

SPECIAL FEATURE: POSTER OF EMPEROR PENGUINS ENCLOSED

THE PUBLICATION OF THE NEW ZEALAND ANTARCTIC SOCIETY

# ANTARCTIC

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## EMPEROR PENGUINS

- on thin ice

Mid-winter  
medevac

The dog  
abandoned at  
the South Pole

Iceberg A68  
- odyssey of a giant

Arnold Spencer-Smith  
& the darkroom at  
Cape Evans



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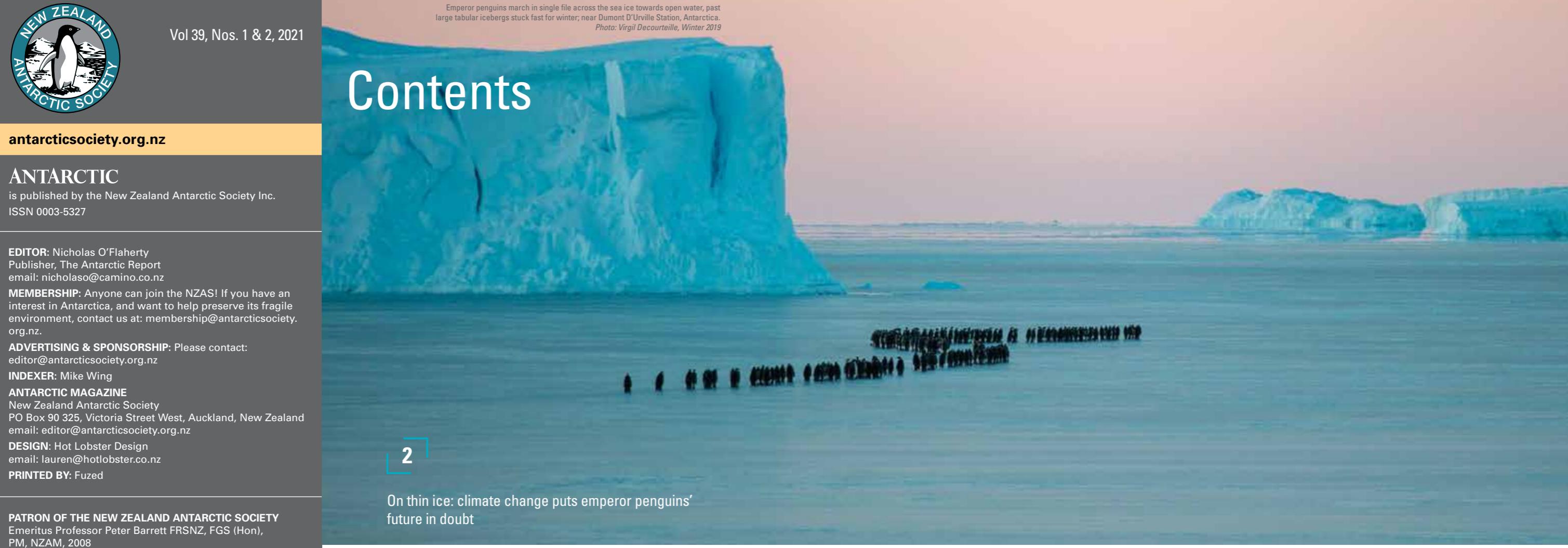
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Cover photo: First chick! Hatching commences at the emperor penguin colony near Dumont D'Urville Station. Photo: Virgil Decourteille, July 2019

# Contents



2

On thin ice: climate change puts emperor penguins' future in doubt



Where ice meets ocean at Cape Crozier: Wāhanga

28



Iceberg A68 - odyssey of a giant



The dog abandoned at the South Pole

35



Arnold Spencer-Smith and the darkroom in the Cape Evans Hut



The future of Scott Base

21



Mid-winter medevac

26

- 7 Photographic contributors
- 9 How to take great photos in Antarctica
- 10 The curious case of the emperors' eggs
- 11 Return to Cape Crozier
- 15 Ralph the mummified penguin
- 17 Antarctic students
- 24 Twenty years building in the harsh Antarctic environment
- 30 The wreck on Possession Island
- 32 The challenges and rewards of drilling in Antarctica
- 34 Shackleton's Ross Sea Party 1914-17
- 38 Ghostly images from the past
- 39 Obituary: Alec McFerran
- 40 Book reviews
- 42 Obituary: Bob Norman
- 43 Message from NZAS President
- 44 Rutherford Ridge
- 45 Become an NZAS member
- Back cover:** Erebus Glacier



Seven week old chicks at the Auster emperor penguin colony. At this age they are still relatively small, but with a good cover of down they become more independent, beginning to form creches. The Auster colony is located 10km offshore, 45km north-east of Mawson Station. Icebergs grounded on a shallow bank hold the sea ice together, providing wind shelter to 12,000 breeding pairs.  
Photo: Kim de Laive, September 2019

## On Thin Ice: Climate Change Puts Emperor Penguins' Future in Doubt

*Despite new research revealing the population of the world's largest penguin is larger than previously thought, concerns are mounting for their survival as the planet warms.*

They are a unique bird that has adapted remarkably well to living and breeding in some of the coldest, harshest conditions on the planet. But now there are fears emperor penguins may not be able to survive their toughest challenge: the impact of climate change.

The largest of the 18 penguin species, emperor penguins (*Aptenodytes forsteri*) grow to 1.2m tall and can weigh up to 40kg. They live for 20, and even up to 40 years.

They are the only animal that breeds during the Antarctic winter, a feat made possible because

they have evolved several special physical characteristics that enable them to survive the continent's sub -40°C temperatures and 200km/h winds.

Their size means they are uniquely equipped with the energy-giving body fat they need to survive over winter, and they have unique nasal chambers designed to recycle much of the heat an animal usually loses when it exhales.

Because their arteries and veins are close together, emperors can effectively 'recycle' their own body heat. Their blood is pre-cooled as it is pumped to

their feet, wings and bill, and then warmed again on the way back to the heart.

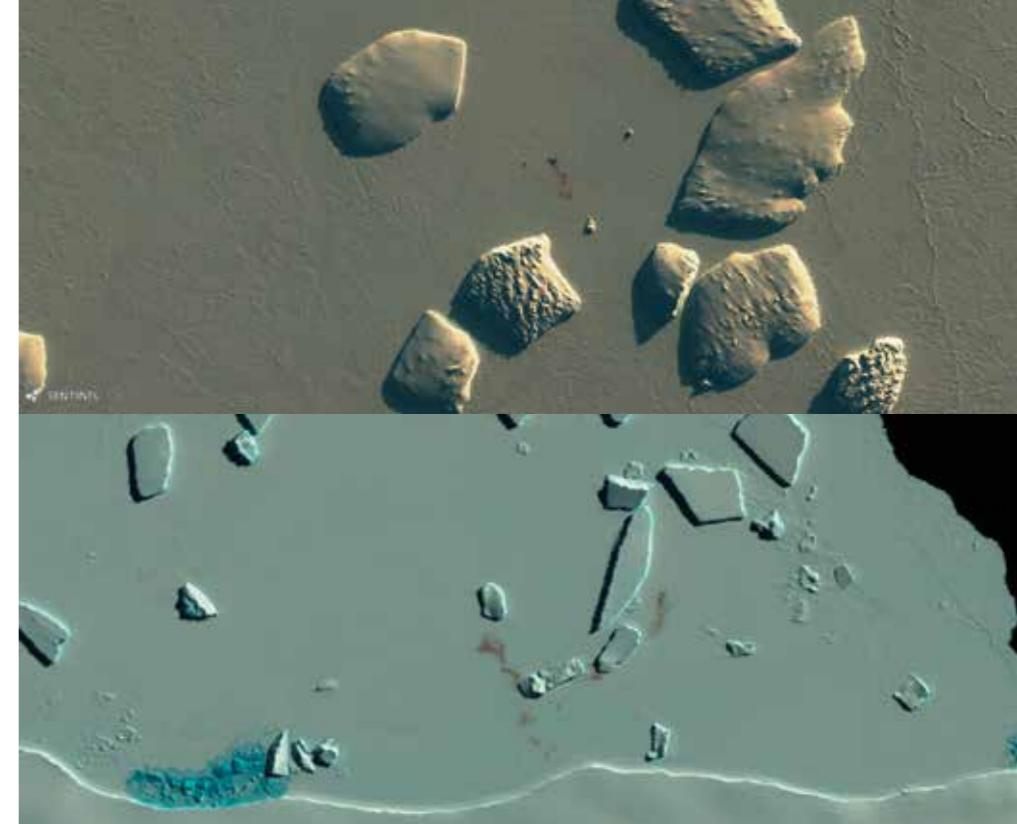
Emperors have relatively small bills and flippers in proportion to their overall size, another trait that helps them conserve heat. With several layers of scale-like feathers, they are able to remain unruffled in winds up to about 110km/h.

They have special fats in their feet to prevent them from freezing, along with strong claws to allow them to grip the ice as they walk.

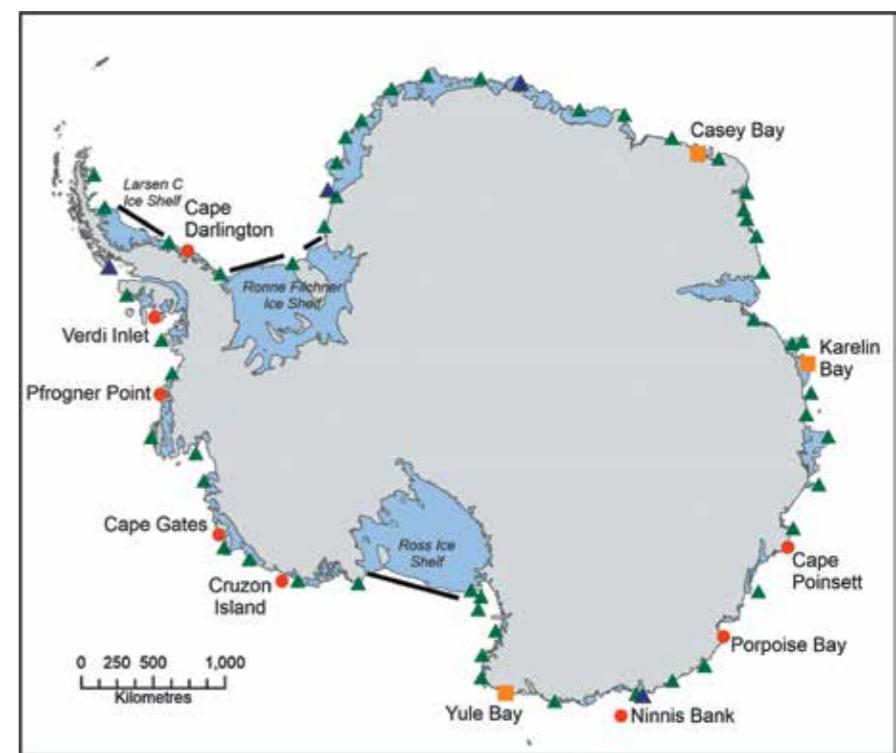
As well as these physical characteristics, emperors have developed special social behaviours to tackle the extreme cold. They huddle together in tight packs – including while incubating their eggs over winter – cutting their heat loss by about half. They also minimise their travel and movement during the coldest months, in order to minimize the energy they need to burn over winter.

The species return annually to breed at dozens of colonies spaced out around the Antarctic circumference, most located on stable land-fast sea ice. They arrive at the breeding sites in late March or April, and lay eggs from May to June. Only the male emperors incubate the eggs, which hatch after 65 days, at which point both parents nurture the chicks, who fledge from December to January.

In February to March, adults haul out to moult, travelling up to 1200km to areas of persistent pack ice where they



Guano stains on the sea ice indicate newly discovered emperor penguin colonies at Ninnis Bank (top) and Cape Gates (bottom). The higher resolution and more efficient search mechanism of the Sentinel-2 satellite imagery enabled the discovery of eight previously unknown colonies from 2016 to 2019. It's possible more colonies await discovery.  
Source: Copernicus Sentinel-2 satellite, European Space Agency



Newly discovered (red circles) and re-discovered colonies (orange squares) found using Sentinel-2, in relation to previously known colony locations (green triangles). The dark blue triangles are sites thought to be no longer extant.  
Source: Fretwell, P. T., & Trathan, P. N. (2020). Discovery of new colonies by Sentinel2 reveals good and bad news for emperor penguins.

remain for several weeks before returning to the breeding colonies to repeat the annual cycle.

### THE THREAT OF CLIMATE CHANGE

The International Union for Conservation of Nature lists emperor penguins as "near threatened" with extinction, and scientists expect the population of around 600,000 to undergo a "moderately rapid" decline over the next three generations as a result of climate change

The huddle! Emperor penguins near Dumont D'Urville Station form tightly-packed groups to conserve heat, and shelter from the intense frigid winds. The penguins are most likely to start huddling when the temperature with windchill decreases below  $-45^{\circ}\text{C}$ . Those on the windward edge feel the cold more than those in the centre and downwind. One by one they peel off, shuffling with egg on feet, around the flanks to join again on the downwind side. After following one another in a continuous procession, they pass through the warm centre, eventually returning back to the windward edge.

Due to this constant circulation, the huddle can take on the appearance of a single living

entity, gradually moving downwind and shifting position by as much as 200m during a sustained blizzard. Huddling cuts heat loss by as much as 50%, enabling the male penguins to survive the long incubation fast. Temperatures inside a huddle can be as high as  $+24^{\circ}\text{C}$ , and the warmer the penguins are, the longer their fat lasts.

Located on the East Antarctic coast, Dumont D'Urville Station is one of the windiest places on Earth with winds sometimes exceeding 200 km/h. The emperor colony faces blizzards fuelled by katabatic winds which descend from the polar plateau, intensifying the cold.



Photo: Virgil Decourteille, Winter 2019

impacting Antarctica.

While they have proven resilient to the continent's extreme cold, emperors risk losing much of the stable land-fast sea ice they rely on for breeding, feeding, and moulting as temperatures rise.

"The reason it's important to have a thick, stable platform of sea ice is that the chicks that are raised during the breeding season in winter, they have this downy plumage, but they need to acquire waterproof plumage to be able to survive at sea in the cold water," Stephanie Jenouvrier, a seabird ecologist at Woods Hole Oceanographic Institute, explained in a recent interview.

"So if the sea ice breaks up too early in the season, they will not have acquired this waterproof plumage, and then they will drown and die in the Antarctic water, so it will be a complete breeding failure."

Jenouvrier was involved in a study that found emperor penguins may be able to survive as a species if global temperature rises can be kept down to 1.5-2°C above pre-industrial levels. But if climate change continues at its present, much faster rate, by 2100, more than 80 percent of the species' colonies are predicted to become "quasi-extinct" – a situation where the number of adult birds is not sufficient to enable continued survival through breeding.

Even if global temperature rises are limited to 1.5°C, the emperor population is forecast to drop by at least 31 percent over the next three generations.

## TRACKING EMPEROR COLONIES FROM ABOVE

In a bid to better understand emperor penguins and the climate-related dangers the species is facing, scientists have been working on developing more effective ways to track their colonies.

In 2009 they realised the colonies could be identified on satellite photos from the visible guano stains the birds left on sea ice.

Recent analysis of high-resolution images taken by the European Space Agency's Sentinel-2A and Sentinel-2B satellites has enabled scientists to confirm the location of 61 emperor penguin colonies, up from 50 known active breeding sites a decade ago.

The images were studied by British Antarctic Survey researchers who said in a paper setting out their finding that the new data was both "good and bad news for emperor penguins".

Of the 11 new colonies identified, two are in the Peninsula Region, three in West Antarctica and the other six in East Antarctica.

In the paper, authors Peter Fretwell and Philip Trathan said the largest of the new colonies found was at Cape Gates.

"This colony consists of several groups of penguins and is likely to comprise many thousand pairs."

The findings have increased the known emperor population by 5 to 10 percent, meaning there could be as many as 278,500 breeding pairs.

The researchers found that over half of the birds' colonies were located on the windward side of bays, headlands, glacier tongues and ice shelves. Seven were on land-fast ice within small island archipelagos and another seven were offshore on fast ice amongst icebergs trapped by shallow shoals, while five were on semi-permanent ice creeks.

They also discovered two new breeding sites on ice shelves, and two offshore sites.

One of the new offshore colonies is near Cruzen Island, a small, isolated island 40-50 km from the Rupert Coast. The other was near Ninnis Bank, about 180km offshore.

