

# ANTARCTIC



The Journal of the New Zealand Antarctic Society Vol 20, No. 3 & 4, 2003

## Sea Swells and Pack Ice Heritage Conservation Report Route to the Pole

Special  
Double Issue

# experience ANTARCTICA

The thrill and fascination of Antarctica has long been a part of New Zealand's culture. Because of Antarctica's isolation and the extreme environmental conditions there, most people will never experience the Antarctic first hand. However, the University of Canterbury currently offers ways to find out more about Canterbury's links to the Antarctic including a course that takes 20 students to Antarctica each year.

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## COVER PICTURE



Cover photograph: Iceberg at Cape Hallett, 1966. (Courtesy Antarctica New Zealand).

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## Call for articles

We invite readers to submit articles for *Over My Shoulder*, a series relating to past experiences in Antarctica. The aim is to record memories in print so that they are not lost to the future. Contributions from any country will be accepted.

Topical discussions on Antarctic themes are also welcome.

Please send to: The Editor, New Zealand Antarctic Society, PO Box 404, Christchurch 8015, New Zealand.  
Email: marga@chch.planet.org.nz  
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# "Colossal" Squid caught in Ross Sea

Scientific interest and ancient sea myths have been stirred since a fishing boat caught a huge 150 kg squid in February 2003 whilst fishing for Patagonian Toothfish under permit in the Ross Sea.

It seems that the squid too was interested in the toothfish as a meal, and was gaffed by the crew.

Squid expert Dr Steve O'Shea, Auckland University of Technology, identified the catch as an immature *Mesonychteuthis hamiltoni*, commonly known as "Colossal Squid". The body of the female animal is 2.25 m in length, already larger than an adult Giant Squid, or *Architeuthis dux*, that can weigh up to 910 kg.

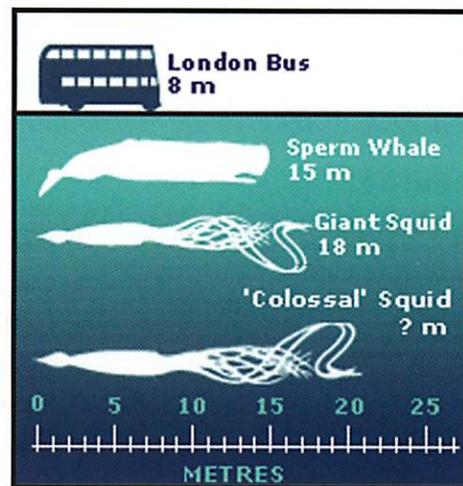
The Colossal Squid was armed with powerful eyes the size of dinner plates, had the largest parrot-like squid beak known, that was surrounded by eight arms, as well as two very long tentacles bearing 25 deeply-rooted hooks able to rotate through 360°. A fully mature Colossal Squid must be a formidable and aggressive predator, easily capable of overpowering a two metre long Patagonian toothfish, and holding its own against an attack from a Sperm Whale.

The Colossal Squid was first discovered in 1925 when two arms were recovered from a Sperm whale's stomach. Since then six other fragmented specimens have been recovered, five from the stomachs of Sperm whales, and one trawled up from a depth of 2000 to 2200 m.

The Ross Sea squid was the first to be collected from the surface of the ocean and is virtually intact. The Colossal Squid was previously believed to lurk at least 800m below the surface, glowing in the dark to light up prey so that they would become visible to the largest eyes of any animal known.



Dr Steve O'Shea studying the immature Colossal Squid collected in the Ross Sea. The pair of five metre long tentacles has been bent back over the head. Steve is touching the large eye of the animal.



Size comparison chart, including mature "Colossal Squid".

