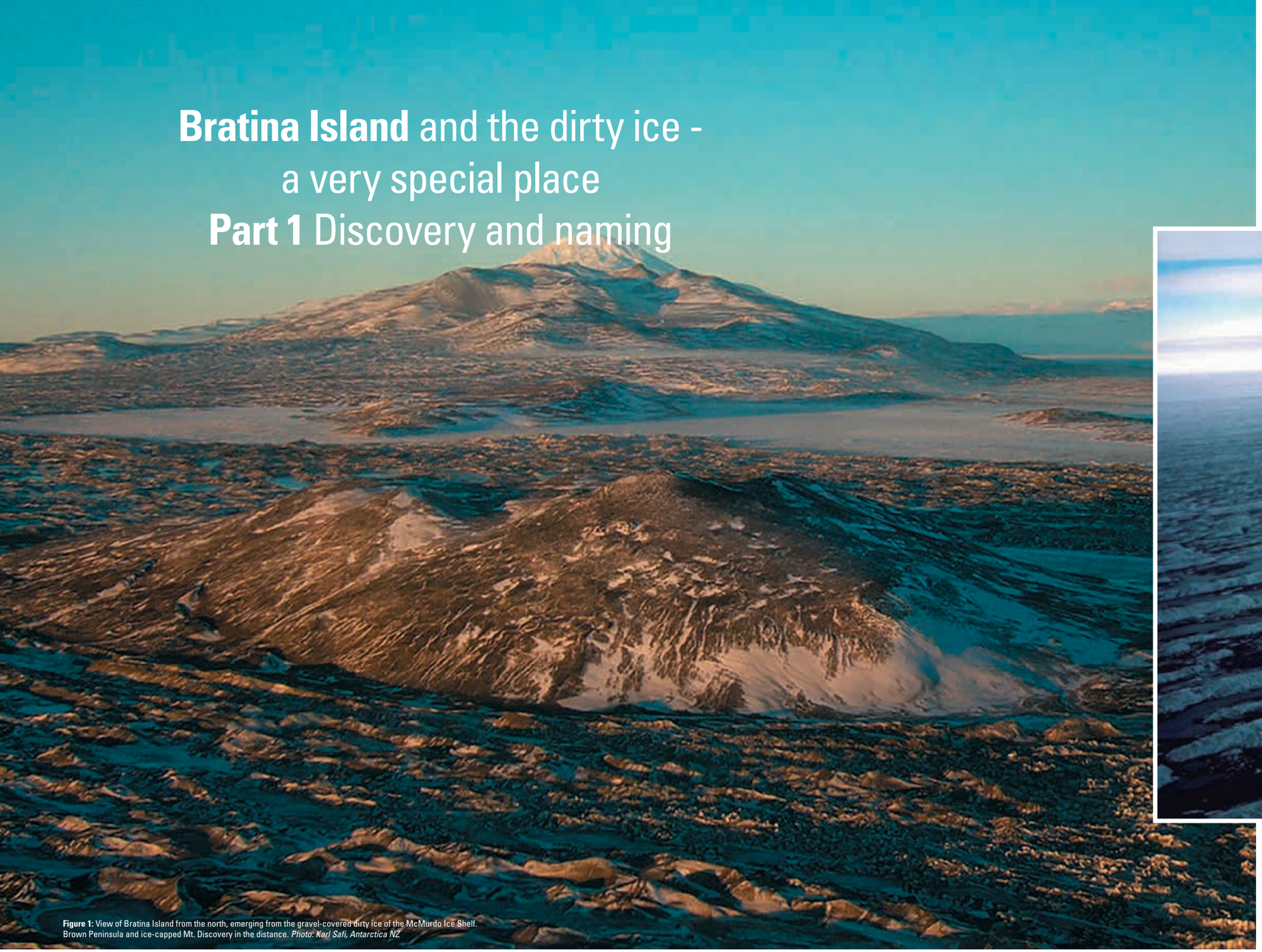


Figure 1: View of Bratina Island from the north, emerging from the gravel-covered dirty ice of the McMurdo Ice Shelf. Brown Peninsula and ice-capped Mt. Discovery in the distance. *Photo: Karl Safi, Antarctica NZ*

INTRODUCTION

Bratina Island is a place name that has appeared almost every summer over the last 30 years on the helicopter flight schedules in the operation centres at Scott Base and McMurdo Station. An observer looking south-south west from McMurdo may see Bratina Island as a small black speck emerging from the ice shelf between McMurdo Sound and the Royal Society Mountains in the distance. So, what is so special about Bratina Island that needs so many flights for scientists and equipment? We have provided an answer this question in the form of a two-part article. Part I gives the background and historical information, while Part II (in the following edition of *Antarctic* magazine) describes some of the exciting recent science findings from the area around Bratina Island.

Bratina Island's significance lies in its location in the north-west of the McMurdo Ice Shelf (MIS), where it sits in the middle of a unique feature known colloquially as the 'dirty ice'. Here the ice shelf is slow moving (<20 m a-1 – Glasser et al., 2006), undergoes extensive summer melting (up to 450 mm a-1) and presents a surprising scene of ice and gravel-covered 'dunes', between which lie thousands of lakes, ponds and streams that melt out each summer (Figures 1, 2). Sometimes referred to as Antarctica's largest wetland, these countless ponds and lakes teem with microbial life, making the dirty ice one of the most biologically rich areas on the continent of Antarctica.

Figure 1a: Aerial view across the northwest McMurdo Ice Shelf, approx 1200 km2 of strange terrain of gravel-covered, ice ridges and ponds and lakes. *Photo: Clive Howard-Williams*

THE DIRTY ICE

The dirty ice was first described by Griffith Taylor and Frank Debenham, scientists on Scott's 1910-13 Terra Nova Expedition, in their diaries of the Western Sledging Party 1911 (Taylor 1916; Back 1992). Their accounts were not enthusiastic. On their return to Ross Island from exploring the western side of McMurdo Sound in February and March of 1911, Debenham's diary of 7th March (when they were on the MIS, north

Figure 2: The skeletal remains of a glass sponge that has travelled, intact, up through the ice to the surface of the McMurdo Ice Shelf. *Photo: Ian Hawes.*

of what is now Bratina Island) records: "We are now camped at the edge of the Pinnacle Ice which is a belt of huge pinnacles of ice and silt running in a broad line from Brown Island (now Brown Peninsula) to the north… It is impossible to get across the belt at this point" and then later "in short, we will have to cross 6 or 8 miles of the rottenest stuff possible". On the same day Griffith Taylor (Griffith Taylor 1916) records: "The surface was frightful, consisting of big rough undulations much broken into snags and pyramids and crossed by frozen rivers with window glass buried in snow drifts". Figure 1 gives an idea of what it must have been like trying to cross the McMurdo Ice Shelf hauling sledges.

However, in spite of the tribulations of travel, and ever the insightful scientists, on the 6th of March Griffith Taylor recorded: "All round us were heaps of large sponges half buried in the snow and ice. The sponges were a foot in diameter, and among the long spicules we found Bryozoa, Brachiopoda, Serpulae, molluscs and a fine solitary coral. How did these marine animals come to be entangled in the old ice on which we found them?".

Previously, Hartley Ferrar, geologist with Scott's 1901-04 Discovery expedition, had noted marine debris amongst surface deposits on the MIS, in the bay between Black and White Islands. Ferrar was quoted by Debenham as reporting that, among isolated moraines, large mounds of mirabilite (sodium sulphate) occurred on the surface of the ice, and that "Balanus shells and sponge-spicules occurred upon the ice in association with this salt. The occurrence of this salt, mingled with shells and ice-scratched stones, is a freak of Nature which is difficult to explain."

But Debenham did explain. Inferring that the remarkable presentation of delicate marine fauna in near-life arrangement, with traces of fine marine muds below them, precluded them having arrived pushed by ice, he concluded that only the gentlest method of transportation can have been involved. He also noted (Figure 3) that they occurred close to or downstream of land and at low elevations (5 to 35 ft – 1.5 to 4.6 m), and only where the surface of the MIS was wasting. Rather than packed snow, the wasting surface was clearly melting each summer, in part due to the low albedo of the mud and gravel. He concluded that for surface-wasting ice shelf to persist it had to be nourished by basal freezing. The gentle mechanism that raised muds, gravels and associated fauna, in life-like orientation, was thus hypothesised as occurring during episodic freezing of the base of the ice sheet onto the sea floor where water depth was close to ice shelf thickness.