The new sites were found in gaps between previously known colonies, reinforcing scientists' belief that emperor penguin colonies are spaced out at regular intervals around the continent, generally at least 100km apart.

## A GLOBAL WARMING 'INDICATOR SPECIES'

Peter Fretwell and Philip Trathan's reason for describing their discovery of more emperor colonies as both good news and bad was that, while it increases the known population of the bird, it does not appear to reduce the uncertainty they face to their long-term survival as a species.

The newly discovered breeding sites "are all in areas where colonies are expected to become extinct or quasi-extinct by the end of the century,"

the scientists say in their paper.

"After consideration of the distribution of the newly reported colony locations, it is evident that future climate change is likely to affect them, based on projections for nearby colonies. Our findings therefore suggest the possibility of an even greater proportion of the global population will be vulnerable to climate change, than previously considered."

The unfortunate reality for this unique species is that its survival rests on the extent of the planet's change in climate – and what humans can do about that – rather than on the bird's own ability to adapt to the changes or relocate to a new home.

If we are unable to deliver on the toughest target to come out of the Paris climate agreement – a 1.5°C

A lone emperor penguin explores the foreshore in McMurdo Sound in May, a long way from the nearest colony at Cape Crozier 70km to the east. Juvenile emperors leave the colony in December to forage at sea, completely on their own. Some have been tracked with data-archiving tags for up to 344 days, traveling 7000km and as far away as 3500km from their starting colony. Emperor penguins are three years of age or older when they first return to their colony to breed.  
Photo: Jonathan Foster



limit in global temperature rises – then the emperor penguin is headed for extinction.

As Stephanie Jenouvrier puts it, these birds are an "indicator species" as we grapple with global warming.

"[Like a] canary in the coal mine, they are warning us of the future effect of climate," she says.

"The big message is we need to listen to the penguins, and implement policies to meet the Paris agreement's objective, and we need to do that now," she says.

## Photographic Contributors

After many years dreaming of going to Antarctica, French biologist **VIRGIL DECOURTEILLE** finally got his opportunity in November 2018 when he commenced a 14 month assignment at Dumont D'Urville Station, on the East Antarctic coast. Working for the French National Centre for Scientific Research (CNRS), Virgil managed the census and monitoring program of the wildlife at the station, which included seals as well as birdlife. Dumont D'Urville Station is ideally located next to both adelie and emperor penguin colonies, and during the long winter Virgil was able to monitor the emperor penguins huddling on the sea ice. He is the photographer of three stunning images of emperor penguins that appear in this edition of Antarctic magazine, including the cover photo.

Virgil Decourteille near Dumont D'Urville Station  
Photo: Mervyn Ravitchandiran



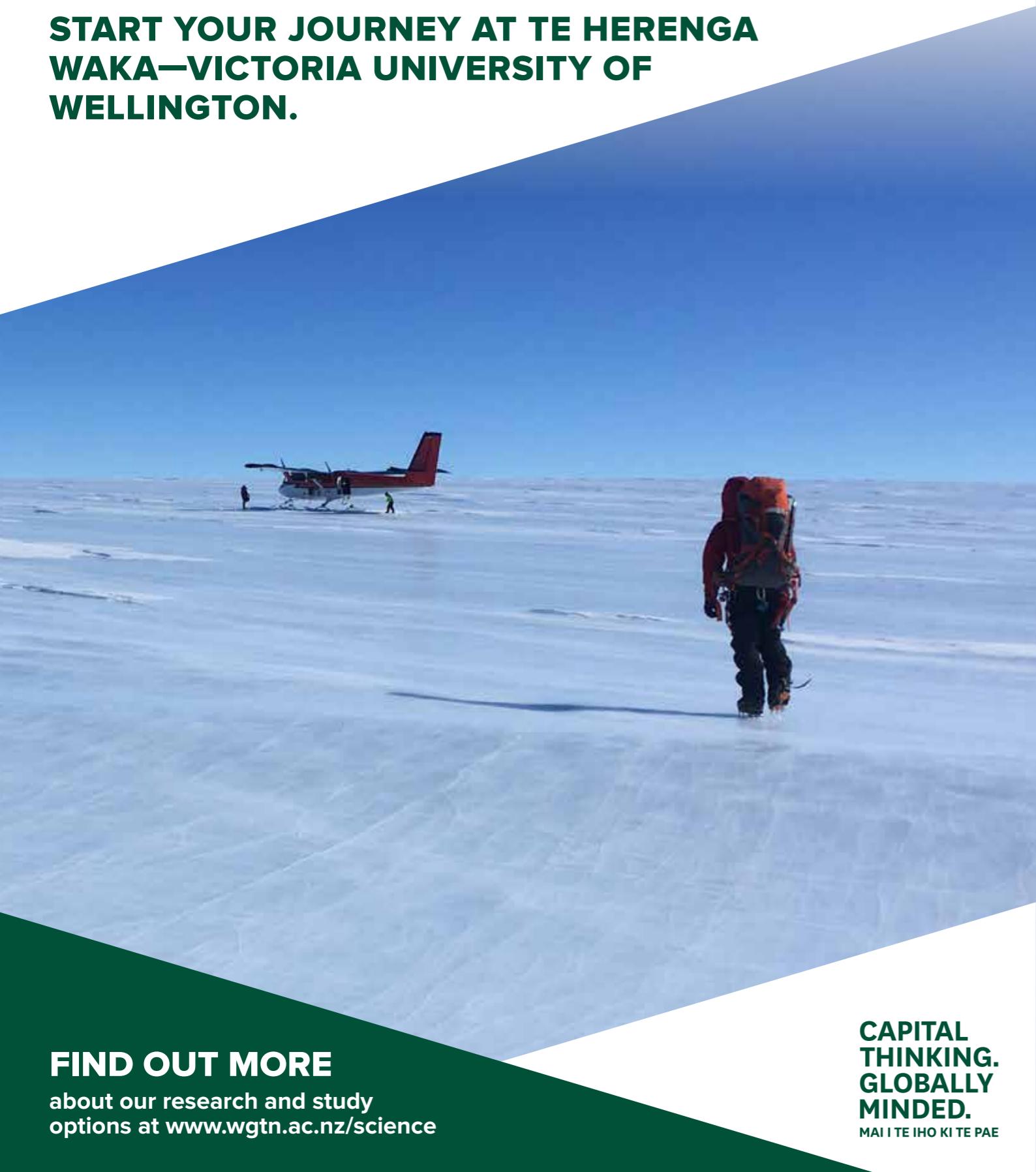
**STEFAN CHRISTMANN** has wintered-over twice in Antarctica. In 2012 he worked as a physicist at the German Antarctic Research Station Neumayer-III, operated by the Alfred Wegener Institute. The station sits atop the Ekström Ice Shelf close to Atka Bay and one of the largest emperor penguin colonies in Antarctica. Stefan's photographic portfolio sparked the interest of the BBC Natural History Unit who recruited him as part of a film team for the BBC landmark production BBC Dynasties. In that role, he returned to Atka Bay and stayed at Neumayer for 11 months during 2017. Stefan was able to capture the entire life-cycle of the emperor penguins in unprecedented detail. His photos won him the prestigious 2019 NHM Wildlife Photographer of the Year Portfolio Award. He also published a photo book in 2020 called "*Penguin – A Story of Survival*".

Stefan is the photographer of the image of two adult emperor penguins with chick and egg which appears on the poster included with this magazine. More at [www.nature-in-focus.de](http://www.nature-in-focus.de)



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## How to take great photos in Antarctica - five practical tips

Stefan Christmann is the photographer of the stunning poster image of emperor penguins included with this magazine, taken at Atka Bay in August 2017. A veteran of two winters in Antarctica, here he offers practical tips on how to take photos in the challenging environment of the icy continent.



Emperor penguins at Atka Bay  
Photo: Stefan Christmann

### 1) HOW DO YOU KEEP GEAR AND BATTERIES WARM?

- We never kept the gear warm, as ultimately the lenses, camera bodies, tripods and filters need to be exposed to the cold in order to be used. So cooling them down and keeping them cold reduces the mechanical stress induced by thermal expansion and contraction. In fact, aside from batteries and memory cards, we pretty much stored our camera gear in a somewhat cold place around 0°C all the time.
- The batteries however I would usually take out of the camera body when I was not shooting and put them in pockets close to my body, where my own bodily warmth would keep them warm as well. Even on super cold days I was then able to get a couple of hundred images more from a single charge.

### 2) HOW DO YOU WORK WITH VIEWFINDERS IN THE COLD?

- It's simple. Use an optical viewfinder whenever possible, since it will not drain your batteries. I understand that this is not possible with mirrorless cameras, which is why I believe DSLR cameras still have their place in the photography world.
- On very cold days, whenever you look through the viewfinder, simply hold your breath. Not only will you have less camera shake when your abdomen is tense, but also, any moisture from your breath could freeze on the viewfinder of your camera. And that's a pain to scrape off; you would have to take your gloves off, which is usually not fun at all.

### 3) HOW DO YOU BEST PHOTOGRAPH IN LOW LIGHT IN ANTARCTICA?

- To be honest, low light situations happen all the time in Antarctica – at least when you stay for a winter. In summer time, the sun never sets and you usually do not have to deal with high ISO speeds.
- Since most cameras nowadays are ISO-invariant, the only things affecting noise are lens-speed and integration time. Integration time (or shutter speed) is somewhat limited too if you would like to freeze action. Especially with long lenses, I would never go below 1/250th or 1/500th of a second. In such cases all you can do really is shoot at a wide open aperture, make conscious decisions about where you want to place your focus and try to use that limited depth of field in a creative way. And then shoot shoot shoot! and

take more than one single frame (especially at longer shutter speeds) – only one or two might be sharp.

- If you are shooting with wide-angle lenses, of course you can go lower with your shutter speeds. Here I would always recommend using a tripod to reduce camera shake and to more consciously compose your photographs.

### 4) HOW DO YOU BEST PHOTOGRAPH THE EMPEROR PENGUINS?

- Photographing penguins is a lot of fun and I would urge you to really observe the birds from a distance first. Then approach slowly, so that they can see you. You never want to spook the birds or cause them distress. Also stick to the rules and do not approach any closer than is allowed. Instead, use a telephoto lens – the best animal photos are those where you can clearly tell that the animal was not affected by human presence in a negative way.
- Last but not least, for most of my penguin images I was lying flat on the ground, which gives the best perspective. Also use manual exposure – on overcast days you might be able to use one exposure setting all day long. On sunny days use matrix metering as the dark or bright feathers of the emperors can easily fool your camera's metering system (for example in spot meter mode) and will hence give you a messed up exposure.

### 5) HOW DID YOU CLEAN YOUR CAMERA GEAR?

- On windy days with a lot of snowdrift, usually our camera lenses and bodies would be covered in snow after a while. Of course in these cases you do not want to warm up your camera before you have removed the snow, since moisture could otherwise damage the electronics.
- For that purpose, I usually used a standard paintbrush in order to remove snow, even in the smallest of cavities of buttons on my lenses and camera bodies. Very cold snow is also very dry and almost comes off like dust does. Only after I had brushed my gear carefully, I would slowly warm it up if it needed to come inside for a FW upgrade or overall maintenance work like sensor cleaning, etc.

By Stefan Christmann  
[www.nature-in-focus.de](http://www.nature-in-focus.de)

# The curious case of the emperors' eggs

*There was a time in the 19th Century when it was mistakenly believed that eggs could reveal evolutionary links between reptiles and birds.*

It was even postulated that the embryos of emperor penguins, thought to be one of the most primitive birds on Earth, might even show reptilian scales - if only one of these elusive eggs could be found!

The so-called ‘theory of recapitulation’ had been promoted by Ernst Haeckel in 1866, during a time of heightened interest in the evolutionary origin of birds. In 1859, Charles Darwin had written in *Origin of the Species* that “the embryos of mammals, birds, fishes and reptiles [are] closely similar, but become, when fully developed, widely dissimilar”. Two years later, the sensational discovery of fossil remains of the bird-like dinosaur Archaeopteryx further enhanced the appeal of evolution as a theory.

When Robert Falcon Scott first travelled to Antarctica leading the Discovery Expedition of 1901-1904, the ‘recapitulation’ theory still had its proponents, including zoologist Edward Wilson who accompanied Scott south. So the discovery of the first emperor penguin colony by fellow expeditioner Reginald Skelton in October 1902 greatly intrigued Wilson.

Skelton had observed the colony on the sea ice near Cape Crozier on the far eastern side of Ross Island. He had also spotted well developed chicks among the adult penguins, which could only mean one thing - that remarkably the emperors breed in the depths of the Antarctic winter, the only penguins to do so. Wilson vowed to return to the colony the following year to obtain the precious eggs.

In 1903, he set off for Cape Crozier timing his visit in September, a month earlier than Skelton’s the previous year, calculating that he would arrive before hatching. However, hatching was well under way when he got there, and so the emperor eggs continued to elude him.

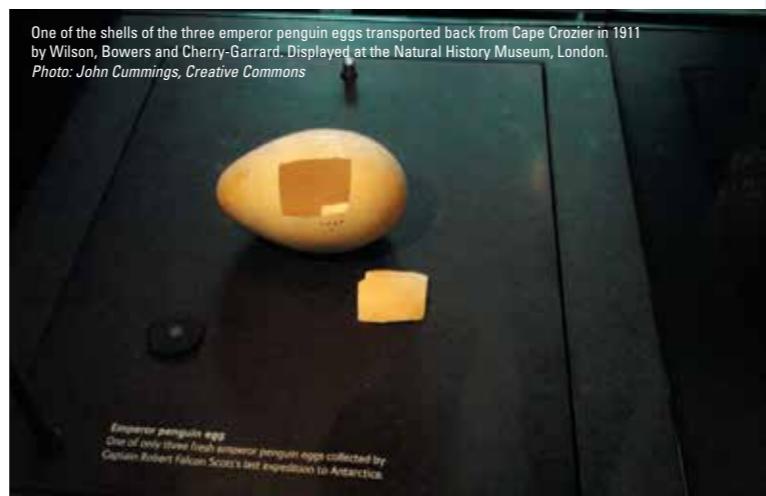


Cape Crozier at the eastern end of Ross Island. Below, sea ice abuts the front of the Ross Ice Shelf, with the emperor penguin colony lower right, first discovered in 1902.  
Photo: Sara Labrousse & Michelle LaRue; Permit ACA 2019-006



The exhausted faces of Wilson, Bowers and Cherry-Garrard at the Cape Evans Hut, having just returned from Cape Crozier.  
Photo: Herbert Ponting

In 1911, Wilson was once again back in Antarctica with Scott’s ill-fated Terra Nova Expedition. Not to be outdone by the hatching cycle of penguins, Wilson calculated an even more ambitious starting time for the Cape Crozier trip: late June, the peak of the polar winter! He convinced two other expeditioners to join him, Henry ‘Birdie’ Bowers and Apsley Cherry-Garrard, on what would become one of the epic journeys of polar exploration.



One of the shells of the three emperor penguin eggs transported back from Cape Crozier in 1911 by Wilson, Bowers and Cherry-Garrard. Displayed at the Natural History Museum, London.  
Photo: John Cummings, Creative Commons

The three men took 19 days to travel the 97km from the Cape Evans Hut to Cape Crozier. In the darkness of the polar night the temperature fell to -61°C. At Cape Crozier they built an igloo, which was almost destroyed in a blizzard. They collected five eggs (though two broke) at the emperor colony, and killed three penguins for their oil and meat.

The men came close to dying several times in the five weeks they were away. At one stage, they lost their tent, without which they would have perished. It was miraculously found half a mile away. When

they arrived back exhausted at Cape Evans on 1 August, Scott remarked that it seemed like ‘the worst journey in the world’, words that Cherry-Garrard later took for the title of his book. In the Cape Evans Hut, Wilson cut little windows in each shell of the three intact eggs to extract the embryos which he later pickled to preserve them. No reptilian scales were to be found.

Tragically the following year, both Wilson and Bowers died with Scott on their return from the South Pole. Later back in England, Cherry-Garrard presented the hard won egg shells to a seemingly indifferent Natural History Museum. Humiliatingly, he was kept waiting in the corridor, while a curator’s assistant muttered “What do you want? This ain’t an egg-shop”. In 1934, anatomist Charles Parsons declared dismissively that the eggs obtained at Cape Crozier “have not contributed much to the understanding of the embryology of penguins”.

Despite the tepid reaction from the scientific community of the time, today the egg shells attract considerable interest at the Natural History Museum, where one is now on permanent display – a testament to the public’s continued fascination and respect for one of the truly gripping episodes in the Heroic Age of polar exploration.