## Antarctic Artifacts Added to Museum

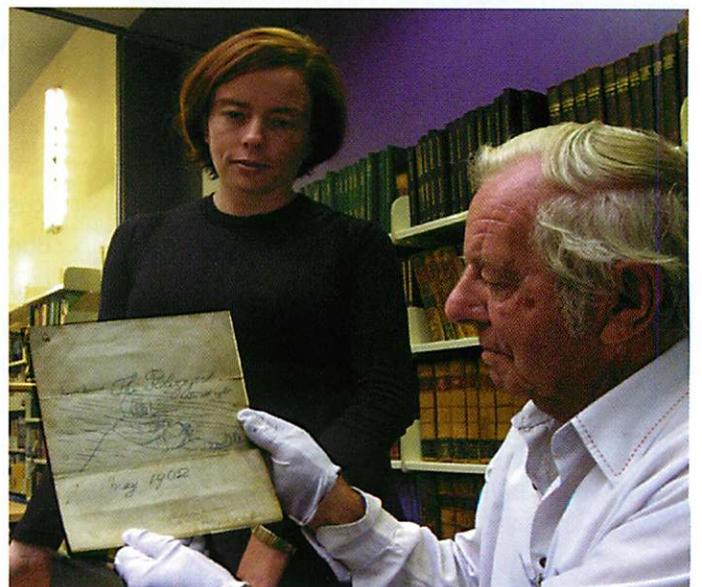
A train ticket issued to Captain Scott in 1910 by the Victorian railways and a rare Antarctic pamphlet organised by Shackleton were purchased by Canterbury Museum (Christchurch) in March from Bethune's auctions in Auckland using the Museum's Miss M C K Richard Bequest.

Shackleton's pamphlet *The Blizzard* was printed for the crew only using articles and sketches unsuitable for the Discovery Expedition's official publication *The South Polar Times* (1901/2).

The pamphlet belonged to dog-handler Isaac Weller and very few copies are known to exist. The pamphlet was bought for NZ\$23,625 and is the only one in an Australasian public collection.

The train ticket was issued to Captain Scott when the *Terra Nova* arrived in Melbourne en route to Lyttelton. Scott left the ship for a fund-raising campaign and the Victorian Railways granted him free train travel between 17 and 31 October 1910.

This unique ticket was purchased at the auction for NZ\$1856. Twelve other Antarctic items were also bought at the auction for NZ\$5000.



Kerry McCarthy, Curator of Pictorial Collections at Canterbury Museum watches as Baden Norris, Emeritus Curator of Antarctic history, displays Shackleton's pamphlet *The Blizzard*. Photo: Martin Woodhall.

## Basler Plane Wrecked at Patriot Hills

An Adventure Network International (ANI) 15 tonne Basler 67 was severely damaged during a storm at Patriot Hills early last November, despite being tied down. Winds of up to 100 knots, with rapid fluctuations between gusts, snapped the anchoring cables and the plane was blown 20-30 m across the snow. The impromptu "flight" resulted in the collapse of the undercarriage, which also bent the main structural members of both wings. The plane was regarded as unmendable.

After several months of evaluation and negotiation, the plane has been officially declared "written off". It will remain in Antarctica for the coming winter, and plans are underway to remove the wreck during the 2003-4 season. Before it can be removed, the plane will have to be dismantled so that it can travel north as air cargo. Even with the engines, wings and tail removed, the Basler may still be large enough to cause problems. The Iluyshin-76 would be able to fly the separated components, but the fuselage may be too big even for a C-130 Hercules without further dismantling.

The accident has created an unexpected set-back for ANI. The Basler had been highly successful, showing a greater operational capacity than a Twin Otter, and was about to start its fourth summer of Antarctic operations. It is not known if ANI will be looking for another Basler 67. A new aircraft is said to cost \$US4.9 million.

This summer's storm had shades of the one that destroyed Byrd's Fokker monoplane in the Rockefeller Mountains during his 1933-35 expedition, where again the wire tie-down cables broke. In the Marie Byrd Land accident, the engines were retrieved and returned to America, but the fuselage remains there, partially frozen into the ice.