Figure 2a: A live example of a glass sponge at 30 m depth in McMurdo Sound. *Photo: Ian Hawes.*

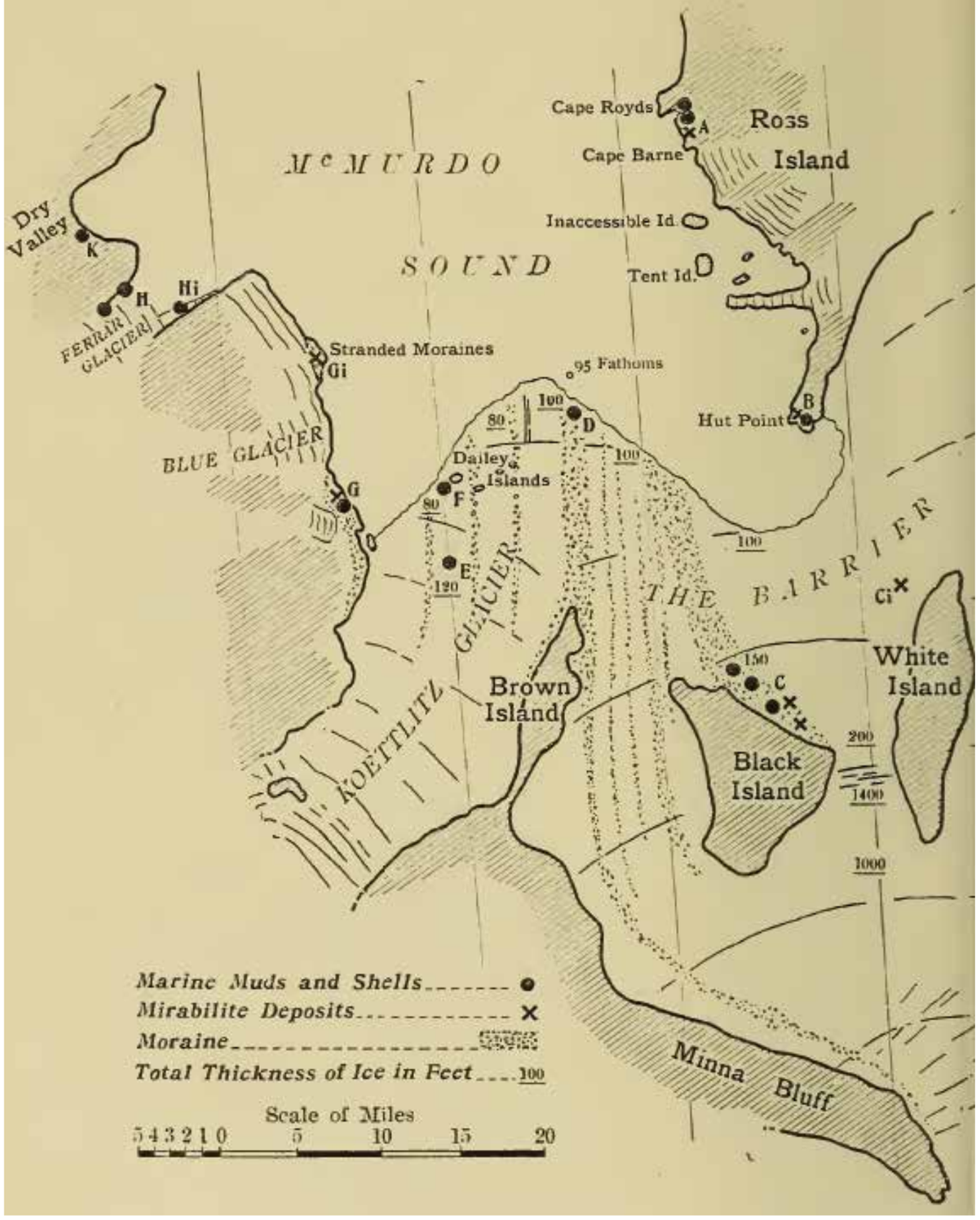


Figure 3: Map from Debenham (1920) showing bands of surface sediments across the McMurdo Ice Shelf. Bratina Island is not indicated in this map and was likely considered as the northern point of Brown Island (now Brown Peninsula).

His explanation of the gradual passage of trapped materials up through the ice has proven robust in the passage of time, and all recent evidence supports this mechanism. It is extraordinary that this implies a complex and biodiverse benthic marine fauna, dominated by filter feeders, in the aphotic environment underneath the MIS.

Figure 4 : Young Joseph Bratina. *Photo: courtesy of Dr. Bonnie Jo Bratina*

BRATINA ISLAND GETS A NAME

In the second half of the 20th Century, scientists began to return to explore the enigmatic MIS, now with the assistance of helicopters. The island that emerges through the ice shelf at the end of Brown Peninsula, a volcanic cone 160 m high, 1 km long and 0.6 km2 in area (Figure 1), finally got a name. Bratina Island is named after distinguished US serviceman Joseph Bratina (Figure 4). In 1963 the US Advisory Committee on Antarctic Names (ACAN) (a committee of the US Board on Geographic Names) named: "Bratina Island 78°01'S., 165°32'E. Small island lying at the N. tip of Brown Peninsula in the Ross Ice Shelf. Named by US-ACAN in 1963 for Chief Aviation Machinists Mate Joseph Bratina, US. Navy Squadron VX-6, stationed at McMurdo Station in the 1958-59, 1960-61 and 1961-62 summer seasons." Adjacent to Bratina Island, and named after the island, is Bratina Lagoon a rare tidal lagoon with sandflats covered by the once daily tides.

Joseph Bratina was born to immigrant parents from Slovakia. One of eleven children, he grew up on a farm outside the U.S. town of Ladysmith, Wisconsin. Not uncommon for farm boys of the time, he left school early, wanting to see more of the world, and enlisted in the U.S. Navy (Figure 4). During his 30 years in the Navy, he served in the South Pacific theatre during World War II, the Korean War, and the Vietnam War. In the course of his highly decorated career, he also spent three summer seasons in Antarctica (1958-59, 1960-61, and 1961-62), as a Chief Aviation Machinist's Mate working on exploration and supply planes. His squad, Air Development Squadron Six (VXE-6) nicknamed "The Puckered Penguins", was based at McMurdo Station. The squadron supported Operation Deep Freeze, and later provided the Navy's operational support for the U.S. Antarctic Research Program

During his first Antarctic season he was unfortunately badly injured. On the 5th January 1959 he was flown to Christchurch hospital on a medevac flight with two compatriots following an Otter aircraft crash the day before at the Marble Point runway on the edge of McMurdo Sound (Christchurch Press 6 January 1959). The two pilots, Lt Harvey E. Gardner and Lt Lawrence J. Farrell were killed, and "Those injured in the crash were Chief Aviation mechanic Joseph Bratina, who was suffering from a possible pelvic injury, photographer's mate [second class) Richard Bundy with multiple bruises and lacerations, and journalist James Donald, having fractures and lacerations." [Excerpt from 'Courage Sacrifice Devotion; The History of the U.S. Navy Antarctic VXE-6 Squadron 1955-99' by Noel Gillespie (2005), privately published]. Joseph eventually recovered and was able to return in 1960 for the next season in Antarctica.