Photo (below): Up close with the emperors, on the sea ice at Cape Crozier.  
Photo: Alison Ballance



of where and how emperor penguins forage from Cape Crozier. Covid scuppered plans for 2020 and 2021, but the scientists are hopeful they can return in 2022.

The fieldwork is part of the Ross Sea Region Research and Monitoring Programme (Ross-RAMP) which evaluates the effectiveness of the Ross Sea Marine Protected Area. It’s funded by the Ministry of Business, Innovation and Employment (MBIE) and run by NIWA. The MPA, originally championed by New Zealand and the United States, will cease in 2052, and proof of the effectiveness of the MPA is needed for it to continue beyond this 35 year period.



The Cape Crozier emperor penguin colony from the air. The sea ice in long embayments at the front of the Ross Ice Shelf is an ideal platform for the colony, with the ice cliffs providing shelter from the wind.  
Photo: Sara Labrousse & Michelle LaRue; Permit ACA 2019-006

# Where ice meets ocean at Cape Crozier: Wāhanga

Ocean, land, atmosphere and two kinds of ice all converge at Cape Crozier, the easternmost point of Ross Island.

*“It’s a connecting place - or wāhanga in te reo Māori.”*

The Cape itself is named after the remarkable navigator Francis Crozier, one of the most experienced polar explorers of all time. A bit of history: Crozier skippered HMS Terror into the Ross Sea with James Clark Ross and, with the same ship, was eventually lost on John Franklin's infamous voyage in search of the Northwest Passage.

The first kind of ice in the wāhanga is the freshwater ice of the giant Ross Ice Shelf. This ice is formed by snow accumulating on the polar plateau over millennia. It flows in giant glaciers to create a massive shelf of freshwater ice many hundreds of metres thick. The land-ice shelf connection is important because it acts as a pinning point, holding back the largest ice shelf on the planet. If Ross Island were to suddenly

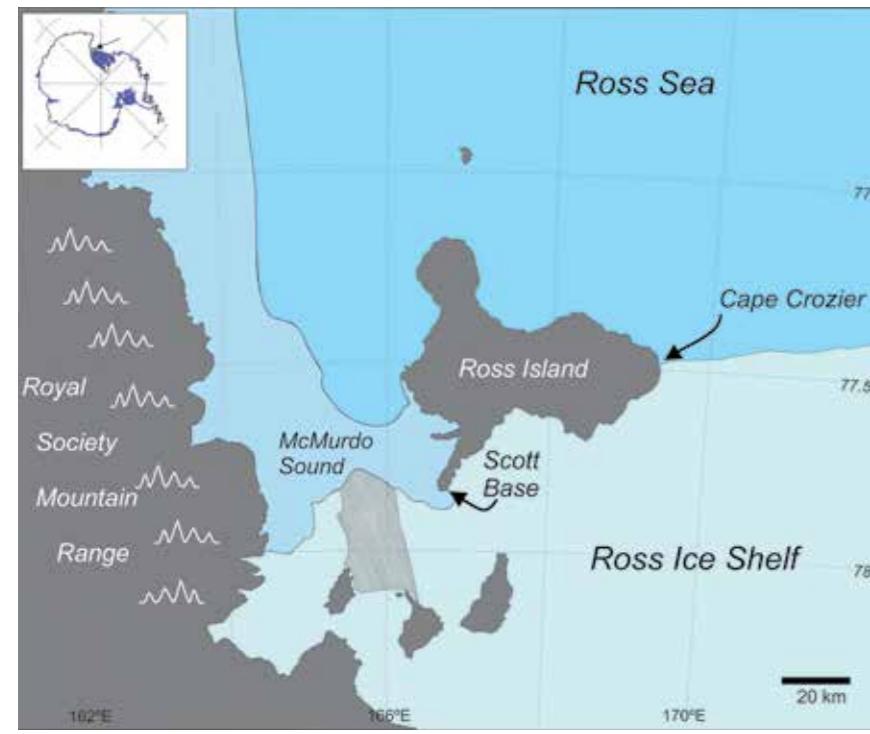


Looking east past Mt Terror on Ross Island towards the Ross Ice Shelf front beyond.  
Photo: Craig Stevens/K132/NIWA

vanish, ice would flow much faster into the ocean and increase the rate of sea level rise significantly.

The ocean in this area is remarkable. Despite being very far south and inundated with very cold and very fast winds, it tends to be ice free: this situation is described by the Russian term ‘polynya’ (pronounced po-lin-yah). It occurs because the wind blowing off the ice shelf is so strong that it rapidly blows any newly forming ice away – acting as a sea ice factory that disperses the ice elsewhere.

The Ross Sea holds the second type of ice in this wāhanga – sea ice, or the frozen skin of the ocean. This ice starts out as salty seawater, but the salt is expelled as it freezes. Sea ice in the region is produced in the Ross Sea polynya described above – which is thought to be the largest sea ice factory in the world. It helps fill the region with new sea ice at the same time as creating cold salty seawater. The latter then falls



Map showing where the Ross Ice Shelf abuts Ross Island. Credit: NIWA

to the sea floor to commence its thousand-year journey through the planet’s oceans.

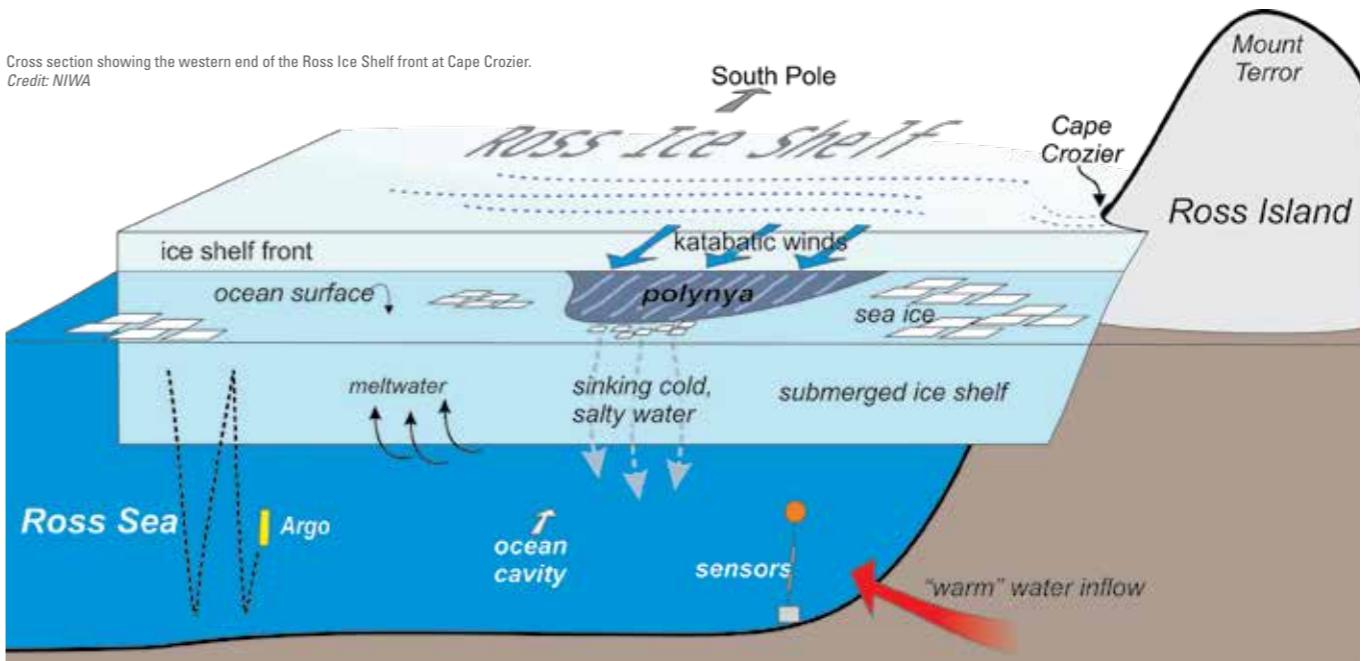
The region around Cape Crozier proves to be a location where we think relatively warm ocean water is able to flow from the open ocean and penetrate into the Ross Ice Shelf Cavity. This warm water then circulates beneath the ice and melts and thins the ice shelf in a critical location.

At a glance, the Cape Crozier wāhanga looks impervious and permanent because it is so massive, but it is a system in a delicate balance with the occasional massive change. For example, in 2002 the massive C19 – the fifth largest iceberg seen in the 40-odd years we’ve had satellite detection – broke away from the Ross Ice Shelf adjacent to Cape Crozier. At 200 km in length, C19 helped contain sea ice that would normally get flushed away. This significantly disrupted the nutrient cycle in the region. Phytoplankton populations reduced followed by drops in silverfish and krill. This in turn impacted larger species like penguins that feed on these intermediate species.

There’s a natural bias to acquiring data in summer due to easier access. But just as much is going on in winter, which is why researchers tend to deploy instruments that record continuously, capturing temperature and salinity data all year round.

Even in summer, Cape Crozier is not an easy place to get to. It is possible to get near the front of the ice shelf from the ice side and the 2010 Coulman High expedition managed to install a set of oceanographic instruments that monitored the ocean for the next four years. On the ocean side it is sometimes possible to piggyback on the fisheries

Cross section showing the western end of the Ross Ice Shelf front at Cape Crozier.  
Credit: NIWA



survey vessels that regularly ply these waters and deploy instruments this way. A trial suite of instruments just off Cape

Crozier is currently collecting data that we look forward to extracting in the summer of early 2022.

The deployment of Argo drifting robotic floats in these coastal waters is a recent development helping us to learn more about the environment. These robots can control the depth they float at and move up and down measuring temperature, salinity and average currents. Once deployed, they stay in the region taking measurements for many years. Every now and then they pop to the surface and relay their data back via satellite. Of course, this isn’t always as easy as it sounds – if the robots drift beneath sea ice they are unable to transmit to the satellite. The drifters are patient though and by waiting until they drift free of the ice the data eventually gets through.

These instrument deployments are the start of a multi-year experiment called RISIPE (Ross Ice Shelf Integrated Polynya Experiment) as part of the Antarctic Science Platform. We are looking to measure the creation of cold salty water, new sea ice and the evolution of the base of the food chain in this remarkable environment.

*By Assoc. Prof. Craig Stevens, NIWA/University of Auckland; Dr Natalie Robinson, NIWA; Dr Craig Stewart, NIWA*

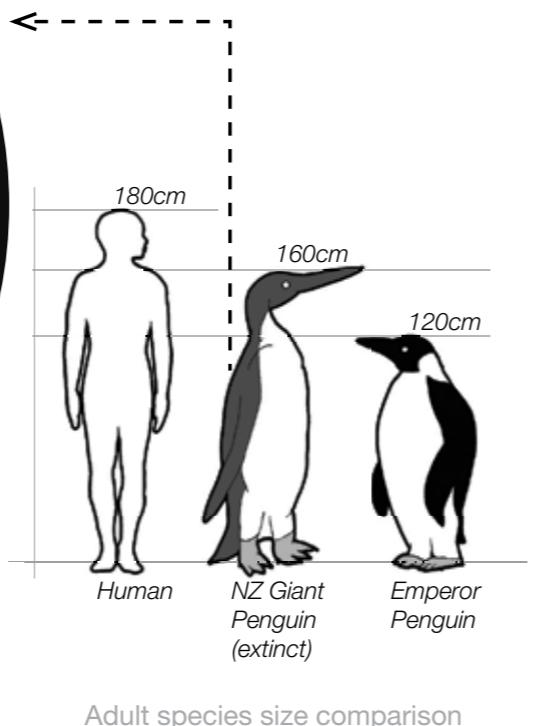


Deploying NIWA instruments from San Aotea II.  
Photo: Sanford

# 35 million years ago, New Zealand had a penguin larger than the emperor penguin



Fossil from the extinct Eocene New Zealand giant penguin, *Pachydyptes ponderosus*, from Oamaru



## National Paleontological Collection

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Fossil leaf from Windy Nunatak, Antarctica



Southern Ocean  
radiolarian microfossil  
(*Cycladophora bicornis*)

## Ralph the mummified penguin

The Rafter Radiocarbon Laboratory at GNS Science currently has an important visitor – Ralph the penguin, on loan from Te Herenga Waka – Victoria University of Wellington's Te Puna Pātiorio – Antarctic Research Centre, in hopes of finding out how old Ralph is. See, Ralph is a mummified juvenile Adélie penguin (*Pygoscelis adeliae*) that

has a storied past. He was found in the Miers Valley in the Dry Valleys of Antarctica, 35 km from open water and 450 m above sea level, by Victoria University lecturer Ralph Wheeler in 1960. He's one of many mummified penguins and seals that have been found in the Ross Sea region that are thought to become lost and disorientated and smelling water in the Dry Valleys, start a long journey in the wrong direction to eventually die of starvation.

The cold, dry climate in Antarctica facilitates the preservation of the animals as it is too cold for bacteria or fungi to break down the organic matter. Instead, the bodies eventually mummify and only break down due to physical erosion from wind and sand. Ralph was sheltered from these harsh conditions and as a result is relatively well-preserved and is only missing a few feathers and the colouration in his feathers.

After a few lost decades, Ralph the penguin was rediscovered in 2007 in a cupboard at Victoria University. Ralph was sent to a local artist to be installed into his current display box home. He has been taken to outreach events for kids ever since.

But one question still remains – actually how old is Ralph? Previous studies of mummified penguins and seals from all over Antarctica have been radiocarbon dated from as old as 40,000 years to just 100 years old. Radiocarbon dating



The team that found Ralph on their 67-day geological mapping expedition (VUWAE 3), pictured here in the Victoria Valley, Antarctica, in the summer of 1959-60. From left to right: Tony Allen, Graham Gibson, Ralph Wheeler, Ron Balham and Ian Willis.

is a method of measuring the age of organic material. All living things exchange carbon with the atmosphere, but when they die this exchange stops; so, the naturally present radiocarbon ( $^{14}\text{C}$ ) starts to decay away. By measuring the amount of remaining  $^{14}\text{C}$  atoms, we know how long ago something died.



Ralph in his display box at the Antarctic Research Centre, Victoria University of Wellington.  
Photo: Jeff Brass, GNS Science

To do this, the Rafter Radiocarbon team carefully sampled Ralph's feathers. These feathers will be chemically treated to remove any contaminants, combusted to  $\text{CO}_2$ , then converted into graphite, which can then be measured in the Accelerator Mass Spectrometer to measure the  $^{14}\text{C}$  atoms. Only then, we will finally know when Ralph met his unfortunate fate.

By Nikita Turton, GNS Science

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Southern right whale or tohorā in Port Ross, Auckland Islands Maungatukua  
Credit: University of Auckland Tohorā Research Team 2009, taken under Department of Conservation Permit

## Understanding the ecology of **southern right whales, or tohorā**, around the sub-Antarctic islands

Institute of Marine Sciences and School of Biological Sciences masters student at the University of Auckland, Annabelle Cranswick has received a scholarship for research investigating the diet and foraging ecology of southern right whales or tohorā, in the ocean around New Zealand, including the sub-Antarctic islands. The New Zealand Post Antarctic Scholarship, worth up to \$10,000, will support Annabelle's studies on where tohorā feed and what they feed on and if this has changed over time. She will use whale skin samples or biopsies from more than 1000 whales that make up a dataset

collected over the past thirty years. Annabelle Cranswick says, "We're pretty sure the data is the richest dataset of its type in the world, with samples from all demographics, cows, calves, male and female sub-adults and adults,"

Annabelle's work is supervised by Rutherford Discovery Fellow Dr Emma Carroll and Associate Professor Rochelle Constantine from the University of Auckland. "Annabelle's research forms a key pillar of our project that will assess the relationship between recovery from whaling, foraging ecology and climate change in the tohorā", says Dr Emma Carroll.

## 'The Ross Ice Shelf seemed endless, **all you could see for miles was white and blue'**

**ALANNA ALEVROPOULOS-BORRILL** is a PhD student at the Antarctic Research Centre, Victoria University of Wellington. She's exploring the response of the Antarctic Ice Sheet to ocean forced melting. Alanna uses an advanced computer model that represents ice flow, performing experiments with varied patterns of melting beneath Antarctica's floating ice shelves. She's investigating how this affects the overall health of the ice sheet.