The Basler will be the second non-operational plane to be stranded over winter. Last year an Antonov-3 aircraft run by CERPOLEX (Polar Circle Expeditions) could not be restarted at the South Pole and had to be abandoned for the winter. Over a year later, CERPOLEX still appear to still have no plans for the plane's removal.

## Increase in Large Tour Ships

Eight vessels that fall into IAATO's (International Association of Antarctic Tour Operators) Category 3 class of ships (more than 500 passengers) have indicated that they are planning to visit the Antarctic Peninsula during the next summer season (2003-4).

The ships are the *Amsterdam*, *Discovery*, *Royal Princess*, *Marco Polo*, *The World*, *Saga Rose*, *Aska* and *Olympia Explorer*. Between them, these ships have a total berth capacity of 6407.

Some ships, such as *The World* and *Saga Rose*, plan to carry fewer than 500 passengers per visit so that they can make landings and still be eligible for IAATO membership. The *Marco Polo*, however, which carries up to 550 passengers, makes landings and is therefore ineligible to join IAATO, who have laws preventing landings if there are more than 500 passengers aboard. The largest, as well as the newest, ship is the US owned (Resindensea) 43,524 tonne *The World*, which can carry 600 passengers.

The eight ships could make as many as 16 voyages over a two month period, doubling the previous voyage record for such visits in a single season, and potentially causing cumulative impact at popular sites.

*The World* on a recent visit to Fiordland, New Zealand. (Photo courtesy of South Port New Zealand Ltd)



## Trans Antarctic Flight Crash-lands on Marion Island

A small home-built single engine airplane had to make an emergency landing on Subantarctic Marion Island on 24 November 2002. The solo pilot, Frenchman Henri Chorosz, experienced problems during an attempt to fly across Antarctica as part of an around-the-world flight via both poles. The Glasair aircraft was damaged on landing.

Chorosz is well known in international long-distance flying circles and holds a number of world records. The aircraft, 7m long with a wing span of 11m, had been built by the pilot in his garage, and possessed two seats. One of the seats, as well as the rest of the cabin and the leading half of each wing, was occupied by auxiliary fuel tanks. Chorosz had been planning the world flight for several years, but the attempt caught Antarctic operators by sur-



*A Glasair pre-moulded composite kitplane in flight.*

*Continued on Page 32*

# McDonald Island Changes Shape

Passengers aboard a tour ship on a 30 day visit to the remote subantarctic islands of the South Indian Ocean, December 2002, thought they were the first to notice that a small volcanic island near Heard Island (both managed by Australia) had significantly changed its shape and size. A subsequent check showed that a routine scan by Geoscience Australia of Antarctic maritime boundaries in the Southern Ocean had beaten them to it by a few weeks.

The Russian ship *Academik Shokalskiy*, on charter to New Zealand based Heritage Expeditions carrying 39 passengers was between Crozet and Heard Islands. It was passing McDonald Island at dawn when the changed profile was noticed by a passenger, Grahame Budd, who had been on the island in 1971. Comparison of old and new photographs showed that the whole northern part of the island was much higher than before, and that three quarters of the island was completely new.

After a visit to Heard Island, where three of the passengers (Max Downes, Grahame Budd and Jon Stephenson) had worked in the 1950s and 1960s, the Expedition Leader, Rodney Russ, decided to return to McDonald Island for a closer look in better light. No landings were made because of Australian restrictions, and the surrounding waters were uncharted, preventing a close approach.

Steaming slopes and two types of lava dome greeted the passengers. The view from the north showed that at least three separate volcanic cones had buried most of the old land surface. Another passenger, Tony Bomford, known for his mapping in South Georgia and Australia, estimated that the highest point on the island was now 310 metres in the north, compared to an earlier high point of 212 metres on Maxwell Hill in the south. He promptly produced a sketch map of the new island with 50 metre form lines.

Analysis of enlarged digital photographs taken by passengers on the second visit indicated that considerable sedimentation had occurred along the coastline, so that the for-

merly separate Flat Island was now joined to the main island. Several metres of ash appeared to have blanketed the northern half of McDonald Island, while Macaroni Hill at its northern end had disappeared. A low-lying spit and reef now extend over a kilometre to the east of McDonald Island and are hazards to shipping.