Figure 5: Bratina Island field camp at the base of Bratina Island. View south to Brown Peninsula across the floating gravel-covered McMurdo Ice Shelf with its lakes and ponds. *Photo: Ian Hawes.*

Figure 6: Bratina Island field camp consisting of mess hut and two laboratories. Scientist sleeping quarters were comfortable Scott tents. The wind generator and roof-mounted solar panels were added in 2007-08 to provide power to the complex when it was occupied from January through April as part of NZ's International Polar Year contributions. *Photo: Ian Hawes.*

A NEW ZEALAND RESEARCH OUTPOST AT BRATINA ISLAND

The extraordinary wetland ecosystem on the gravel-covered surface of the MIS continued to draw in scientists. In 1985 Warwick Vincent, Clive Howard-Williams and Gillian Wratt (later Chief Executive of Antarctica New Zealand) landed on Bratina Island and decided it would be an ideal location for a field research facility to study this most unusual of ice shelves. The New Zealand Antarctic Research Programme responded by moving three field huts (and later, the height of Antarctic comfort, a portaloo) onto the southern shores of the island, one to serve as a mess hut and two as laboratories, with scientists sleeping nearby in tents (Figures 5, 6).

This turned out to be the start of three decades of international science on the McMurdo Ice Shelf based from the Island. Part 2 of this article (in the following edition) centres on the fascinating discoveries of life in the extreme environment of a floating Antarctic ice shelf.

By **Ian Hawes,** *University of Waikato;* **Clive Howard-Williams,** *NIWA;* **Bonnie Jo Bratina,** *University of Wisconsin-La Crosse*

Acknowledgements: *The authors wish to thank Antarctica New Zealand and its predecessors for the many years of support at Bratina Island. Funding from MBIE , NIWA, and the Universities of Canterbury and Waikato supported much of the research. The US Navy Squadron VXE-6 and the RNZAF flew many times to Bratina Island and the McMurdo Ice Shelf in support of the science. David Harrowfield assisted the authors in finding some of the early news items on the crash that injured Joseph Bratina.*

Coincidently, there are two completely separate sites named Bratina in the McMurdo Sound area. Joseph Bratina's niece Professor Bonnie Jo Bratina, a microbiologist, carried out research in the McMurdo Dry Valleys in 1995-1997 while at Michigan State University. Bratina Valley is named after her, honouring her research with the US Antarctic Programme. Bonnie Jo, now at the University of Wisconsin-La Crosse, is a co-author of this article and was able to visit Bratina Island in 1996.

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FROST FLOWERS

on sea ice in Marguerite Bay, near San Martín Station on the Antarctic Peninsula. This view north towards the peaks of Adelaide Island in the distance.

Frost flowers grow on new sea ice in very cold (below -15°C), calm conditions. When moist air becomes saturated, frost forms on imperfections on the icy surface.

The heavy water vapor turns into ice crystals, which rise as they wick moisture from the sea water, capturing salt and marine bacteria as they grow. The crystals, dense with bacteria, are three times more saline than the frozen water below.

Photo: Gustavo Barreiro

Aurora in dry dock, Port Chalmers, 1916. *Credit: Canterbury Museum 2018.61.3*

“Solid oak and iron went like matchwood”

What became of Aurora’s jury rudder?

In July 1915, SY Aurora with 18 men on board, was at the mercy of the sea-ice of the Ross Sea after it had been torn from its moorings at Cape Evans, Ross Island two months earlier. On 21 July, the stern was forced against thick ice floes and the rudder smashed. “Solid oak and iron went like matchwood,” wrote the captain, Joseph Stenhouse. Utilising surplus spars and timber, and six bags of cement fortuitously on board, the ship’s crew led by carpenter, Clarence (“Chippie”) Mauger, made a jury-rigged rudder. This was fitted when Aurora broke free of the ice in March 1916, and succeeded in getting the ship to port.[1]

Funded by the governments of New Zealand, Australia and Great Britain, Aurora went into dry-dock at Port Chalmers in June 1916 for extensive repairs, before again sailing south six months later to relieve the remaining men of the Ross Sea Party. On board was Sir Ernest Shackleton following the ordeal of the Weddell Sea component of his aborted trans-Antarctic expedition, and to whom the three governments later returned the ship free of debt.

Shortly after the sailing, Joseph Stenhouse who through circumstances not of his making was no longer Master of Aurora, wrote to Professor William Benham, Curator at the “University Museum”, Dunedin advising that Shackleton expressed the wish that the museum accept the jury rudder for permanent exhibition.[2] Professor Benham examined the rudder and “saw

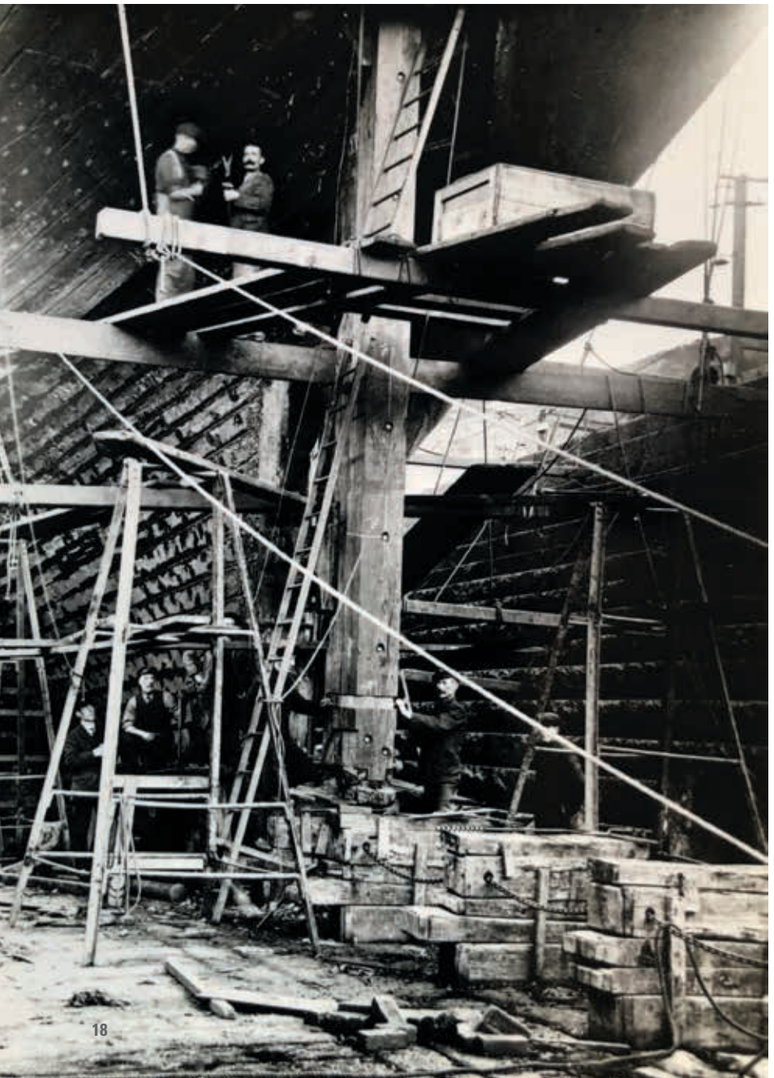
that its huge bulk rendered it quite unsuitable for a museum exhibit."

Three years later, in February 1920, Professor Benham, in response to an enquiry from Wellington Solicitor, Leonard Tripp, on behalf of Shackleton, advised he "waived all claim to the thing…its interest is chiefly to the seafaring man, and a wonderful piece of work it is…" He gave a letter to the same effect following enquiries from the Merchant Services Guild. The professor, in a clearly self-typed letter, expressed exasperation that "Thrice I on behalf of the Museum stated that we do not want the rudder."[3]

In September 1920, Antarctic mariner Captain Gerald S. Doorly took up the cause and wrote to the Mayor of Wellington. When in Port Chalmers some months earlier, Doorly had observed the rudder "lying on the dock side." He felt Shackleton's "gift has not been appreciated at its proper value." He added, "the dock Master pointed this out to me

Captain Gerald S. Doorly, R.N.R.
Credit: The Voyages of the 'Morning', John Murray, London, 1916

Working on rudder post of Aurora, dry dock, Port Chalmers, 1916. *Credit: Otago Witness*



remarking that unless the rudder was removed it would be destroyed to make room on the dock side." Doorly urged that the rudder be obtained for the people of Wellington "and find a suitable resting place in Newtown Park".[4] Doorly, who had been 3rd Officer on the Antarctic relief ship Morning, 1903 -04, was in 1920, Master of the Union Steam Ship Company's S.S. Paloon.