"Numerical modelling of ice flow has its challenges, a lot of which are to do with the way we represent the physics and properties of the ice," says Alanna

"There is a lot that we are not able to measure, such as how much friction there is at the base of the ice. We also have to make a number of assumptions and approximations in order to appropriately capture observed ice flow in our

models. As a result, there are always things to be improved!"

Alanna has already done fieldwork in Antarctica, studying the seasonal changes in the velocity of the Ross Ice Shelf.

"Going to Antarctica was a dream come true, it is absolutely breath taking. We flew out to our field sites and the Ross Ice Shelf seemed endless, all you could see for miles was white and blue. For over three years I'd been looking at maps of the ice on my small computer screen which really doesn't do the scale any justice," says Alanna.





The 1959 winter-over team with dog at the Amundsen-Scott South Pole Station.  
Photo: Fred Mayeda (Special thanks to Bill Spindler for supplying this photo and further background information for this article)

## The dog abandoned at the South Pole

A recent issue of “Antarctic” (1) included an article describing the fate of Fuchs’ TAE dogs. Reference is made to the mystery of Beauty – the dog which spent two unscheduled winters at the South Pole in 1958 and 1959.

Both Arthur Jorgensen and Paul Dalrymple were IGY scientists at the Pole during the 1958 winter. In his personal memoir (2) Jorgensen wrote “... January 26th, the last ski plane took off not to return until October. Along with the last of our summer visitors, the TAE sled dogs were loaded aboard with the exception of one that avoided capture and for days he roamed around outside living off our garbage dumpsite. He was finally coerced to come inside by Paul Dalrymple who adopted and named him Beauty (which he wasn’t). Beauty spent most of his time under Paul’s desk and always in his company not trusting anyone else.”

Jorgenson thought the dog was a male. However, when interviewed in 1999 (3), Paul

Dalrymple remembered, “... when Fuchs came in to the South Pole, he had two dog teams. And the dogs were flown out because they were spent. ... Fuchs’ dogs all came from Greenland outside of one dog, and that dog was given to Fuchs by the London Zoo. And that dog was flighty. When they took the dogs off the line to put on the plane, the dog escaped. So they couldn’t catch the dog.

“So the Navy doctor ... issued an order, we’re going to shoot that dog. We already had one dog. In fact, I’d taken the other dog up there as a puppy. So the Navy started chasing this dog with a Weasel trying to shoot the dog. They never could. And then the temperature got cold at the South Pole ... And the revolver wouldn’t go off!

“We had an emergency hut up there and the dog would go in there. ... Then I started stealing food from the camp, and I would take out half a dozen hot dogs and give it to this stray dog. ... and it got so (it) was friendly with me, and eventually I could put a line on (it) and could walk around

with the dog.

“So, I finally told the people at the camp, “Hey. I can bring the dog in here, but you’re not going to kill that dog.” So, it was agreed that no one would kill the dog. I brought the dog in and tied the dog up in the passageway at night-time. I didn’t bring the dog into the buildings. I went out next morning and someone had taken a fire ax trying to kill the dog, and they severed the rope right by the dog’s neck. I got up that night at dinner, and I was furious. I gave a big speech. I was really raising hell.

“So after that I brought the dog in. The dog was with me all the time. The dog went to bed with me, the dog went to work with me. When I slept, that dog was awake. I’d wake up in the night, and that dog would be looking at me with her tongue hanging out. The only time that dog slept was when I was working.

I sent a telegram to Fuchs: “Can I bring Beauty back? ” and Fuchs said, “Go ahead. The dog is yours.” So, when it came time to come home, I got some cortisone pills and forced them down Beauty’s throat to quieten her down. When I went out to the airplane with the dog, a P2V, the pilot said, “What are you doing?” I said, “I’m taking this dog home with me.” And he said, “The hell you are. There’s only one dog on this plane and that’s my dog.” He had a German shepherd aboard. ... So that dog wintered over for a second year.”

Dalrymple’s account suggests the dog was female; records from Fuchs’ expedition show that they had a female husky named Beauty from London’s Whipsnade Zoo.(4)

I wrote to Paul Dalrymple for confirmation and to ask him about the dog on board the P2V. He confirmed that Beauty was definitely a female and added that the P2V was flown by Lt Buz Dryfoose. (5)

Given the strict rules of the NZ Agriculture authorities, I felt that the story of the dog in his plane was scarcely believable and so I contacted Buz Dryfoose. He replied that the dog was “Utz, a German shepherd border, trained and raised in Garmisch, Germany” (6). Buz took him on every flight that he made down to and on the Ice during the 1958-59 season. The NZ Agriculture officers

were kept happy by confining Utz to the aircraft (except for comfort stops) whenever Buz and Utz were in New Zealand.

A dog appears (apparently quite comfortable in human company) in the photograph of the 1959 Winter Pole Station personnel (7), but there is nothing written to identify the dog as Beauty. The mystery of Beauty’s fate remained.

Nevertheless, in the year 2000, an article appeared in “Antarctic” entitled “The Hound of Scott Base”, written by Jim Lennox-King, who had been Scott Base Leader 1959-60. According to Jim, a dog called Beauty, reputed to have survived outside at the Pole during the 1959 winter, arrived at Scott Base in January 1960 (slung under a helicopter). However, the dog was a male, and so Jim renamed him Beau and then attempted to befriend him. After he slipped his collar and roamed free during the winter



darkness, Jim felt obliged to shoot him (8). Jim’s memory was faulty. The 1960 Dog Report prepared by wintering-over surveyor Garth Matterson repeats the story of Beau having been left behind at the Pole by Fuchs. However, his report makes it clear that Beau was still there at the end of September 1960 and he was later a member of Matterson’s team when they went into the field during the 1960/61 season.(9) The myth of Beau being an ex-TAE dog was again repeated in Wally Herbert’s 1961 Dog Report. He was still present but remained behind at Base for

the 1961/62 summer.<sup>(10)</sup>

Kevin Pain was the dog handler who looked after him during the 1962 winter, and when I arrived in October 1962, Kevin told me the same story which, of course, I believed. (11) Why not? Beau was by then showing his age, but Kevin felt that, with all his supposed experience, he would be useful as a lead-dog introducing the pups to the discipline of sledging.

We now know that his experience was limited and that his poor performance as a leader was not due to assumed deafness and failing eyesight. Time and arthritis caught up with him and in January 1963, he was reluctantly put down. To preserve the myth, his name was passed on to a black pup which had just been born.<sup>(12)</sup>

But, if Beau was not the dog left behind by Fuchs, what was his history? We may never know for sure, but I suspect that he was probably one of the American rescue dogs brought south in 1956 and may even have been one of the un-named dogs taken by air to the South Pole when the station was being constructed in 1957. Once they were no longer needed as rescue dogs, some spent time as pets on outlying IGY bases and were later returned to McMurdo. He was quite different in appearance to the "Eskimo" derived New Zealand dogs. Beau must have felt welcomed at Scott Base as, within days of arriving, he mated with Liz. (13) The resultant litter included a lookalike called Johnny who performed as a much-respected lead dog from 1962 until 1968.

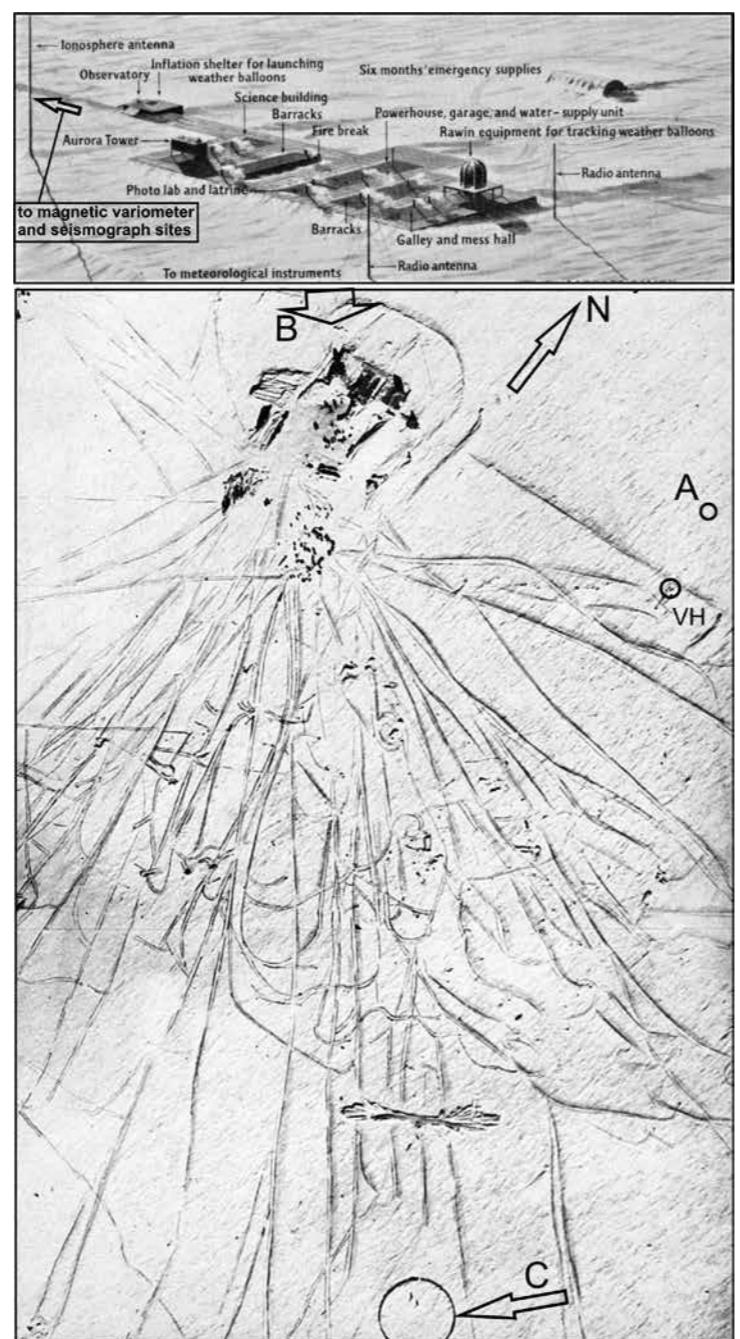
It is a pity that we don't know the fate of Beauty as it would have been fitting for her to have seen out her adventurous life at Scott Base, and it is an equal pity that we do not know the history of her near namesake, Beau, who would have had his own exciting story to tell.

By Frank Graveson PM, Life Member NZ Antarctic Society

Photos (right): The South Pole Station in 1957-58. The upper sketch of the station shows its layout and the location of the geomagnetic observations (after National Geographic Magazine, 1957). The Lower aerial photograph (US Navy, 1958) shows the station at the top with a circle of oil drums (arrow marked "C") around the South Pole position at bottom. The lines mark the tracks made by vehicles picking up air dropped supplies. The "N" and arrow is the direction of grid North (0° longitude), "B" marks the direction of the view in the upper sketch, VH is Variometer Hut, and "A" is the approximate position of absolute magnetic measurements.

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## The future of Scott Base

As part of Budget 2021, the New Zealand Government has committed \$344 million to rebuild Scott Base at Pram Point on Ross Island. The money will see the existing base replaced by three new interconnected buildings, and includes the replacement of the Ross Island windfarm. The funding announcement was made by the Minister of Foreign Affairs Hon. Nanaia Mahuta in May.

Antarctica New Zealand CEO Sarah Williamson is thrilled.

"This funding is vital to secure New Zealand's future in Antarctica and our ability to continue to support world-leading science," she said.

The rebuild will be the biggest project the government agency has ever embarked on, and is expected to bring millions of dollars to the Canterbury economy.

Four years of design work and planning has already been carried out, the next step is for the Government to confirm the Implementation Business case as well as ministerial approval of the Comprehensive Environmental Evaluation. Antarctica New Zealand anticipates being able to begin some elements of the build in New Zealand in November, with plant and materials being purchased and sent South with the annual resupply in February 2022.

"The plan is to construct the base in large sections at a port in New Zealand, and then ship the modules to Antarctica," said Senior Project Manager Simon Shelton.

CGI version of the proposed rebuilt Scott Base on Ross Island, designed by Jasmax and Hugh Broughton Architects. Credit: Antarctica New Zealand



"We will be building the new base in the same place as the existing buildings, so the current Scott Base will be deconstructed and brought back to New Zealand for disposal. Hillary's Trans-Antarctic Expedition hut will not be affected by the build and will remain in place.

"The new base can accommodate up to 100 people at a time. Of the three buildings; one is designed for accommodation, dining and welfare, the second for science and management and the third for engineering and storage. Due to the importance of critical life support services, approximately 30% of the building is space for plant and service reticulation such as water, power and data. It has been designed to be as flexible as possible to accommodate unknown future science needs," he said.

But it is not completely out with the old, and in with the new. The team is working hard to ensure the legacy of previous Scott Base inhabitants lives on, with some features of the existing base moved into the new. Each winter-over photo since 1957 will be proudly displayed in the new base, as well as the whakairo that celebrates the connection to the Ross Sea.

Antarctica New Zealand will continue to support science during the rebuild seasons, with plans underway for a temporary base to house researchers, base staff and construction workers during this time. Plans for the temporary base are expected to be released later this year.

For more information, and to keep up with the latest redevelopment news visit: [www.scottbaseredevelopment.govt.nz](http://www.scottbaseredevelopment.govt.nz)



## SCOTT BASE IN WINTER

Over the summer season more than 300 people stay at Scott Base, with up to 86 personnel accommodated at any one time. However, the population drops dramatically once the last flight of the season departs for Christchurch in February. A core team of 12 people stay on, maintaining the facilities during the long polar night of winter. The Sun disappears in April, not to reappear until August. Temperatures can drop below -50°C, while polar wind speeds reach up to 170km/h.

However, the high latitude at 77°South, only 1350km from the South Pole, makes Scott Base an ideal location to view aurora australis. Charged particles from the Sun collide with oxygen and nitrogen molecules high up in the atmosphere, which are funnelled by Earth's magnetic field down towards polar regions, creating spectacular auroral displays such as those seen here.

A halo of aurora australis above Mt Erebus and Mt Terror on Ross Island. This winter view from Scott Base, July 2018. The galactic centre appears above in Scorpius and Sagittarius, with Jupiter at left and a very bright Mars at right. In July of that year, the Red Planet made its closest approach to Earth in 15 years; at opposition Mars was a mere 57 million km away.  
Photo: Jonny Harrison, Scott Base winter station manager, 2018 and 2019  
Antarctica New Zealand

# Twenty years building in the harsh Antarctic environment



It was a pivotal time for Scott Base. Originally built in 1957, with redevelopment work over subsequent years, by 2001, the station was outgrowing its storage and preparation area. All construction at the base up to that point had been carried out by public sector entities, such as the Ministry of Works and Defence Force. As a result of that initial engagement, Leighs Construction became the first private sector organisation to design and build for the New Zealand Government in Antarctica.

The first project by Leighs Construction at Scott Base was building what would later be named the Hillary Field Centre (HFC). The new building initially housed the station's storage and

One Friday afternoon in 2001, Anthony Leighs received a phone call from Antarctica New Zealand, the government agency that runs Scott Base, the scientific-research station on Ross Island. Anthony was the managing director of Christchurch-based Leighs Construction, a New Zealand-owned and operated business he had founded in 1995, with a reputation for completing construction projects with a high level of professionalism and integrity.

The call was the beginning of a long standing relationship with Antarctica New Zealand that changed the trajectory of Leighs Construction forever. As Anthony recounted, "the call came in at about four o'clock on a Friday afternoon. There were a heap of guys coming into the office, having a beer while they dropped their timesheets off, as they did back then. I looked around, and it was most definitely a resounding 'Yeah!'"

While Leighs Construction had no experience building in polar climates, it had carried out multiple projects in the primary sector, including the building of meat processing facilities and cold stores. The company wasn't going in blind and, with that experience applied correctly, Anthony and his team knew they could meet the challenge.



Sir Edmund Hillary with the Leighs Construction team at Scott Base, 2007.

logistics which, up until then, had been kept in an unheated old aircraft hangar in poor repair, isolated from other buildings.

Since 2001, the company has been involved in multiple projects at Scott Base, such as laying the foundations for the wind turbines, constructing the Arrival Heights remote laboratory, creating corridors to link buildings within the station, upgrading the kitchen, as well as extensions to the Hillary Field Centre completed in 2016.

Building in the harsh environment of Antarctica, by its very nature, presents a myriad of obstacles.

With its unique environment, a risk focused approach has been undertaken by Leighs Construction to ensure no room for error in all works completed to date. The biggest obstacle faced by the company during its first expedition was putting together a team of specialists who could operate in the extreme climate and freezing winds.