Geologist Jon Stephenson, a former Heard Island expeditioner who had climbed on Big Ben with Grahame Budd in 1963, viewed the lava domes with great interest. "The finger-like pinnacles associated with two of the domes are probably being forced out as spines by pressure from below. This may mean that the volcano is in an unstable state and could erupt violently again."

An unseen vent to the south of these domes was producing an intermittent smoke plume. A larger, more rounded volcano, possibly composed of a different type of lava, now covered the central part of the island. Much of the new ground had fumaroles emitting steam.

It is unclear exactly when these new volcanic domes were formed. Earthquakes felt on Heard Island in 1992 were followed by the arrival of pumice fragments on the beaches that may have come from McDonald Island. Volcanic activity on or near McDonald Island was reported in 1997, 1999, and 2001, but the greatly altered shape of the island had occurred by the time Landsat 7 images were obtained in 2001. In an article for the Australian Geologist Newsletter, December 2002, John Manning drew attention to the discovery, made the previous month by Bill Hirst of

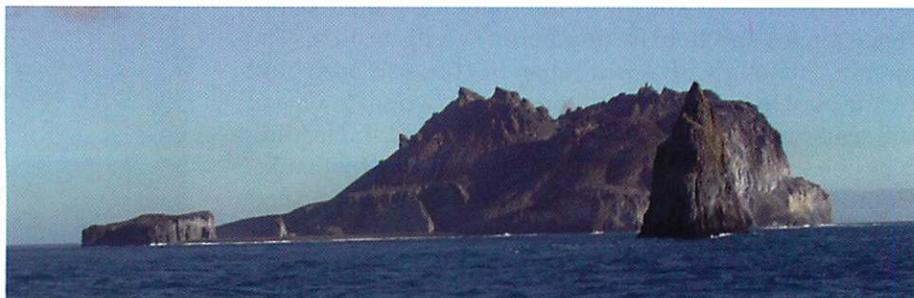


Top - aerial photograph of McDonald Island taken March 1980.

Insert - The greatly changed shape and size of McDonald Island is clearly visible in this Landsat 7 image collected November 2001. Note reef on east side of island, and Flat Island now joined to main island. Images courtesy John Manning.

Below: The new profile of McDonald Island seen from the north, with Needle Rock in the foreground. The earlier land, now mostly buried, is the level surface visible a third of the way up from the sea. Flat Island to the left has become joined to the island by a wide beach. The cloud top left is the remnant of an intermittent plume issuing from a vent on the western side of the island. Photo: Dr Jon Stephenson.

Continued on page 32



# Sea Swells and Pack Ice

## The voyage of the *Sir Hubert Wilkins* to the Ross Sea

By John Parsloe

In October 2000, when I joined a roll on-roll off vessel plying between Lyttelton and Wellington as a Relieving Deck Officer, there by Lyttelton's dry dock was a new arrival in port - a very small "polar-shaped" vessel, undergoing a transformation at the fitting out jetty.

It was the ice-ship *Sir Hubert Wilkins*, an Australian-owned vessel on its delivery voyage from Finland stopping off at Lyttelton to have a face-lift.

From a rather pallid white and inconspicuous small vessel, it was metamorphosing into a work of art that couldn't be missed on the Lyttelton waterfront - bold, bright splashes of colour - an Australian graphic designer's dream.