The Town Clerk, Wellington then sought the assistance of Sir Joseph Kinsey of Christchurch, to secure the rudder "for the City of Wellington where its value will be properly appreciated." In reply, Kinsey wrote, "standing alone in Newtown Park, its meaning and much of its interest would disappear."[5]

The cost of removing the rudder of "about 2½ tons" from Port Chalmers to Wellington was "34/- a ton plus about 10/- handling and cartage at [the Port Chalmers] end."[6] The total cost of the transaction (91 shillings or £4-11-0) is worth approximately $900 today.

This was apparently acceptable to the Wellington Council which then

The jury-rigged rudder, Port Chalmers, April 1916, 'Chippie' Mauger is second from right.. *Credit: Otago Witness*

wrote to Port Chalmers' shipping agent, John Mill & Co, stating it was now understood John Mill & Co had "some interest in the Rudder" and asking if they desired to retain it. The Council's file contains no response.[7]

It is unclear why John Mill refused to release the rudder. He, like Kinsey, may have considered it has little merit as an exhibit in Wellington. He and Kinsey had been members of a working committee which oversaw the repair and refitting of Aurora. As such there was considerable tension, eventually resolved, with Shackleton in 1916 as to the arrangements for the Relief Expedition. Although Wellington-based Tripp as Shackleton's legal advisor urged Shackleton to be conciliatory, there may have been some "anti-Tripp" feeling. Parochialism may also have played a part. In any event, Mill did not co-operate.

The exhibit never happened in Newtown Park, Wellington. The Dock Master likely carried out his intention of having it destroyed. The jury rudder was lost for posterity.

When David Harrowfield, then Antarctic Curator, Canterbury Museum, and I went to Port Chalmers in the early 1980s to try and find an answer, we concluded the rudder was likely used as fill in the port's reclamation of its former dry dock area.

By **Richard McElrea,** *QSO*

References:

(1) **Refer Polar Castaways, The Ross Sea Party (1914-17)** *of Sir Ernest Shackleton, Canterbury University Press/McGill-Queen's University Press, 2004 by Richard McElrea and David Harrowfield.*

(2) **J.R Stenhouse (c/- Otago Club) to Professor Benham,** *5 January 1917, Hocken Library. He also offered "an old sledge used by the Scott Expedition and afterwards by the Aurora's party and one pair of leather shoes made at Cape Evans by one of Scott's party."*

(3) **W. B. Benham to the Town Clerk, Wellington,** *13 October 1920, Wellington City Council (WCC) records.*

(4) **Gerald S. Doorly to J.P. Luke, Mayor of Wellington,** *8 September 1920, WCC records.*

(5) **J. J. Kinsey to The Town Clerk, Wellington,** *7 October 1920, WCC records.*

(6) **Town Clerk, Borough of Port Chalmers to Town Clerk, City Council, Wellington,** *5 November 1920. WCC records.*

(7) **Town Clerk, WCC to Messrs. J Mill & Co, Port Chalmers,** *17 November 1920. WCC records.*

The NZ Satellite Earth Station Saga

Aerial view of the ASPA and SES from the south – it extends from First Crater (by SES) to Second Crater in the north. Mt Erebus is in the background. Approximate extent of the ASPA delineated by dashed orange line. *Photo: G Varcoe, ©Antarctica New Zealand Pictorial Collection, 77697, 1992.*

In the last edition of Antarctic (v39, 3/4, 2021) Bill Robertson gave an account of the important collaborative DOSLI(NZ)/US Geological Survey (USGS) aerial mapping program in 1992. He highlighted that the US National Science Foundation (NSF, that ran the US Antarctic Research Program) had originally agreed to fund the project. Details were to be finalised at a "bilateral side meeting" at the June 1992 SCAR meeting held at San Carlos de Bariloche in Argentina – side meetings are common at SCAR meetings to progress collaborative work. At this meeting, NSF declined to support the mission, that, subsequently, the USGS did. However, what Bill did not mention, and may have been the cause of the change in NSF's position, was the Satellite Earth Station (SES) that NZ had just built on the margin of a Protected Area at Arrival Heights (Site of Special Scientific Interest (SSSI) 2) that had been set up to preserve an area with low electromagnetic noise.

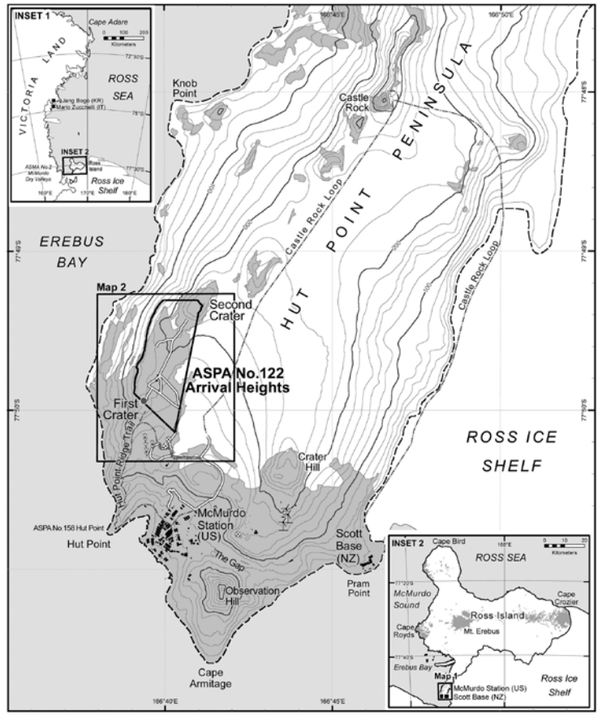
The Satellite Earth Station was constructed during the 1991/2 summer to improve communications between Scott Base and New Zealand via satellite. A worthy cause. The essential component was a very directional (parabolic) transmitting and receiving aerial (narrow beam width) contained within a radar dome (Figure 1). To get the line-of-sight necessary to directly see the commercial communications satellites located above in much lower latitudes, the station needed to be high but close to Scott Base and would transmit at a low elevation. A site on First Crater just outside the boundary of SSSI-2 (now ASPA 122) was selected. However, during construction, I understand that it was decided to move the position of the foundations slightly to get the best rock base for the foundations. Unfortunately, it appeared that no-one checked the exact position of the SSSI boundary, which may have been poorly defined anyway, and the base may have come just inside the boundary (Figure 2). If so, it would infringe on the protected area. As an aside, one can wonder why a protected area for low electromagnetic (EM) noise was located close to two major bases, both with powerful radio transmitters, and known to be subject to significant man-made EM noise from, for example the main power cables at McMurdo Station (Stuart and Sites, 1973 – this report was 2 years before the SSSI was designated). Understandably, scientists with experiments utilising the low EM noise environment of the SSSI were upset, particularly US scientists, who thought the SES transmissions were affecting their experiments. The issue was discussed by the Antarctic Treaty parties as some considered it a major infringement of the Antarctic Protected Area system, but I have no details. However, the parties decided that it should be only considered a scientific issue and thus passed it onto SCAR to resolve. I got involved as Chair of the NZ National Antarctic Committee and NZ Delegate to SCAR. Bill appears to have forgotten the issue.