The huge distance from New Zealand shores also creates significant logistical challenges that demand careful planning and much thought must be put into the containerisation of the requisite materials for each project, before they begin their journey south.

The proof has always been in the final product and Leighs Construction's ongoing relationship with Antarctica New Zealand, which shows no sign of slowing. A close working relationship was key to the success of the Hillary Field Centre, enabling the team to work through several possible options and reach completion within difficult budget constraints. "The project went

really well, and everybody was extraordinarily happy" commented Anthony Leighs.

The CEO of Antarctica New Zealand at the time, Lou Sanson, said "Leighs have done a wonderful job and made us very proud to work with you on such a challenging project."

The Leighs Construction team were lucky enough to be on the ground for Sir Edmund Hillary's visit to the site, a real career highlight for many, according to Matt Searle, Senior Site Manager on the company's first expedition to the station.

Leighs Construction is thrilled to see the Government provide significant funding for the redevelopment of Scott Base - a crucial research facility not just for New Zealand, but the world. "We're proud to be working with Antarctica New Zealand to realise their vision in constructing the most sustainable solution possible, in an extremely unique and challenging environment. We look forward to the redevelopment work beginning, and our partnership continuing," says Anthony Leighs.

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ANTARCTIC GEOLOGY

# Mid-winter Medevac



RNZAF C-130 Hercules on the ice runway at Phoenix Airfield, Ross Ice Shelf, after the 7 hour 3920km flight from Christchurch. Air crew used night vision goggles to land in the dark of the polar night, while McMurdo ground crew made sure the runway was lit and safe for the aircraft to land. The engines were kept running as ground crew carried out a 'hot refuel'. Photo: Jeff Capps

*A remarkable team effort in July saw the Royal New Zealand Air Force (RNZAF) successfully carry out a mid-winter medical evacuation of an injured person at McMurdo Station.*

The patient, who was a member of the United States Antarctic Program, was not suffering from life-threatening injuries, and received further medical treatment in Christchurch.

At 10.25pm on the 11th of July, a C-130 Hercules left Christchurch for Antarctica, landed and picked up the patient at Phoenix airfield, and

arrived back in Christchurch at 2pm the following day.

It was no mean feat with the crew using night vision goggles to land on the ice runway in darkness; this is the first time the RNZAF has flown a medevac mission using this technology. The last midwinter medevac was in the 90s, and

involved a member of the Scott Base team who fell ill.

Air Component Commander Air Commodore Shaun Sexton said the NZDF had been providing support to Antarctica New Zealand and the United States Antarctic Program for many years, but missions like this occur infrequently.

"We were pleased to be able to assist our US partners when the call came to help with the medevac. The aircrew and supporting New Zealand and US personnel in both Antarctica and in New Zealand did an outstanding job to complete this difficult medevac," he said.

RNZAF Base Auckland Commander Group Captain Andy Scott said poor weather had initially hampered efforts by the Air Force team trying to get to Antarctica.

"Flying to Antarctica is one of the highest risk missions we fly due to the lack of divert airfields and inability to get down and back without refuelling. The crews therefore are highly trained to analyse the situation with regards to the weather and the airfield state before making a decision to proceed," he said.

It was a huge team effort involving not only the RNZAF, but also the National Science Foundation, the McMurdo Station ground crew and Antarctica New Zealand's operations and logistics teams.

Antarctica New Zealand General Manager of Antarctica Operations Simon Trotter says it was great for New Zealand to be able to help out our friends at McMurdo Station.

"We have worked alongside our American Antarctic counterparts, both on the ice and in Christchurch, for years, and when a friend needs your help, you do everything you can to support them."

"Whether you are Kiwi or American, Antarctica is a long way from home for everyone, and we're just thrilled the patient made it back to New Zealand safely to receive expert medical care," he says.



The McMurdo Station ambulance reverses towards the loading ramp of the C-130 Hercules at Phoenix Airfield, Antarctica. Photo: RNZAF



Delivering the patient at Christchurch Airport. Photo: Wayne Williams



RNZAF air crew and medevac team at Christchurch Airport – job well done! Photo: Wayne Williams



Disintegration in progress: one of the larger fragments in December 2020; Iceberg A68D drifting off South Georgia visible in the distance, its highest point Mt Paget (2935m) at left.  
Photo: Cpl Phil Dye, RAF

## Iceberg A68 - odyssey of a giant

The Larsen C Ice Shelf is a huge platform of floating ice, built by the merging of glacier tongues that flow off the Antarctic Peninsula into the Weddell Sea. At 48,600 km<sup>2</sup>, it's the fourth largest of the ice shelves on the Antarctic coast and the world (ice shelves in the Arctic are much smaller - the Ward Hunt Ice Shelf is the largest at a mere 400 km<sup>2</sup>).

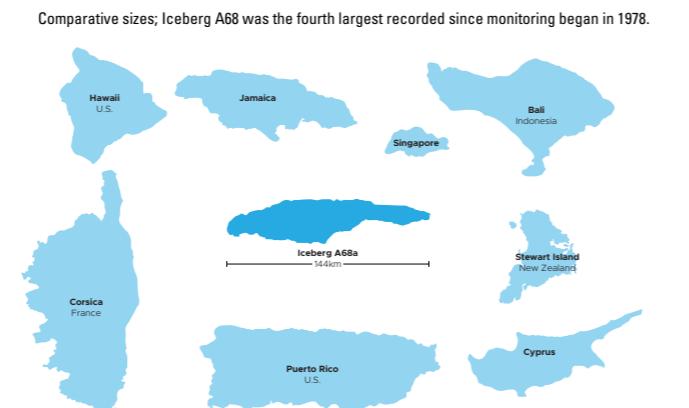
In July 2017, one of the world's largest icebergs calved from the front of Larsen C, the result of a crack that had taken years to form. It was

given the designation A68 - it was the 68th iceberg, originating in sector A, large enough to be registered by the US National Ice Center since records began in 1978 (see map). With a surface area of nearly 6,000 km<sup>2</sup> and weighing approximately 1 billion tons, it was also the fourth largest iceberg ever recorded.

Photo (left): Birth of a behemoth; Iceberg A68 calved from Larsen C Ice Shelf in July 2017.  
Photo: Landsat 8, NASA/USGS

So began the voyage of Iceberg A68, though slowly at first - for a year it barely moved, frequently grounding on the sea floor as it drifted along the coast of the Antarctic Peninsula. Then, with increasing speed, it drifted north driven by currents associated with the gyre of the Weddell Sea, along with katabatic winds that descend from the polar plateau. A68 became a social media star, with people around the world sharing satellite images that were freely available online.

Finally, in 2020, it spun out of the Weddell Sea into the South Atlantic where many of the biggest icebergs go to die. Along the way, smaller chunks of ice calved off, some big enough to



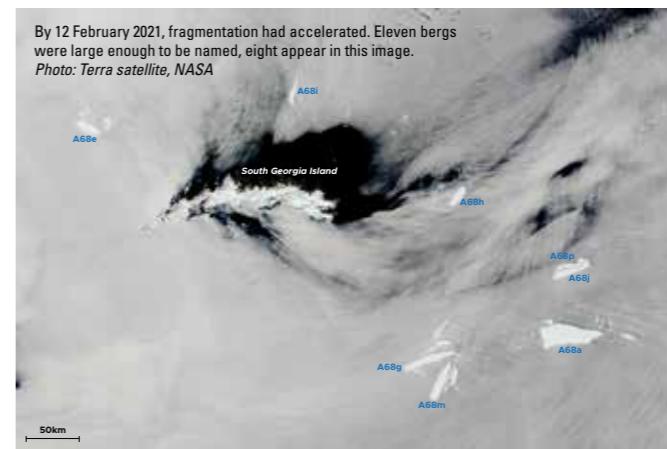
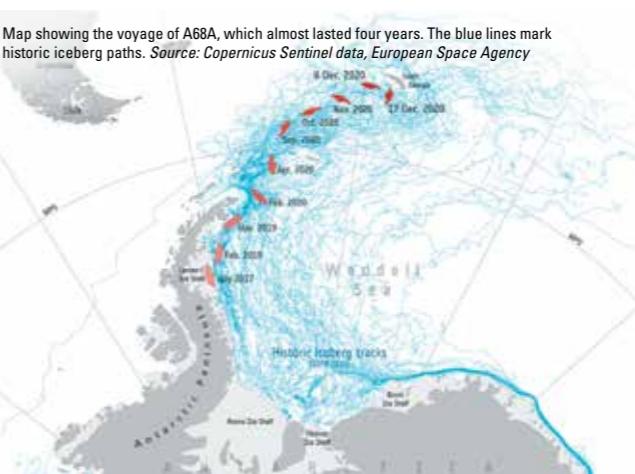
merit their own name, such as A68C. The mother berg, still largely intact, was redesignated A68A. Picked up by the powerful Antarctic Circumpolar Current, it moved in a north-easterly direction, bearing down on the island of South Georgia.

With the decrease in latitude and increase in air temperature, the melting accelerated. The sides of an iceberg melt twice as fast as its base, so iceberg shape is important in terms of the rate of melt. Wide behemoths such as A68A melt more slowly than smaller, narrower bergs.

As it melted, the berg deposited iron into the ocean, fertilizing the seawater which nurtured phytoplankton blooms. The phytoplankton helps regulate the global climate by taking up carbon dioxide (CO<sub>2</sub>) from the atmosphere through photosynthesis, just like trees and other plants on land. In fact, the Southern Ocean accounts for a large proportion of the total global oceanic carbon uptake.

There are several sources of iron that are transported into the ocean including dust, sediments, and ice. The extent to which icebergs support phytoplankton blooms depends on the amount of iron contained within them; some bergs contain enormous quantities of windblown dust that has been deposited on ice shelves over thousands of years.

By early December last year, Iceberg A68A lay just to the



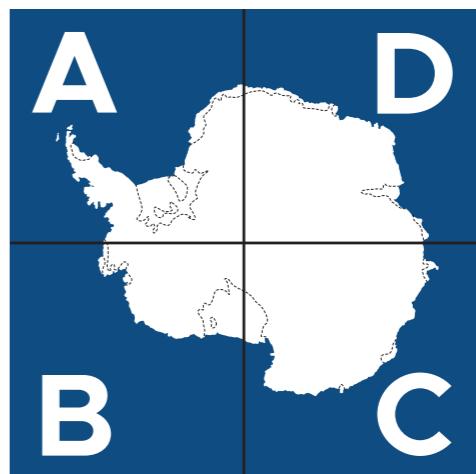
west of South Georgia, with much speculation that it would run aground and break up. In the meantime, hydro fracturing began to take its toll. The warming air temperature created meltwater on top, which in turn filled fissures and cracks, widening the openings through to the base. In the end, the demise was relatively swift. Over a period of four months from December 2020, A68A simply began shattering into smaller and smaller fragments, around the island of South Georgia.

Professor Adrian Luckman of Swansea

University said "Icebergs from the Peninsula normally break up around this location. A68's demise was most likely due to a combination of factors such as air temperature (causing surface melt to drive hydro-fracture), sea temperature (which will have been gradually eroding the

iceberg from below), and the long-period swell which doesn't normally make it through the pack ice further south. It is possible that the iceberg grounded, but I doubt that was a big factor in its break-up."

By April 2021, it was all over. The last major fragment of the berg adrift amidst the icy slush, still with the designation A68A, melted below the minimum threshold set by the USNIC: it was a mere 3 nautical miles long by 2 nautical miles wide. A68 was no more - the odyssey had come to its natural conclusion.



**The naming of icebergs.** The US National Ice Center has been monitoring and registering Antarctic icebergs since 1978. In order to be registered with a number, icebergs must be larger than 20 square nautical miles (68.6 km<sup>2</sup>), or at least measure 10 nautical miles (18.5 km) at the longest axis. Iceberg names are derived from the Antarctic quadrant in which they were originally sighted, from sectors A through to D. If icebergs break into pieces which are still large enough to meet the threshold, they are assigned a further letter at the end of their name. In the case of A68, the last fragment big enough to be designated was A68P.



Remnant of the LCVP stern (Landing Craft Vehicle Personnel) belonging to USS *Edisto* wrecked while crew attempted to land on Possession Island in 1956, as part of the US Navy's Operation Deep Freeze.  
Photo: Michael Harris, 2014

## The wreck on Possession Island

The Possession Islands in the Western Ross Sea in Antarctica ( $72^{\circ}2.50'S - 71^{\circ}42.10'S$  and  $170^{\circ}36.00'E - 171^{\circ}23.80'E$ ), have a long and interesting history. They consist of two main islands (Possession and Svend Foyn or Foyn), two basalt pillars, several smaller islands and rocks. The islands were discovered by James Clark Ross with *HMS Erebus* and *HMS Terror*, on 12 January 1841. Subsequent early landings took place from the whaler *Antarctic* on 18 January 1895; the *Southern Cross* on 3 February 1900; the *Morning* on 8 January 1903 and from a *Star* whale chaser ca.30 January 1924.

With the commencement of the US Navy's Operation Deep Freeze 1 in 1955-56, and the commencement of the International Geophysical Year (IGY) set to begin on 1 July 1957, there was already interest shown by the United States, New Zealand and Japan, at having a scientific station in North Victoria Land.

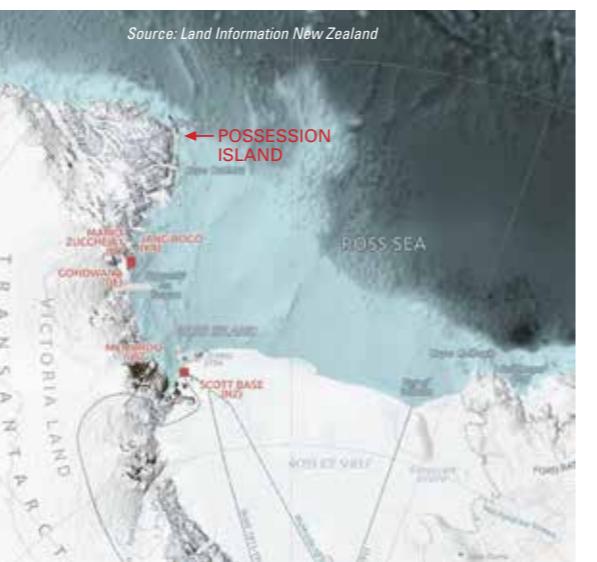
On 3 February 1956, *USS Edisto* AGB-2 (Cdr R. Luther) with Capt. Thomas on board, left McMurdo Sound on Cruise 00514, to escort the freighter *USS Arneb* AKA-56 (Cdr. L. Smythe) to open water. The *Edisto* then proceeded to Cape Adare. On 5 February when landing in a big swell on Ridley Beach, the whale boat broached [when it heeled too far to one side in the swell] 'dumping 12 cold, wet men on the shore.' Along with severe

gales at the time, the location for a station here was then ruled out.

The *Edisto* with a survey party which included IGY Representative, M.J. Rubin, then headed south past the Downshire Cliffs, however high surf made a landing at the time, impossible on Possession Islands. A likely site was then found at Cape Hallett. In the Report prepared for Rear Admiral James Reedy, '....on the way down [from Cape Adare], the eyes of both the IGY representative and civil engineers had been attracted to Foyn, formerly Svend Foyn', one of the Possession Islands' (1).

The US Navy chart with track of the *Edisto* indicates Possession Island was at the time, mistakenly named Foyn or Svend Foyn (further south) in the expedition report to Rear Admiral H.C. Daniel.

An oceanographic station (ED7) was established near the southwest corner of Possession Island 'in an unprotected location' at 192m depth' (2).



The large relatively level surface on Possession Island was also considered perhaps suitable for an airfield and the decision was made to visit before concluding the survey. Late that evening, a party went ashore in an LCVP (Landing Craft Vehicle Personnel).

Conditions on Possession Island were similar to those encountered on Ridley Beach and according to events at the time 'the landing craft broached and attempts to recover it proved futile...the *Edisto*'s commanding officer [had] observed a rocky beach, strong currents, and drifting ice which made Foyn [sic] Island somewhat inaccessible' (1).

A severe storm with 60-knot wind resulted in seven men left ashore (3). Salvage attempts using all the other *Edisto* boats and finally the ship itself [had] continued through the night [and] after the survey, personnel were recovered using [a] rubber life raft and line-throwing gun. (4) Years later, meteorologist Ruben recalled, for those ashore 'No food had been brought. No radio. No tent. No water. Nothing' and all they could do [for warmth] was to 'keep walking' (5). The LCVP was produced in large numbers during WW2 when 20,094 were made (6) and no further attempt was made to recover the wreck.