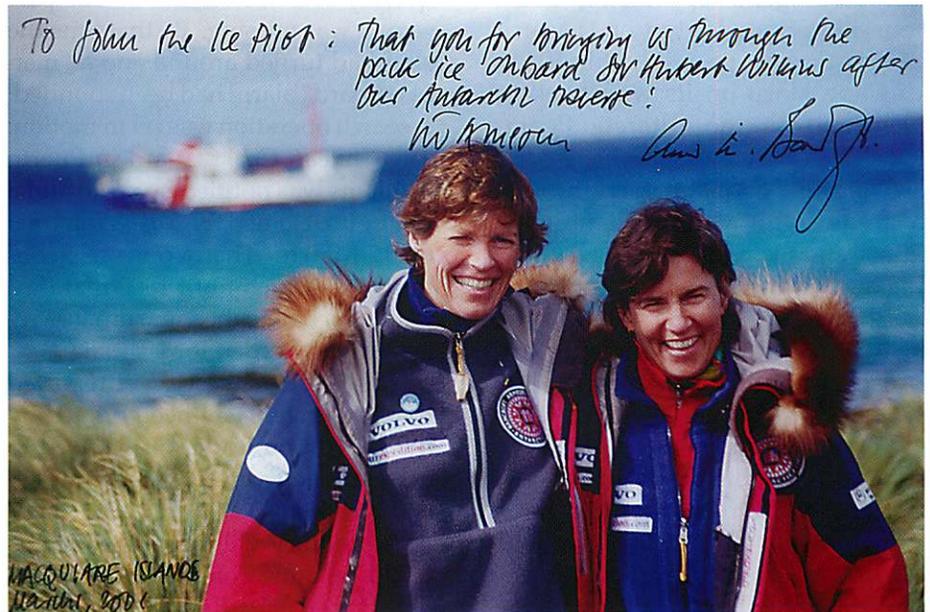
Three months later, on 1st February 2001, I was on a flight to Hobart to join the *Sir Hubert Wilkins* as Ice Pilot. I'd been seduced by her beauty and polar destination! It was *Sir Hubert Wilkins'* second Antarctic voyage and its first venture into the Ross Sea.

The *Sir Hubert Wilkins* had been chartered on behalf of the Bancroft Arnesen Expedition to collect American Ann Bancroft and Norwegian Liv Arnesen in the McMurdo Sound area after crossing Antarctica on skis (see *Antarctic* Vol.18 No.2, p.29). The majority of berths on board were to be filled by "Expeditioners", composed mainly of members of the media (referred to as "liquorice-allsorts"), an expedition co-ordinator and an interested Norwegian husband!

This was *Sir Hubert Wilkins'* second voyage to Antarctica, having just returned from visiting Mawson's Hut in Commonwealth Bay and locating the current position of the ever-moving South Magnetic Pole.

The *Sir Hubert Wilkins* is a small (37 m) ice strengthened vessel (Ice Class Finnish 1A), built for the Finnish government as a light buoy servicing vessel. Launched as *Tutka* in Finland in 1960 ("radar" or "all seeing eye"), she was renamed by her new Australian

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Above: Antarctic Traversers Liv Arnesen and Ann Bancroft on Macquarie Island.

Below: The *Sir Hubert Wilkins* in Antarctica. Photo: John Parsloe.



Below: The author John Parsloe in Shackleton's Hut, Cape Royds.



# Passenger Falls from Ship Near Cape Horn

A passenger disappeared from the tour ship *Grigory Mikheev* on 11 March 2003 as the ship passed within 10 km of Cape Horn on its way back to Ushuaia from the Antarctic Peninsula.

The ship had just passed through a strong storm with winds up to 70 knots, and the vessel had been pitching and rolling heavily as it headed north. The sea seemed to have been a little less rough as the ship approached the Horn at around 1400 hours on 11 March.

Some passengers went up to the bridge deck and some went outside, but according to the Captain none went out onto the main deck or bow. At 1523 hours the Captain was advised of "something suspicious in the water behind the ship", but by the time he reached the bridge the "suspicious" object was already out of sight.

Orders were immediately given for a count to be undertaken of all passengers, staff and crew, and it was

quickly established that a male passenger was missing. By that time the ship had turned around and a "man overboard" alarm had been sounded. A search operation was set in motion. The Chilean Coast Guard in Puerto Williams was notified by radio and a rescue boat joined the *Mikheev* at 0900 on 12 March. The two vessels continued to search until 1800 that day, after which time the tour ship was released and headed for Ushuaia.