The New Zealand Satellite Earth Station (SES) in 1992. *Photo: by G Varcoe, ©Antarctica New Zealand Pictorial Collection, 77701, 1992.*

The issue occurred at a time of great upheaval in New Zealand science with the transfer on 1 April 1992 of DSIR staff into the new Crown Research Institutes (I had the task of looking after the interests of the former DSIR Geology and Geophysics staff). Antarctic Division, DSIR, became the New Zealand Antarctic Programme within Ministry of Foreign Affairs and Trade. Hugh Logan had resigned as head of Antarctic Division of DSIR and David Geddes was acting head. I also had no reason to think that the new SES did not meet all regulations. So, the first I heard of the problem was in May 1992 with a rather irate email from Lou Lanzerotti (an eminent US astrophysicist working in the SSSI) to me as Chair of the NZ National Antarctic Committee, demanding to know what I was going to do. Being a reasonable sort of person, I replied at once that I would look into it and find out what had happened from the NZ viewpoint. Lanzerotti's immediate response was to call me "disingenuous" in a news item in the New Scientist (my only mention in that worthy journal in 50 years). So, I started to find out what Antarctic Division/NZ Antarctic Programme had done. I talked to Colin Keating (Antarctic Policy Unit) to find out about the Ministry of Foreign Affairs and Trade (MFAT) perspective, and with NZ Antarctic Programme staff. As SCAR had been tasked to resolve any scientific issue, a preliminary meeting was set for the 1992 SCAR meeting at San Carlos de Bariloche for NZ and US to sort out a way forward. Unfortunately, due to flight delays, the meeting with NSF was held before I arrived at Bariloche. NZ was represented by Geddes, Knox and Macfarlane, US by Rutford, Bentley and Rosenburg, and the meeting chaired by Laws (SCAR President). They agreed that a small group of US and NZ researchers should investigate the sources of electromagnetic noise in the SSSI and immediate region and identify which were impacting experiments being undertaken there. The group was to be chaired by the Chair of the Solar, Terrestrial and Aeronomy (STAR) working group, John Dudeney. The STAR WG

covered the research being undertaken in the SSSI and likely to be affected by EM noise. The small group initially comprised the US investigators working in the SSSI and myself. Not being at this initial meeting, I do not know what was said there, but I would expect that NSF was very unimpressed by New Zealand's actions affecting the SSSI and in apparently persuading Antarctic Treaty parties to move the issue onto SCAR. This, I think, was the probable reason for the negative attitude taken by NSF to the aerophotography project, noted by Bill. As we had no NZ member of the STAR WG at Bariloche, I sat in on their meetings and spent time lobbying down more extreme recommendations from the group on this issue.

Researchers of US projects within the SSSI had noted that their experiments were being adversely affected by extraneous noise sources which they attributed to the SES. So, in consultation with Dick Barr from the Industrial Research CRI and with the New Zealand Antarctic Programme and NZ Post (operators of the SES) support, I developed a programme of EM noise surveys in the SSSI and surrounding region. I also corresponded with the US researchers (Lou Lanzerotti, Ted Rosenburg, Tony Fraser-Smith) about the type and timing of any extraneous EM noise impacting on their measurements and how this affected their results. We were looking for adverse effects that corresponded with when the SES transmitted – note it transmitted directly across the western part of the SSSI (Figure 3) with a narrow beam at low elevation. We also looked for other noise sources within the McMurdo/Scott Base region. The results of the surveys and analyses showed that the SES transmissions were not interfering with any experiment in the SSSI. The main source of EM noise within the area was from the main radio transmitter at McMurdo Station and the latter did have some impact on one of the US experiments. These results were communicated to our US colleagues and a meeting was set up at Cambridge under the chairmanship of John Dudeney to come to some agreement on scientific impacts, their cause, and a



Map of location of Antarctic Special Protected Area (ASPA) – 122, formerly Site of Special Scientific Interest (SSSI) - 2. The SES (solid circle) lies at its southern boundary (First Crater). USAP map ID 10069.001.04. https://www.ats.aq/documents/recatt/att473_e.pdf (retrieved on 2-2-22).

way forward. Gordon Keys and Ian Axford agreed to join me as the NZ delegation. The US delegation was Lou Lanzerotti, Ted Rosenburg, and Tony Fraser-Smith. We agreed that the SES was not impacting on experiments within the SSSI, the major noise source was the main US transmitter and that a management researcher (alternately a NZ representative then a US one – initially Graeme Fraser) should review annually proposed new experiments within the SSSI to ensure no new interference sources. We also floated the idea of a Special Managed Area to control noise sources over a broader region, but this was not taken up by SCAR.

Note the comments on this issue in the SCAR History (Walton and Clarkson), although extensive are very general and miss out most of the detail of what happened and the results of the investigations.

By **Fred Davey** *(Former SCAR Secretary, SCAR Vice-President, NZ SCAR Delegate, NZAM)*

References:

Refer Polar Castaways, The Ross Sea Party (1914-17) Stuart GF, *Sites MJ., 1973. Man-made Radio Noise Levels at 150 kHz to 32 MHz near a large Antarctic Base. IEEE Transactions on Electromagnetic Compatibility, Vol. EMC-15, No 3.*

Walton DWH., Clarkson PD., 2011. *Science in the Snow, Scientific Committee on Antarctic Research.*

New Zealand Recipients of The Polar Medal and The New Zealand Antarctic Medal

The Polar Medal was instituted in September 1904 to give recognition to those who had participated in the National Antarctic Expedition 1901-04 led by Commander Robert F. Scott. It was issued in Silver and Bronze. The medal was not granted to any member whose conduct was unsatisfactory.

It was agreed to continue the award for service on subsequent expeditions. It has been used widely to reward the personnel of major explorations recognised by British and Commonwealth governments whether by land, sea or air.

The Bronze Polar Medal ceased to be issued after 1939 following an earlier decree by George V ordering all Polar Medals be issued in silver.

Until 1968, the Polar Medal was presented to those who participated in a polar expedition endorsed by the governments of any Commonwealth country, subject to the unsatisfactory conduct exception. Since then, the rules have been revised with greater emphasis placed on personal achievement rather than participation.

The medal took its unusual octagonal shape from a medal (The Arctic Medal) authorised in 1857, and awarded to persons engaged in certain expeditions (dating back to 1818) to the Arctic Regions. The obverse shows the monarch's head viz: Edward VII (1901-10), George V (1910-36), Edward VIII (1936), George VI (1936-53), Elizabeth II (1953-present).

The New Zealand Antarctic Medal was instituted as a New Zealand Royal Honour on 1 September 2006. In the New Zealand context, it replaced the (British) Polar Medal instituted in 1904 under a British Royal Warrant.

Made of Sterling Silver, it retains the famous octagonal shape and white ribbon of the Polar Medal. The reverse design shows a group of four Emperor Penguins on an Antarctic landscape with Mt Erebus in the background. The obverse bears an effigy of the Queen and the inscription Elizabeth II Queen of New Zealand. The medal was designed by Phillip O'Shea, CNZM, LVO, New Zealand Herald of Arms.

THE POLAR MEDAL

** = NZ resident but not born in NZ*

National Antarctic Expedition 1901-04, "Discovery", Commander R.F. Scott R.N.
With Clasp "Antarctic 1902-04"
*A.H. BLISSET (Silver)
Steward
*Hartley FERRAR (Silver)
Geologist
*Charles Reginald FORD R.N. (Silver)
Chief Steward/Stores Officer
*Clarence Howard HARE (Bronze)
Steward
*Isaac WELLAR (Silver)
Seaman

National Antarctic Expedition 1901-04 , "Morning"
*Arthur BEAUMONT (Bronze)
Seaman
*Gerald DOORLY (Bronze)
3rd Officer
*James PATON (Bronze)
Seaman

British Antarctic Expedition 1907-09 ,"Nimrod"
With Clasp "Antarctic 1907-09"
*W.D. ANSELL (Bronze)
Steward
Clasp only (Bronze) "Antarctic 1907-09"
*James PATON
Seaman

British Antarctic Expedition 1910-13,"Terra Nova ", Captain R.F. Scott R.N.
With Clasp "Antarctic 1910-1913"
*William "Bill" BURTON RN (Silver)
Stoker 1st Class
*Thomas CLISSOLD (Silver)
Cook
*James R. DENNISTOUN (Bronze)
In charge of mules on ship
*William KNOWLES (Bronze)
Seaman
*Charles LAMMAS (Bronze)
Fireman
*Mortimer McCARTHY (Silver)
Seaman
*Angus McDONALD (Silver)
Fireman
*William "Bill" McDONALD (Silver)
Seaman
Thomas McGILLION (Silver)
Fireman
*James PATON (Silver)
Seaman
*Charles WILLIAMS (Silver)
Seaman

Australasian Antarctic Expedition 1911-14,"Aurora", Douglas Mawson
With Clasp "Antarctic 1912-14"
Harold HAMILTON (Silver)
Chief Biologist, Macquarie Island
Eric Norman WEBB (Silver)
Chief Magnetician
Dr Leslie A. WHETTER (Silver)
Surgeon