The ship left the area and agreed that the spit (later Seabee Hook) below Cape Hallett and with less swell, was the most favourable location for a station. This was confirmed by visual flight operations and VX-6 aerial photography.

The wrecked LCVP was reported in January 1965 when a landing was made by LCVP and again in January 1983 (M. Mabin pers.com. 17 May 2021). On 30-31 January 1995, Emma Waterhouse (NZ Govt. Representative) and Rowley Taylor (ornithologist), during Cruise 1195 of Southern Heritage Expeditions (*Akademik Shokalskiy*), also saw the wreckage 60m from the beach at the north-west corner of Possession Island. The LCVP was then considered to have been washed onto the island 'probably during a heavy storm' and was perhaps a relic from the United States Navy Antarctic Developments Project, Operation 'Highjump' (1946-47).

Components along with elements of the plywood and steel hull (still with a large 225hp diesel engine, bronze rudder and propeller) were strewn along a storm berm on a beach ridge (7).

On 14 February 1996, the LCVP was again examined by John Charles (pers. com. 30 April 2021) and P. Doole (NZ Govt. Representatives), also polar historian Robert K. Headland, on the *IB Kapitan Khlebnikov* (Capt. V.Vasilyev) (8). In February 1997, the wreck was again seen by Paul Chaplin (NZ Govt. Representative) on the *MS Bremen* (Capt. H Aye).

Although the LCVP has been seen by Heritage Expeditions, conditions for landing have to be

Offshore view of Possession Island, home to a large adelie penguin colony.  
Photo: D.L. Harrowfield, February 2020



good without a heavy swell and ice to contend with. While an interesting feature for those visiting Possession Island, it is suggested that the remnants be removed perhaps to a suitable naval museum.

*By David L. Harrowfield NZAM, Life Member NZ Antarctic Society*

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### ACKNOWLEDGMENTS

The generous assistance from many people for this article is gratefully acknowledged. Antarctica New Zealand (Anita Kerr) LINZ Wellington (Chris Buckler, Garth Falloon); United States Antarctic Program (Elaine Hood) Scott Polar Research Institute (Dr Peter Lund, Naomi Boneham); Bob Headland (Research Associate); Canterbury Museum (Julia Bradshaw); Dr Mark Mabin; Strannik Ocean Voyages (Rodney Russ); Rowley Taylor; John Charles; Paul Chaplin, Larry Conrad

# The challenges and rewards of drilling in Antarctica

He may have spent five decades involved in pioneering research and drilling projects in Antarctica, but Bain Webster's first attempt to work on the continent ended in rejection.

Not long out of high school and working as a driller's assistant for a Wellington drilling company in the late 1960s, Bain put in an application to be part of the annual Antarctic summer programme.

"I applied to be a field assistant, saying I went tramping sometimes and I liked going skiing. Unbeknownst to me, a field assistant had to be a crack mountaineer. So, consequently, I got a polite reply saying thank you but no thank you."

But things were different a couple of years later. By then he had worked on drilling projects in Australia, gaining experience with 'wireline' and diamond core drilling – skills that were rare in New Zealand but required by the Antarctic programme recruiters.

Bain found himself on the ice in the early 1970s, working on the Dry Valley Drilling Project, a scientific collaboration between New Zealand, the US and Japan that was the first significant geological research drilling programme on the continent.

He recalls being stormed in at Marble Point. "We were only going to stay there overnight before the main move the next morning and a storm came in and we got caught there for nine days, scrounging for food. We were cracking out all the supplies and the Americans had these marvellous T-bone steaks and [the Kiwis] were swapping T-bones for the likes of a little packet of Magi chicken noodle soup."

Cape Roberts Project drilling system with rig, ramp and mud hut on sea ice 10 km off the Victoria Land coast, with the foothills of the Transantarctic Mountains in the background, 1999.  
Photo: Peter Barrett



The project included the first ever drilling on Lakes Vanda and Vida.

"We flew all the gear into Lake Vanda, where, in the middle of the lake there was about 3m of solid ice. We were living in these polar tents. When you pitch them on dry ground

you couldn't see your hand in front of your face, but on that lake ice which was shattered so it was white – the light reflected through, and the floor of those tents was like a neon light, broad daylight inside the tent. We had to line the floor so we could get some sleep."

About a decade later, in 1983, Bain started his own business, Webster Drilling & Exploration, initially keeping busy with seismic and geotechnical projects around New Zealand, but his interest in Antarctica remained strong.

Webster's was called on to do some Antarctic work in its early years before becoming heavily involved in the Cape Roberts Project, a major research programme undertaken between 1997 and 2000 involving scientists from several countries. The project recovered drill cores of up to 1000m from the Ross Sea coastal region.

In 2006 and 2007 Webster's were the lead drilling services provider for the Antarctic Drilling Project (ANDRILL), an ambitious and technically challenging operation to investigate past Antarctic climate from sediment cores in the McMurdo region.

Bain was involved in setting the drill rig specifications and purchasing on behalf of the drilling consortium. Webster's managed the rig and systems development once the rig arrived in New Zealand from Brisbane, where it was



Bain Webster, Founder of Webster Drilling

manufactured.

The ANDRILL teams drilled what are still today the two deepest drillholes in rock in Antarctica: 1284.87m on top of the ice shelf in December 2006 and 1138.54m on top of sea ice in December 2007.

The 2006 project involved the team drilling a hole through the 84m-thick Ross Ice Shelf, then lowered the drilling pipe a further 850m down to the sea floor, and then drilling the 1284m through rock, recovering a 14-million-year record stored in the sedimentary layers.

ANDRILL's co-chief scientist, Tim Naish, says the project combined "minerals technology with oilfield technology in a polar environment with an unstable platform that's moving around with the tide, plus there are ocean currents. Pulling all those things together was pretty clever".

He says the challenge of drilling from an ice shelf is that while getting a pipe almost 1km down to the sea floor, it has to be kept from freezing into the almost 100m-thick ice shelf.

"It goes up and down with the tide, so you don't want to bring your pipe out of the seabed every time there's a tidal cycle. What they had to do was use hot water: put a big doughnut around it, a hot water ring that melted the ice and kept an ice hole open the whole time. So they essentially reamed the outside of the drill pipe, up and down, so that it could move independently from the ice shelf. It was really clever stuff."

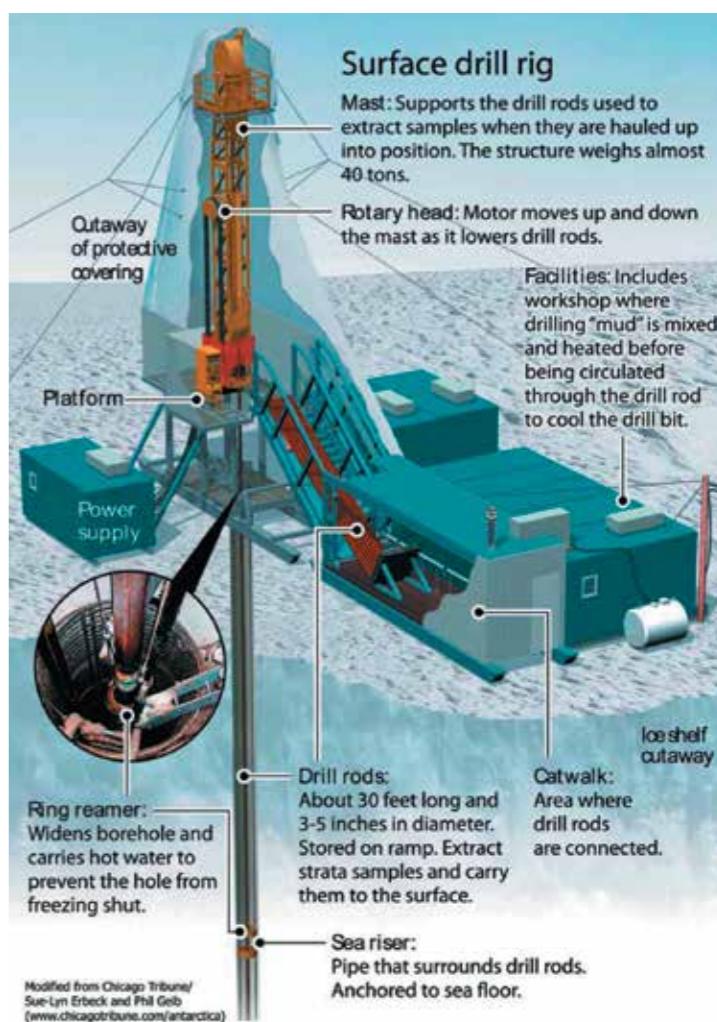
On top of that, Tim says, the ice shelf moves horizontally at about half a metre per day, meaning the team had to account for the constantly changing bend in the drill pipe.

"We had to get the job done in 60 days and there was a 30m horizontal tolerance for the bend on the pipe before we bent it too much and we couldn't get our drill rods through it. So when they put the pipe through the ice shelf they dangled it above the seabed and let the tide take it before they pushed it in. Then, as we were drilling, the pipe straightened up as the ice shelf moved, and then it tilted the other way, so we doubled

the drilling window."

Over the past two decades, Webster Drilling & Exploration has had a presence in Antarctica most years, and Bain says the unique conditions, including the extreme cold and winds, make it "an amazing experience".

"We used to have a saying: if a task took a certain amount of time in New Zealand, you could assume it



Layout of ANDRILL drill rig.  
Source: Naish et al., 2007 A record of Antarctic climate and ice sheet history recovered.

would take twice as long and double the budget down there – and you'd probably be about half right."

Websters has worked in more than a dozen countries around the world, and while its Antarctic work hasn't been its most profitable, Bain doesn't begrudge that.

"The odd job in Antarctica has made us a little bit of money, but it's about more than that. It's the challenge of going down there and actually doing it, and giving our staff the opportunity to have that experience," he says.

"From my perspective, I like being involved. I like the scientific challenge in it."

## Shackleton's Ross Sea Party 1914-17

Sir Ernest Shackleton's plans for crossing Antarctica required a support party to lay depots from the Ross Sea to the mighty Beardmore Glacier in the Trans-Antarctic Mountains to provide food and fuel for Shackleton's men slogging from the Weddell Sea coast.

The Ross Sea party sailed from Hobart, Australia in *Aurora* in December 1914 and set up base at Cape Evans. They occupied the hut built by Captain R. F. Scott's British Antarctic Expedition 1910-13. In the following months they laid depots marked by snow cairns to 80°S before returning to base in temperatures as cold as -50°F and causing frostbite to their toes, hands and faces. They were even getting frost bitten toes in their frozen sleeping bags. The 16 dogs they took with them all died from malnutrition.

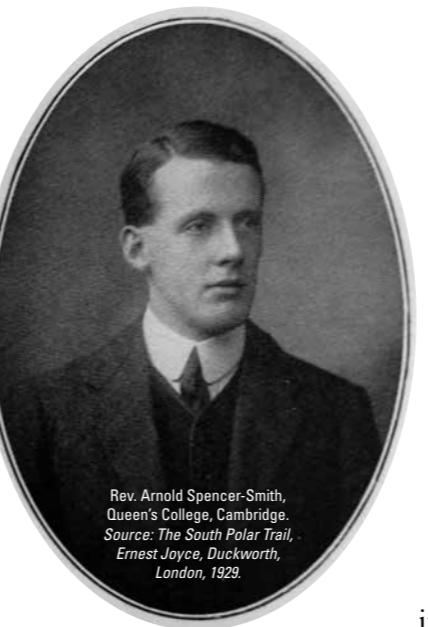
In early May 1915, a severe storm carried *Aurora* away from its moorings at Cape Evans. The 18 men on board faced the real danger of the ship being crushed in the Ross Sea pack, with remote chances of survival and

rescue. They eventually reached Port Chalmers, New Zealand in early April, 1916.

During the second season's sledging, the party with four dogs succeeded in laying the remaining depots to Mt Hope at the foot of the Beardmore Glacier. Over a period of 170 days, they sledged some 2,500 kilometres. One man, affected by scurvy, died and two men were lost on the sea ice soon after.

The seven survivors spent a further winter at Cape Evans before being rescued in January 1917 by a relief party including Shackleton that arrived on the repaired *Aurora*.

By Richard McElrea



## Arnold Spencer-Smith and the darkroom in the Cape Evans Hut

Rev. Arnold Patrick Spencer-Smith B.A. was the first padre or chaplain to serve in an Antarctic expedition. In 1914 Sir Ernest Shackleton appointed him as photographer to the Ross Sea component of the Imperial Trans-Antarctic Expedition. As an ordained priest in the Scottish Episcopal Church, he also served as chaplain or 'Padre' to the party.

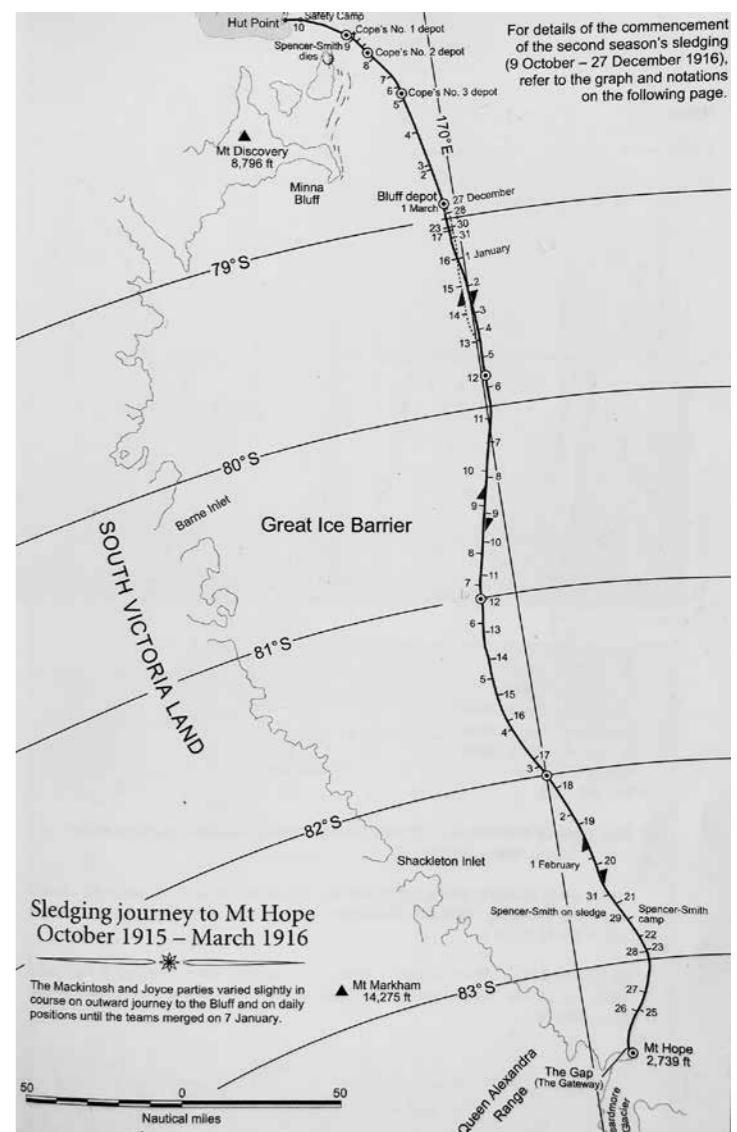
He was a member of the sledging party that in early 1916 succeeded in laying depots to the Beardmore Glacier for Shackleton's party which in the event, failed to make landfall in the Weddell Sea. His diary for the period from 18 January 1915 to 7 March 1916 has survived and is an immensely important historical record.

Expedition members never had a bad word for him. R.W. 'Dick' Richards later referred to him as "sincere and dignified—a good cobber". Alexander Stevens said he was a "very kindly and even-tempered man."

In March 1915 Spencer-Smith was one of four who moved from the ship, then moored nearby, to the Cape Evans hut. As designated photographer he took a particular interest in the darkroom built by Herbert Ponting, photographer to Captain Scott's expedition. It measured 2.4m. by 1.8m.

Ponting wrote: "After boarding the framework, I covered the walls with rubberoid left over from our building operations, to keep out all light, and lined the room all round with two or three tiers of shelves. On one side I built a bench..." He also slept there with a fold-up bed. Surgeon Murray Levick of Scott's Northern Party developed photographs in the darkroom after returning to Cape Evans in November 1912.