The Master of the *Mikheev* reported that passengers had been briefed by the expedition leader of the need to be "extremely careful" at all times in bad weather.

An inquiry will be held, but this could be quite complex as the incident involved a Russian-registered vessel chartered by a Netherlands company (Oceanwide Expeditions) and occurred in Chilean waters.

(As far as the Editor is aware, this is the first death of its kind in over 300,000 tour passenger crossings of the Drake Passage over the last 40 years.)

# Swimming from the *Orlova*

American long-distance swimmer Lynne Cox made two swims from a tour ship in the Antarctic Peninsula during December, both from the Quark Expedition ship *Orlova* to the shore of King George Island.

The first swim on 13 December in water at 2°C was 1500m from the ship in Admiralty Bay to the shore near the Polish Arctowski station. The swim took 22 minutes. The second swim, two days later was in water at 0.5°C, was 1900 m (over one mile) from the ship in Neko Harbour to near the old Argentinean refuge hut. Cox became the first person to swim a mile in Antarctic waters which took her 25 minutes. She "emerged smiling and shivering" from the water with a body temperature of 35.2°C.

In case of emergencies during the swim, Cox was accompanied by three zodiacs and a doctor. Cox has also swum the English Channel and between the Diomed Islands in the Bering Strait at 66°N.

## *Trans Antarctic Flight Crash-lands on Marion Island*

*Continued from Page 29*

prise. The plan was to fly from Cape Town over the South Pole and to land at McMurdo to refuel, finishing in Christchurch. Neither South Africa, nor the US nor New Zealand were aware of the flight.

Chorosz began his world flight in Nice 17 November 2002 and arrived in Cape Town, via Nigeria, on the 19<sup>th</sup>. He left Cape Town 23 November with enough fuel for 27-28 hours of flying; just enough for the 7580 km flight to McMurdo. By the time the plane reached 60°S ice had started to build up on the wings, and even dropping to 20-30m above the waves did not melt it. Chorosz decided to divert to Marion Island, which lies 2180 km south east of Cape Town, believing it had an airstrip. When the aircraft made contact with Marion Island base, Chorosz was advised that there was no runway and that a landing

would be too rough. Chorosz replied that he had no choice but to land, and in the two to three hours before the plane appeared, base staff marked a flat but boggy area three kms south of the station with flares. The plane put down with only 100 litres of fuel left, but the soft ground caused the aircraft to flip onto its back. The pilot was dazed and bruised, but otherwise unhurt.

A French naval vessel took Chorosz back to France in early December, and at the end of April 2003 he returned on the South African ship *Agulhas* to oversee the dismantling and transfer of the plane to the ship by helicopter. The plane will be shipped back to France from Cape Town.

British pilot Polly Vacher is planning to fly across Antarctica next year in a slightly larger single engine Piper Dakota aircraft. It is not clear what arrangements have been made to refuel at McMurdo.

## *McDonald Island Changes Shape*

*Continued from Page 30*

Geoscience Australia, that McDonald Island had doubled in size from 1.13 square kilometres to 2.45 square kilometres.

Whenever this activity occurred, it did not destroy life on the island. Penguins are still nesting up to the top of Maxwell Hill, and in patch-like colonies on the ash-covered remnants of the old land, although they have deserted Flat Island. There are also plenty of penguins and seals on the beaches, and several dozen fur seals were seen swimming offshore.

The two geologists on the Heritage Expedition (Dr Jon Stephenson and Dr Margaret Bradshaw) recommended that a future visit to the island be made, despite the island being officially a closed area, so that the sequence of the new volcanic events and the composition of the lavas can be determined.

# Scott Base Winter Team

This winter, Scott Base will be occupied by the fifteen people pictured. Led by Winter Manager Doug Bell, who has wintered in Antarctica before, base numbers have been increased by three scientists and one support person who will pursue their ice and atmospheric studies over the winter months.