Imperial Trans-Antarctic Expedition 1914-17, "Endurance" & "Aurora", Sir Ernest Shackleton
With Clasp "Antarctic 1914-16"
*Thomas Hans ORDE-LEES (Silver)
Motor engineer, "Endurance"
Frank Arthur WORSLEY (Silver)
Master, "Endurance"
*Charles GLIDDON (Bronze)
Seaman, "Aurora" 1914-16
*Aubrey Howard NINNIS (Silver)
Motor Expert, "Aurora" 1914-16
*Alfred H. LARKMAN (Silver)
Chief Engineer "Aurora" 1914-16
*Clarence Charles MAUGER (Silver)
Carpenter "Aurora" 1914-16
Clasp Only "Antarctic 1914-16"
*James PATON (Silver)
Bosun' "Aurora" 1914-16

Ross Sea Relief Expedition 1916-17, "Aurora", Captain J.K. Davis
*Aubrey Howard NINNIS (Bronze)
Purser
Clasp only (Bronze) "Antarctic 1917"
*James PATON
Bosun
Awarded 1934
As a member of the British, Australian and New Zealand Antarctic Expedition, 1929-1931. (BANZAE)
With Clasp "Antarctic 1929-31"
Robert A. FALLA, M.A. (Bronze)
Ornithologist/Assistant Zoologist
Richie G. SIMMERS, M.Sc. (Bronze)
Meteorologist
Awarded 1956
For good services as members of the Australian Antarctic Research Expedition to Mawson, 1954-55
Bruce Harry STINEAR
Geologist
Awarded 1958
For good services as members of the Commonwealth Trans-Antarctic Expedition, 1956-1958
Harry Herbert AYRES
Ice Expert, Dog Handler
Dr Ronald Walter BALHAM
Meteorologist, Biologist
James Gordon BATES
Diesel Mechanic
Ernest Selwyn BUCKNELL
Cook
Roy Albert CARLYON
Surveyor, Navigator
Squadron Leader John Richard CLAYDON, RNZAF
Chief Pilot
Flying Officer William Joseph CRANFIELD, RNZAF
Pilot
Murray Hamilton DOUGLAS
Mountaineer, Dog Handler
Murray Roland ELLIS
Engineer
John Edward GAWN
Radio Operator
Bernard Maurice GUNN
Geologist, Photographer
Flight Lieutenant Gordon Murray HASLOP, RAF
Shackleton Base, Pilot
Sir Edmund Percival HILLARY, K.B.E
Scott Base Leader TAE, 1957/58*
Wallace George LOWE, O.B.E.
Shackleton Base, Photographer
Dr George Walter MARSH, M.R.C.S., M.R.C.P.
Medical Officer, Dog Handler & Veterinarian
Joseph Holmes MILLER
Deputy Leader, Surveyor
Chief Radio Tech. Peter David MULGREW, RNZN
Senior Radio Officer
Sergeant Walter TARR, RNZAF
Aircraft Engineer
Guyon WARREN
Geologist
Awarded 1958
For good services as members of the New Zealand Antarctic Expedition for the International Geophysical Year
Vernon Bruce GERARD
Geophysicist, (Geomagnetism)
Dr Trevor HATHERTON, O.B.E.
Leader, Science Party, (Aurorae)
John Gerard HUMPHRIES
Hallett Station Senior Technician, (Ionosphere)
Clayton Ernest INGHAM
Hallett Station Scientific Leader, (Aurorae)
Michael William LANGEVAD
Hallett Station Assistant Technician, (Ionosphere)
William James Peter MACDONALD
Technical Officer, (Solar radiation)
Reginald Herbert ORR
Technical Officer, (Seismology)
Herbert Neil SANDFORD
Technical Officer, (Ionosphere)
Awarded 1961
For good services as members of the Australian National Antarctic Research Expedition to Mawson and Davis, 1958
Ian Leonard ADAMS
Macquarie Island, Officer-in-Charge 1958
Awarded 1969
For distinguished services in scientific research and exploration
Albert Leon BURROWS
Magnetician
Colin Maxwell CLARK
Scott Base Leader 1966
Malcolm Roding James FORD
Surveyor
James Francis GRAVESON
Driller
Hillary John HARRINGTON
Scott Base Leader 1957/58, Geologist
Adrian Goodenough HAYTER
Scott Base Leader 1964/65
Arnold John HEINE
Field Assistant, Scientist
*Walter William HERBERT
Field Party Leader
Ronald William HEWSON
Surveyor
Peter John HUNT
Surveyor
Brian Maxwell JUDD
Base Engineer
Geoffrey Alan Munroe KING
Geophysicist
Arthur George LEWIS
Senior Technical Officer
William Raymond LOGIE
Maintenance Officer (Electrical)
David Reginald Cecil LOWE
Field Assistant, Deputy Leader
William Robert LUCY
Vanda Station Leader/Surveyor 1968/69
David Graham MASSAM
Field Leader
Garth John MATTERSON
Surveyor
Peter Miles OTWAY
Surveyor
Kevin Patrick PAIN
Field Assistant
Michael Maynard PREBBLE
*Scott Base Leader 1965/66, 1979/80, DOIC**
Rutherglen Murray ROBB
Posthumous, Deceased 1961
Maintenance Officer
Athol Renouf ROBERTS
Scott Base Leader 1961/62
Kenneth James SALMON
Hallett Station, Scientific Leader
Brian Philip SANDFORD
Senior Scientist
Maurice J. SHEEHAN
Field Assistant
Robert Baden THOMSON, O.B.E.
Wilkes Station Leader 1962/63
Scott Base Deputy Leader 1963/64
Hallett Station Scientific Leader 1969/70
Keith Charles WISE
Field Assistant
Peter Alexander YATES
Radio Officer
Awarded 1972
For good services as members of the New Zealand Expeditions to Antarctica in recent years
Ian Philip JOHNSTON
Technician
Harold Phillip LOWE
Vanda Station Leader 1969/70
William James WEBB
Scott Base Leader 1967/68
Awarded 1978
For good services as members of the New Zealand Expeditions to Antarctica in recent years
Major James Richard BARKER, MBE, RNZIR (RTD)
Scott Base Leader 1971/72, DOIC 1970/71*
With Clasp "Antarctic 1970-72"
Peter John BARRETT
Geologist
With Clasp "Antarctic 1974-75"
Anthony Maurice BROMLEY
Vanda Station Leader/Meteorologist 1969/70
With Clasp "Antarctic 1973-74"

Jack Edward HOFFMAN
Driller
With Clasp "Antarctic 1975-76"
Malcolm Gordon LAIRD
Geologist and Field Leader
With Clasp "Antarctic 1975-76"
Alexander Thomas WILSON
Geochemist
With Clasp "Antarctic 1974-75"
Awarded 1984
For outstanding services as members of the New Zealand National Antarctic Research Expeditions to Antarctica
Allan John DAWRANT
Radio Technician
With Clasp "Antarctic1975-76"
James Sidney RANKIN
Base Engineer
With Clasp "Antarctic1976-77"
Dr David Norman Bryant SKINNER
Geologist
With Clasp "Antarctic 1977-78"
John Rueben THOMSON
Base Engineer
With Clasp "Antarctic 1977-78"
Kevin McIntyre WEATHERALL
Senior Technical Officer
With Clasp "Antarctic 1976-77"
Michael Roger WING
Maintenance Officer, Driller/Field Assistant
With Clasp "Antarctic 1975-76"
Awarded 1986
For good services as members of New Zealand expeditions to Antarctica in recent years
Gary Hendry LEWIS
Technician
With Clasp "Antarctic 1979-80"
Barrie Cooper MCKELVEY
Geologist
With Clasp "Antarctic 1981-82"
Peter Robert NELSON
Mechanic
With Clasp "Antarctic 1984-85"
Charles Ashley ROPER
Technical Officer
With Clasp "Antarctic 1981"
Eric John SAXBY
Assistant Maintenance Officer
With Clasp "Antarctic 1981-82"
Leo Bernard SLATTERY
Postmaster
With Clasp "Antarctic 1984-85
Awarded 1990
For good services as members of New Zealand expeditions to Antarctica in recent years
Alexander R. (Alec) PYNE
Geologist
With Clasp "Antarctic 1978-88"
Garth Edwin VARCOE
Technical Services Officer
With Clasp "Antarctic 1978-88"
Awarded 1991
For valuable services as members of New Zealand expeditions to Antarctica in recent years
Graeme Geoffrey CLARIDGE
Soil Scientist
With Clasp "Antarctic 1959-1990"
Dr Iain Bruce CAMPBELL
Soil scientist
With Clasp "Antarctic 1964-1990"
Dr John Alan MCDONALD
Biologist
With Clasp "Antarctic 1981-1990"
Awarded 1993
Margaret Ann BRADSHAW
Geologist
With Clasp "Antarctic 1975-1992"