Spencer-Smith "thoroughly cleaned out the darkroom" and adopted it as his own. He wrote: "It is nice to be able to sit here and write—a private sitting room in the



Map: sledging journey from Hut Point, Ross Is to Mt Hope return, Oct 1915 - Mar 1916.  
Source: David Harrowfield / Tim Nolan, from *Polar Castaways*, 2004.



Antarctic, an unheard-of luxury.” He enjoyed the companionship of crew members who visited from the ship.

On Sundays he adapted the darkroom for religious purposes. The services were private affairs. They did not take the form of “Divine Service” in the naval tradition with all or most participating. Richards said Spencer-Smith “never obtruded his religion. It was only by accident that we learned he had administered communion in the darkroom.”

Over winter months Spencer-Smith spent many days in the darkroom developing films, both stills and cinematograph. Before the start of the second season’s sledging, the Padre celebrated Holy Communion with three men present.

The Padre’s diary entries ceased just two days before his death on 9 March 1916 after 40 days of being hauled on a sledge.

## THE ARTEFACTS

Few items from Spencer-Smith’s 1915 photograph of the altar table remain on site.

When the room was first entered in 1960, by Leslie Quartermain (New Zealand Huts Restoration Party) and Sir Charles Wright, veteran of Scott’s Last Expedition, “icicles several feet long hung from above the ceiling and the still well-stocked shelves and bench, undisturbed for 44 years, were festooned with beautiful ice crystals”.

In December 1971, Harry Burson and I (Richard McElrea) were the third pair of New Zealand Antarctic Society volunteers (termed “hut caretakers”) who worked at the historic sites on Ross Island. The darkroom was clear of snow. It was in a cluttered state. We left it undisturbed.

Stan Smith, a volunteer from the previous year, had alerted us to a ‘black box’ (an aumbry\*) with the letters IHS (representing the name of Jesus) inside the item. This is showing in the 1971 photograph beneath an image of a female in a shawl, now accepted to depict the Virgin Mary. On top of the aumbry is a circular metal object,

\*Aumbry (alternative spelling ambry), “a locker, or recess in the wall of a church, for keeping sacramental vessels etc.” – The Shorter Oxford English Dictionary on Historical Principles, 3rd Ed.

probably a wafer box. There is a wire candle holder on the upper wall to the right of the former altar, forming part of a sanctuary lamp. This also appears in both the 1915 and the 1971 photographs.

Also showing in the 1971 photograph is a dark curtain suspended on wire to the rear of the bench. This fabric once formed the background for the altar. The wafer box, image of the Virgin Mary, aumbry, sanctuary lamp, and curtain are relics of Spencer-Smith’s use of the space as a chapel.

Archdeacon (later Dean) Michael Brown, who celebrated the Eucharist or Holy Communion on the same altar in December 1983, reported the wafer box he had seen on his first visit in 1978, had been ‘souvenired’.

Antarctic Heritage Trust conservator, Lizzie Meek, says a significant item held is the cross shown in the 1915 photograph, but the base is missing. The picture of the Virgin Mary is also with the Trust. The sanctuary lamp was catalogued by the Trust in the late 1980s but is now missing.

Canterbury Museum holds significant items of Spencer-Smith. These include a linen surplice, ecclesiastical stoles and brass candle sticks. Ross Sea Party veteran, R. W. Richards G.C, who had received the candle sticks from fellow-expeditioner and the Padre’s cousin, Irvine Gaze, donated these in 1980 to the museum to commemorate the work of Spencer-Smith.

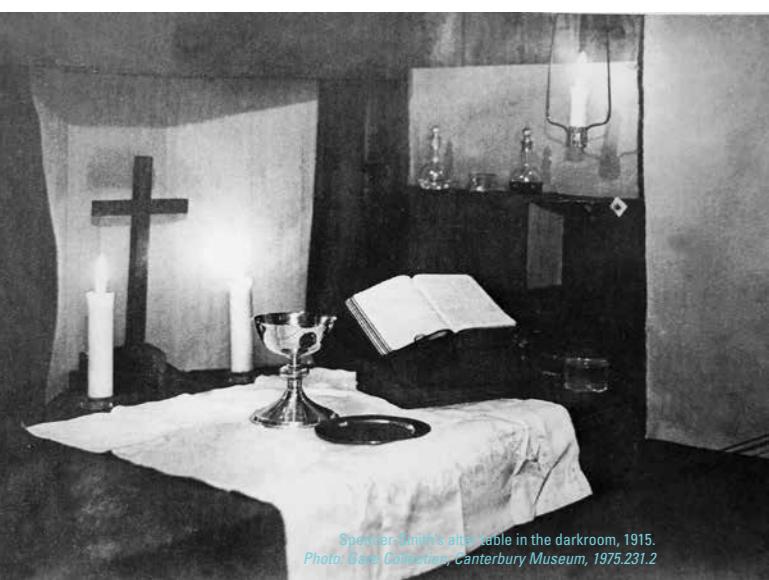
All Saints’ Anglican Church, Dunedin now has the chalice and paten and is well on the way to commissioning a stained-glass window to commemorate the life of Rev. A. P. Spencer-Smith.

It is to be hoped that the wafer box and sanctuary lamp will someday be relocated and returned to the darkroom used as a chapel by Antarctica’s first chaplain.

*By Richard McElrea, QSO*

## REFERENCES / ACKNOWLEDGEMENTS

References for source material supplied. My special thanks to Lizzie Meek, Antarctic Heritage Trust and Julia Bradshaw, Canterbury Museum, for their assistance with respect to the Spencer-Smith artefacts and to Dean Michael Brown for his advice concerning religious aspects.



# Ghostly images from the past

In 2013, almost exactly a century after Ernest Shackleton's 1914-1917 Ross Sea Party departed, photographic negatives were discovered in the darkroom at the Cape Evans Hut, built by Captain Scott's last expedition in 1911. Although the exact identity of the photographer remains unknown, it is possible it was Arnold Spencer-Smith, who joined the Ross Sea Party as the Chaplain and photographer.

Conservation specialists from New Zealand's Antarctic Heritage Trust discovered the clumped together cellulose nitrate negatives in a small box as part of the Ross Sea Heritage Restoration Project, which saw more than 10,000 objects conserved at Scott's Cape Evans hut.

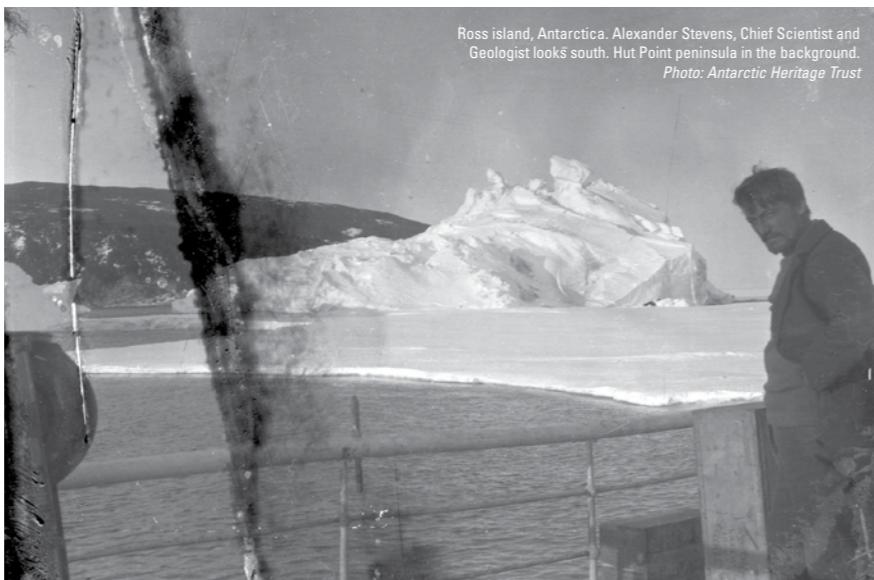
The negatives were found in the darkroom originally used by Scott's photographer Herbert Ponting in 1911, then subsequently as a chapel by Arnold Spencer-Smith in 1914-15.

After being temporarily removed under permit from Antarctica, the negatives were painstakingly conserved by Photographic Conservator Mark Strange in New Zealand. Detailed conservation treatment separated the negatives to reveal twenty-two images. The photographs were from the Ross Sea Party, which spent time living in Scott's hut after being stranded on Ross Island when their ship blew out to sea.

One of the most striking images is of Ross Sea Party member Alexander Stevens, Shackleton's Chief Scientist, standing on-board the Aurora.



Alexander Stevens, Chief Scientist and Geologist on-board the Aurora.  
Photo: Antarctic Heritage Trust



Ross island, Antarctica. Alexander Stevens, Chief Scientist and Geologist looks south. Hut Point peninsula in the background.  
Photo: Antarctic Heritage Trust



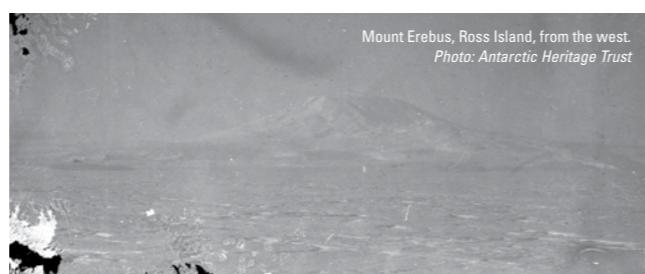
Photo: Antarctic Heritage Trust

Although many of the images were damaged, the Antarctic Heritage Trust was able to recognise landmarks around McMurdo Sound.

*“It was an exciting find and we were delighted to see them exposed after a century. It’s testament to the dedication and precision of our conservation teams’ efforts to save Scott’s Cape Evans hut.”*

said Nigel Watson, Antarctic Heritage Trust's Executive Director.

Mount Erebus, Ross Island, from the west.  
Photo: Antarctic Heritage Trust



# Obituary: “Alec” Robert Alexander McFerran

16 April 1922 - 21 November 2020

The New Zealand Antarctic Society lost Life Member Robert Alexander McFerran at the end of 2020. Robert was known by his family and friends as “Alec”, he was a special person with a great love for the Antarctic.

Alec and his siblings lost their father at an early age and he was brought up by his mother. He was the youngest child and his education was in the “Victorian” style, likely leading to his attitude to life, which was humbled, gentlemanly, and persevering no matter what life threw at him.

When he left school, he started an apprenticeship as an electrician and that became his life-long career. Living in Opawa, Christchurch, all his life, he travelled everyday on his bike to Lincoln (22 kms one-way) for his first job. In World War II, he served in the Army from June 1943 and was transferred to the Air Force in the same year. He was discharged in November 1945.

During the war (1944), Alec married his life-long love Betty. He built a house in Opawa and became father of two daughters, Sandra and Jill. Unfortunately, Alec lost Betty very early to breast cancer as well as their daughter Sandra.

For some time he was running his own electrical business servicing domestic and industrial clients. Therefore, he came quite late in life, in contact with Antarctica. In 1970, he was on the list of the over-winterers for Scott Base as the electrician and assistant dog handler. As he told me, he did not expect to be selected for the position because he had no idea about the Antarctic! However, he always appreciated that he had good people around him that taught him all he had to know about this continent and beyond.

Alec overwintered not only at Scott Base but also at Campbell Island, enjoying both those experiences, which transformed his life, making him a true Antarctic. During



“Alec” Robert Alexander McFerran at Scott Base, where he wintered-over in 1971. Source: Antarctica NZ

his time at Scott Base, Vivian Fuchs' snow cat was rescued and was brought back to Christchurch and is still displayed in the Canterbury Museum. Alec was heavily involved in the digging and recovery of that vehicle. He was also very interested to learn more about the place he fell in love with and so he took Antarctic courses as part of the Continuing Education programme at the University of Canterbury. That was where I met him the first time in 2009, but others from the university remember having Alec in the classroom as far back as 1999. He found in the New Zealand Antarctic Society (NZAS) the forum he could listen and learn about all things “Antarctic”, and he also contributed to the running of the NZAS in his many humbled ways. Alec took part in the Oral History Programme of the NZAS in 2013 and his recording is part of the archival collection at the Alexander Turnbull Library.

In 2016, Alec broke his hip and from that time on, he lived in the Anthony Wilding Retirement Village. Even there, he always wanted to know news from the Antarctic. He read books with Antarctic topics until the very end.

He will always be remembered for his smile, fine humour, and his humbled way to tell his own story, as well as for his love for roses, and his passion for the Antarctic and the NZ Antarctic Society.

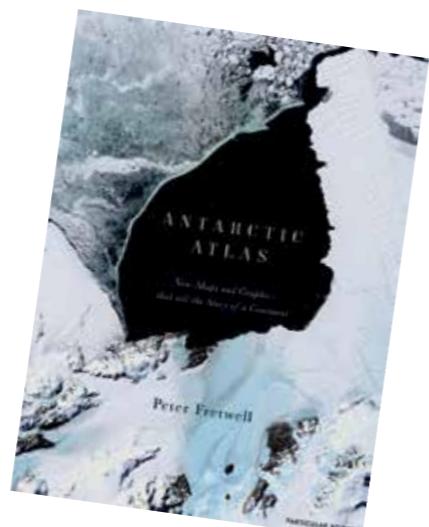
By Ursula Rack and Michelle Rogan-Finnemore

## BOOK REVIEW: "ANTARCTIC ATLAS. New maps and graphics that tell the story of a continent." by Peter Fretwell FRGS

Particular Books 2020. ISBN 978-1-846-14933-7

This handsome new atlas is the first to be published on Antarctica for many years and was long overdue. Nine chapters with carefully arranged sections describe the physical aspects, geography and natural history of the continent and there is a useful Glossary, Index and a Key for major images. The author has used to good advantage the resources of the British Antarctic Survey (BAS) where he has had long experience as a professional cartographer and his own familiarity from working in Antarctica.

The book however, would have benefited from thorough proof reading. Some errors include for Ross Island, Cape Royds with Shackleton's hut and an Adélie penguin colony placed at Cape Barne, the US Palmer Station as Chilean, and Marion Island part of South Africa, located north of the Balleny Islands. It is disappointing to see no reference to the early geographers and philosophers, who compiled the first maps (such as by Ptolemy) and postulated the existence of a southern continent; the Shackleton Ross Sea party of the Imperial Trans-Antarctic Expedition (1914-16); or of the New Zealand and United Kingdom Antarctic Heritage Trusts, responsible for historic sites. I would have liked to have seen scales with



all maps and perhaps less data for krill, seals and iceberg tracks. These are too detailed, difficult to follow and in some instances, have similar colour coding. Some data is obscured by tight binding.

However, it is rare today for any book especially one such as this to be published without any mistakes and many can be rectified in a further print-run. However, Peter Fretwell must be congratulated for such a beautiful atlas with quality paper, refreshing colouration and with much important and up-to-date information. The book is a major contribution to the Antarctic literature and is essential for any collection.

By David L. Harrowfield NZAM, Life Member NZ Antarctic Society

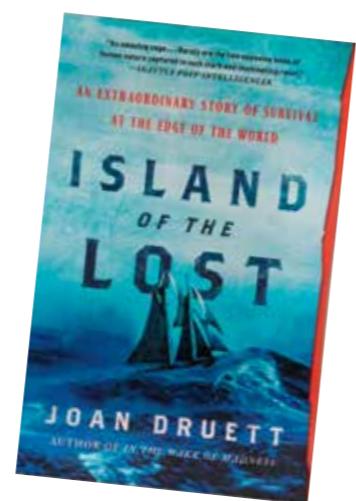
## BOOK REVIEW: "ISLAND OF THE LOST" by Joan Druett

Algonquin Books, Chapel Hill, 2019, American Reprint, two maps.

*Shipwrecked at the Edge of the World.*

What a tale, as enthusiastically consumed as the seal meat eagerly ingested by survivors of these two shipwrecks.

Joan Druett weaves together the riveting true stories of shipwrecks on the same remote Sub-Antarctic island, 1864. If you enjoy reading survival accounts, this will keep you captured in your armchair. It ends up becoming a reflection on human nature, enduring incredible hardships,



ANTARCTIC

validating the importance of cooperation. The small schooner 'Grafton' had five men aboard when their ship came to grief, wrecked on Auckland Island. Remote, cold, and storm-swept, they faced daunting challenges to make fire, build shelter, find water and food. Captain Thomas Musgrave showed strong leadership, rallied his men to work together, and benefited from the inventive Frenchman Francois Raynal, key to their survival. They decided to work together, salvaged materials from the shipwreck, built a cabin, hunted seals, and eventually even built a forge to make their own tools. Finally they constructed a small boat and three of them made an amazing, courageous voyage to reach Stewart Island, four hundred sixty kilometers north. Eventually the other two were rescued and all five survived after almost two years marooned.