**At Top** - Margaret Auger – Science Technician

**2nd Row (L to R):**

Sue Green – Chef

Cath Slee - Domestic & First Aid

**3rd Row (L to R):**

Brian Staite - Field Support Officer

Rebecca Batchelor – Scientist, atmospheric studies

Craig Purdie – Scientist, sea ice studies

**4th Row (L to R)**

Doug Bell – Winter Manager & Base Electrician

Phil Snelling – Carpenter

Rob Teasdale – Mechanic

Jonathan Leitch – Science Support



**Bottom Row (L to R)**

Greg Leonard – Scientist, sea ice studies

Peter Wederall – Engineering Manager & Base Engineer

Kyle Hunter – Painter & Decorator

Glenn Powell – Base Engineer

Anthony Powell - Telecom Technician

*Photo courtesy  
Anthony Powell.*

## New Chief Executive Settles In

Lou Sanson has been busy since taking over as Chief Executive of Antarctica New Zealand from Gillian Wratt on 1 August, 2002.

While overlapping with Gillian's final weeks to ensure a smooth transfer, Lou's first two months included the COMNAP meeting in Shanghai and the Antarctic Treaty meeting in Warsaw.

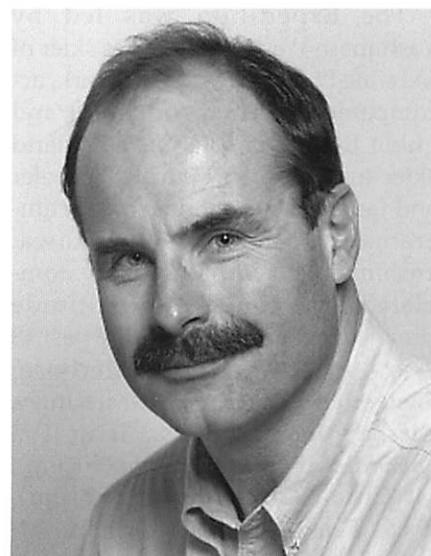
Before coming to Antarctica New Zealand Lou Sanson was head of the vast Southland Conservancy of the Department of Conservation (DOC), which includes Fiordland, Stewart Island, the Catlins Rainforest Park and the New Zealand Subantarctic Islands.

As Conservator, Lou was responsible for the establishment of the new Rakiura National Park on Stewart Island and the New Zealand Subantarctic Islands World Heritage

Area. Lou has extensive experience in operations and logistical planning in remote field locations and has considerable conservation and research management experience. This included the development of conservation partnerships and community arts and education programmes based on the natural environment.

Lou was born in Hokitika on the West Coast of the South Island, and after completing a forestry degree, specialised in environmental forest management. He went south to Invercargill for six months, but took 22 years to leave. Lou's first visit to Antarctica was as a field assistant and driller in a joint USAP/NZAP drilling programme in the Lower Taylor Valley in 1982/83.

Since then he has made thirteen trips to the Ross Sea and Antarctic Peninsula as a lecturer on cruise ships.



In addition Lou has visited the Galapagos Islands to see how management handled tourism. He has also been actively engaged in sea bird conservation in the Southern Ocean.

## Tourist Diver Dies at Half Moon Island

A Latvian scuba diver from the tour ship *Grigory Mikheev* died on 27 January during a dive at Half Moon Island in the South Shetland Islands. The man was in a party of nine Latvian divers who were making their first dive on a 12 day voyage organised by Oceanwide Expeditions of the Netherlands. The man appeared to be well at the beginning of the dive, but after not surfacing, he was found on the sea floor at a depth of 20 metres. Attempts were made to revive the man on board the *Mikheev*,

and a defibrillator was provided by a Brazilian ship *Ary Rongel* that was in the area. All attempts to resuscitate the man failed.

At least five tour companies in the Antarctic Peninsula offer scuba diving and snorkelling activities. Divers have to possess recognised diving certifications, and the first dives are accompanied by dive masters on the ship's staff to assess the competency of the tourist diver. Two dive masters were present on the *Mikheev* when the accident occurred.