Key: * DOIC = Deputy Officer in Charge
* TAE = Trans Antarctic Expedition

THE NEW ZEALAND ANTARCTIC MEDAL

Awarded 2006
For services to Antarctic science
Professor John Dudley BRADSHAW
Geologist
HOWARD-WILLIAMS, Dr Clive
Biologist
Awarded 2007
For services to Antarctic science
Dr Frederick John DAVEY
Geophysicist
HASKELL, Dr Timothy George
Physicist
Awarded 2009
For services to Antarctic science
Professor Peter John BARRETT, PM
Geologist
For services to Antarctic research
Dr David Lawrence HARROWFIELD
Geographer and Historian
For services to Antarctic climate science
Professor Timothy Raymond NAISH *Geologist*
For services to Antarctic engineering
Mr Alexander Richard PYNE
Geologist
Awarded 2013
For services to Antarctic science
Professor Thomas George Allen GREEN
Biologist
For services to Antarctic history and conservation
Mr Baden Nolan NORRIS, QSO
Historian
Awarded 2014
For services to Antarctic science and conservation
Mr Lewis Vernon SANSON
Chief Executive, Antarctica New Zealand
Awarded 2017
For services to New Zealand interests in Antarctica and historic preservation
Mr Randel Murray HEKE,
Foreman, Building works
Awarded 2018
For services to Antarctic science
Professor Patricia Jean LANGHORNE
Glaciologist
For services to New Zealand's Antarctic maritime capabilities and scientific research
The late Mr Andrew LEACHMAN
Posthumous, Deceased 16 Sept 2017
Master Mariner
Awarded 2020
For services to Antarctic exploration and heritage
Mr Eugene Brian FITZGERALD
Surveyor

THE NEW ZEALAND ANTARCTIC MEDAL (HONORARY)

Awarded 2006
For services to New Zealand Antarctic programmes
Dr Karl ERB
Director Office of Polar Programs, NSF

This list is obtained from a variety of sources, but principally the official records in Great Britain (Admiralty) and New Zealand (Honours Unit, Department of the Prime Minister and Cabinet) including the respective Gazette Notices. It includes persons born in New Zealand and those born elsewhere who subsequently became New Zealand residents.

It is the first time such a list has been compiled and is therefore considered an important and valuable historical record. The list reflects the substantial contribution of New Zealanders to Antarctic science, exploration and administration for over a century. The list may be incomplete, despite every effort to ensure its completeness and can be considered "a work in progress." Readers are requested to report errors of omission or commission which will be gratefully received. Please contact: mikewing46@gmail.com

Prepared by **Mike Wing, NZ Antarctic Society**

Background image (both pages): Polar Medal awarded to NZAS Life Member Margaret Bradshaw in 1993.

Obituary:
Vernon (Vern) Bruce Gerard

Vern passed away on Sunday 20 March 2022, he was 97. He was a physicist with the first (1956-57) NZ IGY Antarctic Expedition, responsible for setting up and running the geomagnetism programme. He was awarded the Polar Medal in 1960 by the Queen Mother.

Vern was born on 13 December 1924 and was brought up in Christchurch. He was educated at Shirley school and at Christchurch Technical College. He was born deaf, no one was aware of this but his parents, and he learnt to lip read by himself. He joined the NZ Department of Scientific and Industrial Research (DSIR) Magnetic Survey in Christchurch in 1942 as a technical assistant and saw war service briefly with the artillery (stationed as a technical support person with the Meteorological Service in Wellington Botanical Gardens) in 1944–45. He then returned to Magnetic Survey in Christchurch, gaining a BSc in 1946, and an MSc with Honours in Physics in 1947 at Canterbury College of the University of New Zealand. His MSc and early work focussed on the response of the ionosphere to magnetic field changes, before he moved into developing magnetometers, in particular using fluxgate magnetometers. This was the start of his strong interest in electronics and instrument development. While with Magnetic Survey, he spent a year stationed in Apia Observatory in Western Samoa in 1949 with the DSIR Geophysical Observatory programme there. On return, he embarked on aeromagnetic surveys of parts of New Zealand, in particular a major survey of the Central Volcanic area of North Island and the associated geothermal thermal areas, and offshore to Chatham Islands.

In 1956, with his experience in magnetic observatory operations, Vern was selected to join the NZ IGY Antarctic expedition, led by Dr T Hatherton. He installed and operated the geomagnetic observatory instruments (two La Cour magnetographs and three of his own designed fluxgate magnetometers plus the QHM and BMZ absolute instruments) at Scott Base during the 1957 IGY year. Vern returned to Scott Base in early 1959 to re-calibrate the magnetometers. He then took sabbatical leave from 1960–63 to work with National Physical Laboratory (NPL), London, on atomic frequency standards. On returning to work in NZ, he made the first atomic (caesium) clock and gas laser to be operated in New Zealand. In 1971, Magnetic Survey and Geophysical Observatory were transferred from Geophysics Division, DSIR, to Physics and Engineering Laboratory (PEL) of the DSIR, located in Lower Hutt. Vern also moved to PEL where he worked on geophysical instrument development. He initially worked on strain meters for measuring the deformation of the Earth, working for a time on strain meters at the Geophysics and Geodesy Dept, University of Cambridge in England in 1975. He subsequently worked on developing tilt meters, again for measuring earth deformation. He remained at PEL, where he became a principal scientist, until his retirement in 1981.

After retirement he lived in Upper Hutt with his wife, Remy, and bought a terrestrial telescope to indulge in astronomy as a hobby. In 2000 he briefly returned to Antarctica and Scott Base, as one of the survivors of the first wintering team, to celebrate the millennium. In 2007 he, jointly with John Claydon, organised a 50th anniversary function for NZ TAE and IGY expeditioners in Christchurch. Vern was made a Fellow of the British Interplanetary Society in 1948 and a Fellow of the Institute of Physics in 1963. He was author of many published scientific papers in New Zealand and overseas journals, also the book With Hillary at Scott Base, A Kiwi among the penguins, in 2012.

By **Fred Davey and Remy Gerard**

The times they are a changing again

- message from the outgoing President of the NZ Antarctic Society

The times they are a changing again - as I noted originally back in vol 37 -3&4 in 2019. I have led and chaired the NZAS Council for four terms now from March 2018, and I believe it is now a good time to hand the reins of governance to our new President, Rex Hendry, who was elected at the 2022 National AGM on 17th September. Our council team and subcommittee groupings have achieved much over the last 4 years on behalf of the NZAS, and for most of that time we have been in an unprecedented pandemic called Covid. The NZAS is now strong re financial and membership systems' alignments, and a continuing enthusiasm for its niche future. A number of new passionate and energetic people are also willing to be on board to help take the NZAS toward the 100 year anniversary in November 2033. Since my last presidential message we undertook the SWOT analysis as noted we would in Vol 39 (3&4), in an online workshop meeting – soon after the 2021 National AGM, involving the full council cohort and invited branch members. The key aim was to establish where the NZAS strengths, weaknesses, opportunities and threats were and are - so that council could prepare relevant strategies, annual business and action plans going forward over the next few years. This information was shared at the National AGM in the presidential and other key council reports.