While the Grafton men were still eating seals, another ship, the much larger 'Invercauld',

shipwrecked during a fierce gale on the opposite end of the island. Separated by twenty miles of impassable cliffs and gorges the two crews never made contact. Unlike Musgrave, the larger ship's captain retreated into comatose silence under the same miserable circumstances and died. His men fought, separated, there was one report of cannibalism, and many died of starvation. Only three of the twenty-five survived.

Overcome hardships and suffering through collaboration or succumb to dismal conditions? Contrasting outcomes for the two shipwrecks are dramatically embroidered in Druett's narrative through her maritime expertise, and she presents colourful information on flora and fauna they encountered. The entire tale is based on original journals and historical documents. Read, and learn to survive your own next shipwreck!

By Bill Nye, Antarctic veteran ANDRILL Project, and owner of Adventure Books, Christchurch Arts Centre

## STEP INSIDE HILLARY'S ANTARCTIC HUT FREE VIRTUAL REALITY EXPERIENCE FOR SCHOOLS

Antarctic Heritage Trust is touring New Zealand schools with the fully immersive virtual reality experience of Sir Edmund Hillary's Hut – the first building at New Zealand's Scott Base. Explore the hut and learn about New Zealand's role in Antarctica. Delivered by educators and Antarticians the VR is paired with excellent resources to share with students to introduce them to this fascinating place and its importance to New Zealand.

To book a visit to your school contact:  
Gabriela Roldan - Project Manager, Hillary's Hut Virtual Reality Tour  
E: g.roldan@nzaht.org  
P: 03 358 0212

To find out more visit [nzaht.org](http://nzaht.org).

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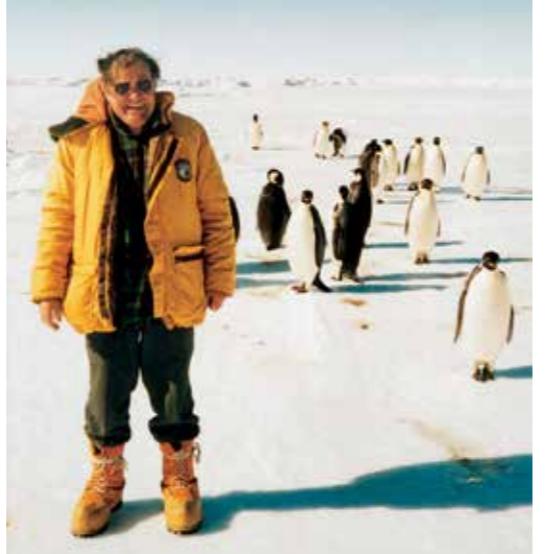
# Obituary: Robert (Bob) George Norman:

**Engineer and Antarctic Enthusiast.  
5 October 1923 - 6 February 2021**

Bob Norman, who died aged 97, was an unusual mix: an engineer committed to finding better ways society could make best use of technology, and an environmentalist who knew that mankind was responsible for its limited planetary resources. Towards the end of a long and illustrious career as a civil engineer with the Ministry of Works (MoW), he made his first visit to Scott Base in Antarctica. To expand his experience of public service management, he applied for and was appointed to the position of one of three State Service Commissioners in 1967 (returning to the MoW in 1969). His position there included responsibility for the efficient and effective running of the Department of Scientific and Industrial Research (DSIR). He thought he should visit all the DSIR research centres and see how well they were operating. After a couple of months, he proudly told Bill Hamilton, Director General for DSIR, that he had visited all the centres. "Not so" Hamilton told him, "you haven't visited Scott Base". Within a week or so, Bob was flying south to Antarctica for an inspection visit of several days. The "bug" bit!

Bob Norman was born and brought up in Lower Hutt, attended Hutt Valley High and then Nelson College, where he switched from the classics to science. He then headed to Canterbury College and graduated with a Bachelor of Engineering with honours in 1944. He went to Egypt with the Second New Zealand Expeditionary Force, then onto Italy, and later went to Japan as part of J Force. He married Beverley in 1950 and went on to have five children. The family settled in Titahi Bay, where he built their home and they lived for the better part of 50 years. Back in New Zealand, Bob returned to the Public Works Department (forerunner of MoW) as a design engineer and did an honours degree in maths at Victoria University. In 1956, he was awarded a Harkness Fellowship. He spent most of his working life at the Ministry of Works, working his way up to be Commissioner of Works in 1985. He was regarded as legendary in engineering annals in New Zealand - Intelligent, direct, uncompromising. An innovative, creative thinker, hugely knowledgeable about bridge design among many other areas of engineering, and often a thorn in the side of several ministers of works. He retired in early 1986, just before restructuring of the Public Service in 1987 saw the disestablishment of the MoW. He recorded some of the MoW's achievements in his 1997 book **You Can't Win 'Em All – Confessions of a Public Works Engineer**.

Later in 1986 Bob was asked by DSIR to review the New Zealand Antarctic programme which involved 10 days visiting Scott Base and the field projects. This was the start of Bob's major involvement with the Antarctic. Shortly after, in 1988, he was asked by Bob Tizard (Minister of Science) to be Chairman of the Ross Dependency Research Committee (RDRC), the committee that had developed and oversaw the New Zealand Antarctic research programme since the International Geophysical Year



Bob Norman at Scott Base in the late 1980s.

(IGY). As Chair of RDRC until 1993, he visited Scott Base every year to assess for himself how Scott Base and the various research programmes were progressing, developing a broad, unique knowledge of the whole programme. He saw the need for humans to be worthy custodians of the ice continent and to be keenly aware of what we could learn from it.

Under the major reorganisation of government science in 1992, Antarctic Division of DSIR became the New Zealand Antarctic Programme, operating as a separate division of the Ministry of Foreign Affairs and Trade (MFAT). Its relationship with the role and responsibilities of RDRC, then part of the Policy Division of MFAT, appeared uncertain so Bob stepped down as Chair of RDRC in 1993. Bob continued his interest in Antarctica through his involvement with the Antarctic Heritage Trust (AHT). The AHT was set up in April 1987 to conserve the historic huts in the Ross Dependency. As Chair of RDRC, Bob became a Trustee in early 1988 and remained a Trustee of AHT until 1993. However, in 1992, Bob was asked to be an Associate Patron of AHT, joining the Governor General (Patron) and Sir Edmund Hillary (Associate Patron), and was thus able to continue his interest in Antarctica and contribute to the work of the AHT for the next 29 years.

In 1985 Bob was made a Companion of the Queen's Service Order for Public Service. For his services to engineering, he was made a Distinguished Fellow of the Institution of Professional Engineers, NZ, in 1997.

*By Fred Davey*

#### SOURCES:

*Dominion Post 27/2/21*

You Can't Win 'Em All – Confessions of a Public Works Engineer. RG Norman 1997, Slide Rule Press, Wellington  
*Antarctic Heritage Trust*

## Engaging the wider community - message from the President of the NZ Antarctic Society



**Writing the presidential piece as we are all in Level 4 Covid lockdown**

again after 6 months of almost paradisiacal L1 normality. Firstly, I would like to acknowledge two in-depth articles, in this edition,

about Alec McFerran (Canterbury Branch), and Bob Norman (Wellington Branch) following their passing in November 2020 and February 2021 respectively. Alec and Bob were both life-long supporters of the NZ Antarctic Society and all things Antarctic; Alec was a Life Member.

I would also like to acknowledge the exceptional work and progress being made in the Antarctic science arena by the NZAS Science subcommittee this last 12 months led by our patron Peter Barrett with Robin Falconer, Margaret Austin and Clive Howard-Williams -for example -the NZAS response to the *Aotearoa New Zealand Antarctic and Southern Ocean Research Directions and Priorities draft strategy* (sent to MFAT in August 2021). Another piece of work in progress for over a year is the 'Organisational Framework Project', (basically a detailed landscape of how research organisations such as Antarctica NZ, MFAT and the Universities are organised and work together in terms of the Antarctic and Southern Ocean).

Since the last issue of *Antarctic* - our new membership officer Irene Gillies with her tech savvy business systems background, in conjunction with Liz Forde (National Treasurer) Peter Barrett and Gracie Jones in particular, have worked solidly and patiently to review and better align our membership and financial systems so that they are now more compatible and streamlined- particularly in relation to our membership renewals process – thank you !!

Another thank you goes to members continuing to join the society or renew subscriptions, and

support events running in our branches and nationally. Regarding the *Antarctic* magazines- the Council agreed in principle earlier this year to produce two double issues in 2021, rather than 4 single publications. So, in July – Council affirmed – “as a short term measure (given the council’s strategic planning meeting later in 2021) – that the Editor produce two primarily (and externally) sponsored double-issue magazine editions in August and October 2021, that will be circulated to all 370 high schools in NZ”. The Editor (Nicholas O’Flaherty) has worked his magic again – finding and securing several committed sponsors for the 2 double issues this year - with the main topics and themes for the first Spring Edition focussed around Climate Change – a topic currently being seized upon by Year 10-13 students.

On the topic of thinking about NZAS' future connections and directions - on August 21st the Council was going to hold a collaborative workshop in Wellington (rescheduled now because of covid lockdowns) - to review the Strategic Plan-(current till October 2022)- conduct a SWOT analysis to establish strengths, weaknesses, opportunities and threats to the Society, agree priorities, and prepare resultant business and action plan drafts for the next 12-18 months. This session will now be very soon after the new Council and Branch Committees commence their 2021/2022 terms in office.

Food for thought ahead of this time is the ever growing number in NZ of those in the 20-30s age bracket (residents already and many new returnees) –and to give them a reason to be attracted to join us and get actively involved in the NZAS by forming a differing niche for example to complement the AHT Inspiring young explorers programme. So, Branch AGMs in September /October and National AGM on 18 October - so please come along or tune in on zoom or you tube - as it will likely be a hybrid meeting this year of face to face and/or online.

*Nga mihi nui.*

*By Linda Kestle, President, NZ Antarctic Society*

# Rutherford Ridge

## - What's in a name?

This year New Zealand celebrates the 150th anniversary of the birth of its greatest scientist, Ernest Rutherford, recipient of the Nobel Prize in Chemistry, and one of only 16 scientists honoured with the name

of an element in the periodic table. In Antarctica too, his name lives on, bestowed on a mountain ridge high above the Miller Glacier, west of Scott Base in Victoria Land.

Born on 30 August 1871 in Spring Grove in rural Nelson, Rutherford studied at Nelson College and Canterbury College in Christchurch (which became the University

of Canterbury). He won a scholarship to carry out further research, which he took at the Cavendish Laboratory, University of Cambridge, England. He later worked at McGill University, Canada, for nine years, returning to the UK to become Professor of Physics at Victoria University of Manchester.

Rutherford is known as the father of nuclear physics for a number of major breakthroughs. These include discovering alpha and beta rays and explaining radioactivity, for which he received the 1908 Nobel Prize in Chemistry. He developed radioactive dating, established the nuclear structure of the atom, and discovered the artificial transmutation of atoms.

When he last visited his home country in 1925, he was received as a national hero and gave talks to packed halls around New Zealand. Rutherford's support helped see the establishment of the NZ Department of Scientific and Industrial Research in 1926. He died in 1937 in England.

In 1969, researchers used the Heavy Ion Linear Accelerator (HILAC) at the University of California, Berkeley to synthesize a new element with the atomic number 104. One of the co-discoverers was American nuclear scientist Al Ghiorso.

According to a leading expert on Rutherford, Dr John Campbell (retired physicist from the University of Canterbury), Ghiorso had enormous respect for New Zealand's greatest scientist. In particular, Ghiorso had been impressed by how Rutherford had conducted simple experiments using simple apparatuses to

\* Campbell is co-producer of the three-part documentary "Rutherford," as well as the author of "Rutherford Scientist Supreme" and [www.rutherford.org.nz](http://www.rutherford.org.nz).



The view up Miller Glacier with Rutherford Ridge visible at left, 2001.  
Photo: Keith Springer, Antarctica NZ

achieve profound results. This inspired Ghiorso to put forward Rutherfordium as an appropriate name for one of the new elements of the periodic table.

Ghiorso, who died in 2010, was interviewed by Campbell in 1999\*. "Al joined the Manhattan Project in 1942. As an electrical engineer, Ghiorso had to read up on nuclear physics and one of the books was by Rutherford, Chadwick and Ellis," said Campbell.

In November of 1969, at celebrations marking the centennial of Mendeleev's periodic table, Al Ghiorso proposed that element 104 be named Rutherfordium (Rf). In his own words "Rutherfordium would be a fine name to add to the plethora of great names of the elements."

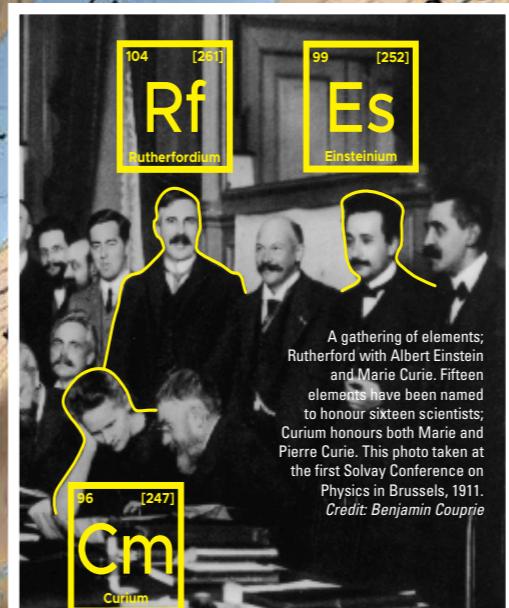
Rutherford Ridge was one of 36 new place names proposed in 2007 by the United States Advisory Committee on Antarctic Names, according to New Zealand Geographic Board Ngā Pou Taunaha o Aotearoa Secretary Wendy Shaw.

The new place names related to a new series of ten digital 1:50k topographic maps, published by the United States Geological Survey in 2009. "Since 1956, the Board has made official decisions on new Antarctic place names, often during the production of new mapping," she said.

Rutherford's legacy continues in Antarctica in other ways. Radioactive dating is used to ascertain the age of minerals, and Rutherford Discovery Fellowships are awarded by the Royal Society Te Apārangi to develop future research leaders, many of whom undertake research in Antarctica and the Southern Ocean.

Source: USGS Map ID618, Polar Geospatial Center

Vol 39, Nos. 1 & 2, 2021



A gathering of elements;  
Rutherford with Albert Einstein  
and Marie Curie. Fifteen  
elements have been named  
to honour sixteen scientists;  
Curium honours both Marie  
and Pierre Curie. This photo taken at  
the first Solvay Conference on  
Physics in Brussels, 1911.  
Credit: Benjamin Couprie

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Established in 1933, the New Zealand Antarctic Society brings people together who are interested in Antarctica to share their knowledge with others, foster interest in the region, and support the protection of the Antarctic environment.

### Membership categories:

Memberships are for a period of 12 months renewable annually.

**Adult:** \$75.00

**Student:** \$40.00

**Family:** \$85.00

**Unwaged:** \$40.00

**New Zealand School:** \$135.00

**New Zealand-based Institution:** \$180.00

Membership is open to all. Please note the currency is NZD and international members pay an additional \$20.00 to assist with postage. Prices are inclusive of gst.

For NZ-based Institutions or Schools wishing to join please contact: [membership@antarcticsociety.org.nz](mailto:membership@antarcticsociety.org.nz)

### Existing members

As a valued member of the Society, we encourage you to keep your subscription renewed annually. We appreciate your continued support and enjoy having you as part of our active community committed to keeping the Antarctic spirit alive. You can easily renew your subscription through your account on the Society website: [antarcticsociety.org.nz/my-account/](http://antarcticsociety.org.nz/my-account/). If you need to change your membership type you can also do this here.

We are always on the look out to welcome new members to the Society, so if you have a friend or colleague with an interest in Antarctica, please direct them to the membership section on our website: [antarcticsociety.org.nz/membership](http://antarcticsociety.org.nz/membership)



Cascading ice stream on steaming volcano; the dramatic descent of Erebus Glacier draining the slopes of Earth's southernmost active volcano, Mt Erebus 3794m. The constant replenishment of snow sustains the flow for a further 11km into McMurdo Sound as a floating ice tongue.

*Photo: Natalie Anne Brechtel, USAP*