This edition of *Antarctic* – vol 40(1&2) is the first since vol 39 (3&4) was delivered to us all in February this year, and is well worth the wait. In the absence of a new Editor as yet - Nicholas O'Flaherty very generously agreed to step in and create Vol 40 1&2; 3&4) this year with the support of the newly convened and ratified Editorial Subcommittee, chaired by Robyn Denize (our Auckland Branch Chair).There is Nicholas' usual great mix of scientific, historic, social and reflective articles – some of which I would like to draw your particular attention to, being about:

Vern Gerard - (passed in March 2022).- was a physicist that studied the Earth's magnetic field and recognised for his magnetic observations. He was on the team that built Scott Base in 1957 and was a colleague of Sir Ed Hillary;

Thelma Rodgers - (passed in October 2021)- remembered for her many realised Antarctic ambitions and influence–for example- undertaking a (usually for boys only) physics degree, being a geophysics technician with DSIR, and then being the first female to winter over at Scott Base in 1979, and spending time at Vanda Station in the Dry Valleys.

The NZ Satellite Earth Station saga is an interesting read as the station was inadvertently located on the margin of the Protected Area at Arrival Heights Special Site of Special Scientific interest (SSSI) in 1991/2 summer, causing some initial angst for researchers and their experiments; And an article about Bratina island (part1) backgrounding this biologically rich island that "undergoes extensive summer melting", located NW of McMurdo Ice Shelf.

According to the Constitution the NZAS can include up to 15 Life Members, and at the moment we have 11. There are deserving people out there within our membership – so please do nominate them to the executive and council for consideration to be awarded a Life Membership at the National AGM or at a Special AGM. Detailed proposals can be sent to the National Secretary - email: secretary@antarcticsociety.org.nz, who can provide the criteria and application form(s). Similarly, there is a Conservation Trophy (last awarded to Lizzie Meek) that can be awarded annually at the National AGM or at a Special AGM.

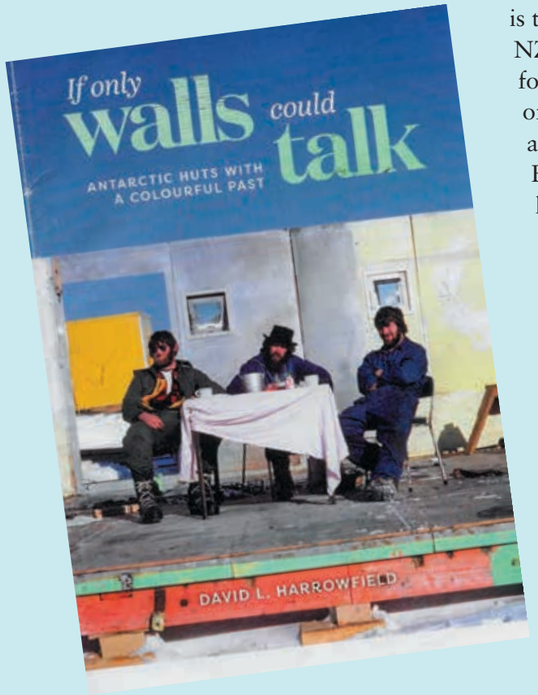
Nga mihi nui.

By **Linda Kestle, President,** *NZ Antarctic Society*

Antarctic huts with a colourful past

The title for this new book seems appropriate for the author's third article and second book focused on the quiet New Zealand coastal town of Oamaru, New Zealand. Oamaru has a significant link with Antarctica and the arrival of the Terra Nova of Scott's British Antarctic Expedition (1910-13). This was commemorated in 2013 with extensive well patronised events in Oamaru.

In 2010 through the generosity of Antarctica New Zealand, a reject wannigan from Scott Base was donated to the Oamaru Whitestone Civic Trust. This was followed by a much smaller hut that was formerly a Bus Stop at Scott Base. A brief background to these huts was in Antarctic Vol.31(4) 2013 page 56.



In his new book, the author has after 12 years careful research and the assistance of many expeditioners, traced the history of both huts. These were 'inextricably interwoven with changes that have taken place at Scott Base' and became part of the overall history of New Zealand's presence in the Ross Sea region.

Over the decades, small huts used at Scott Base and in field programmes have served science parties well. The larger of the two huts was used for accommodation, storage, recreation and when part of a major drilling programme, spent four winters on the continent at Butter Point and two further localities. Although well maintained, eventually both huts were surplus to the Antarctic programme.

Unlike the well documented Hillary TAE/IGY Hut preserved by the Antarctic Heritage Trust at Scott Base, documenting The Swamp and the Bus Stop was difficult. From the outset the main challenge was trying to unravel and record an accurate history. Some expeditioners familiar with the huts were sadly no longer with us and others were unable to be located.

In this book, origin, naming and movement of The Swamp about and beyond Scott Base is traced. Lou Sanson NZAM QSM who followed in the footsteps of his father, Trevor, a technician at Scott Base (1964-65), has kindly contributed a Foreword. In the opening pages reference is made to Lou staying in The Swamp during his first visit to Scott Base.

The early use of the hangar built for the RNZAF Flight post TAE operations, had early accommodation for scientists and the first New Zealand Antarctic Society 'hut caretakers' at Cape Royds. Here field work was also undertaken and the later placement of The Swamp as a bunkroom in the hangar is outlined. Many expeditioners have fond memories of nights spent in The Swamp. It was initially unheated, dark, without a window, had nine steel bunks and outside, the wannigan the hangar floor was of steel matting.

The 146 page book has a prologue followed by nine chapters with science events, a selection of stories, an epilogue with reference to the proposed new Scott Base, two chronologies, endnotes, a reference list, index, concluding memoir and 60 images including eight pages in colour.

While in Oamaru the huts received a variety of visitors from around the world. Included there was Beca Wilson, great-great niece of Dr Edward Wilson of Captain R.F. Scott's Discovery and Terra Nova expeditions, Michael Tarver FRGS, Vice President of the Captain Scott Society Cardiff, Antarctic expeditioners, school parties and Otago University tourism students.

In 2019 the author returned to Christchurch leaving the two huts in the care of Bill Nye of Adventure Books in Oamaru. Later that year a new venture, the Husky Base Camp, was then scheduled to be established at Templeton, Christchurch. Bill now saw the huts as having potential as part of a new Antarctic visitor amenity with husky dogs, Adventure Books and artefacts exhibited in a new setting. This did not eventuate and no one could predict the outcome to businesses globally that resulted from the corona virus.

An ideal location for Adventure Books was then found at the Christchurch Arts Centre and the huts remained at Templeton. With help from Oamaru resident David Wilson, who is passionate about the town and its Antarctic association and contractors Fulton Hogan Ltd, the huts will be returned to Oamaru. It is hoped they will be repositioned on the same site as before.

Although the true history of The Swamp will in all probability never be known, the author hopes this new publication will enhance the existing record of Scott Base. Already consideration is being given to protection of the two remaining IGY huts. Within a few years a new Scott Base will be occupied and this will lead to further books on New Zealand in the Antarctic.

By **David L. Harrowfield**

If Only Walls Could Talk *is a limited edition and was printed by the award-winning Caxton Press Christchurch. It will soon be available from the author at dh.adelie@gmail.com and from selected retailers*

ANTARCTIC TIDES

Polar twilight reveals a tidal crack in the sea ice near Mawson Station on the East Antarctic coast, with tabular icebergs in the distance stuck fast for winter. Cracks form and close up as the inelastic sea ice moves with the rise and fall of the tide.

The tidal range around much of the Antarctic coast is less than one metre, though there are locations where this is exceeded. In the ocean cavity beneath the southern Ross Ice Shelf, two metre tides have been recorded. In the grounding zone of the ice shelf, the ice bends to accommodate these vertical tidal motions, generating longitudinal and shear stresses. In 1912, on the Ross Ice Shelf near the base of the Queen Maud Mountains, Amundsen heard noises that "sounded like scattered infantry fire" as the tide slowly lifted and lowered the massive floating platform beneath them.

The largest tidal range in Antarctica occurs at the southern extremity of the Weddell Sea, beneath the Ronne Ice Shelf. Narrow inlets and local bathymetry act as funnels, amplifying tidal forces. Where the Rutford Ice Stream flows onto the ice shelf, the range at spring tide exceeds seven metres.

Ocean tides are known to greatly affect the horizontal flow of both ice shelves and adjoining ice streams, even far upstream of grounding lines.

Photo: Troy Henderson