## Helicopter Crash in Dry Valleys

Two Americans were seriously injured on 17 January when a US Antarctic Program helicopter crashed onto a frozen lake in the Lower Taylor Valley.

According to people on the ground, the helicopter, with a pilot and crewman on board, was flying an underslung load consisting of the rigid floor of a large Polar Haven tent.

After some movement of the load, the helicopter got into difficulties, the pilot released the strop, but the machine landed heavily.

Both Americans suffered various injuries, including broken bones and back injuries. American personnel on the ground were able to assist the injured men, but rescue was delayed because of bad weather across McMurdo Sound.

Three rescue helicopters were required to extract the men from the wreckage and take them to McMurdo. They were then placed on a MEDEVAC flight on a ski-equipped Hercules for treatment in Christchurch, New Zealand.

The reason for the crash is presently unknown, but considering the number of field missions flown by US helicopters each year, crashes happen very rarely. The last serious crash was in October 1992.

The helicopter was a seven passenger Bell 212 helicopter flown by Petroleum Helicopters Inc of Lafayette, Louisiana. Petroleum Helicopters took over the responsibility for helicopter flight operations in 1996 and undertake about 1500 hours of flying each season.

## Extreme Ski Attempt on Mount Erebus Cancelled

The failure of the *Academic Shokalskiy* to reach Ross Island because of heavy ice conditions foiled a climb of the active volcano Mt Erebus, a ski descent into its main crater, followed by ski descent back to sea level. The four man party was unable to land on Ross Island, and were forced to remain on the ship, which docked in Invercargill, New Zealand, on 31 January.

The Expedition was led by Yoshimasa Wada, Adventure skier of Extreme Dreams World Network, accompanied by US mountaineer and guide John Svenson, New Zealand skier and mountaineer Mike Wheeler and Japanese mountaineer and cameraman, Shigeki Nishikawa. Yoshimasa Wada had already completed nine similar high-altitude climb-ski expeditions over the past 18 years, including the Matterhorn, Switzerland (4478m), Mt McKinley, Alaska (6198m), Mt Jaya, Irian Jaya (5030m), Mt Kenya, Kenya (5000m), Mt Chimoraz, Ecuador (6310m), Wada Peak, Mongolia (4200m), Mt Gyokuzan, Taiwan (3954m) and a 200 km traverse of Juneau Icefield, British Columbia/Alaska. A consistent theme of Wada's extreme ski expeditions that began in 1985 has been to spread the environmental message

"Clean Earth Forever".

The expedition joined the *Shokalskiy* in Hobart, Australia 3 January, and the plan was to pick the party up a month later during the ship's second Ross Sea visit. The expedition was well equipped and had good sponsorship.

Wada had been planning the Mt Erebus adventure for over five years. He made a reconnaissance visit to Ross Island on the *Kapitan Klebnikov* in 1999. An attempt during 2000-01 had to be postponed a few months before departure, and another attempt the following season using the *Sir Hubert Wilkins* was cancelled when the ship had last minute passenger cancellations. Wada has not given up, and will try again another season.

*Mt Erebus. Photo: Reader's Digest*



# Helicopter Forced to Ditch in Sea

A private helicopter with two British men aboard was forced to ditch into the sea 60 km north of Livingstone Island on 26 January.

The men had been attempting to fly from Cape Horn to the Chilean Teniente Marsh base on King George Island, a distance of 850 km. The helicopter was a single turbine Robinson R44, four seater, which, for this flight, was carrying an auxiliary fuel tank on the back seats. The flight by the two men, Quentin Smith and Steve Brooks, appears to have been part of a journey from the North Pole to the South Pole to celebrate 100 years of powered flight. The reason why the helicopter lost power well short of its destination is not known.

According to a press release issued by Steve Brooks' UK-based property development company, the two men had less than a minute to prepare for ditching after the engine stopped. Brooks jumped into the sea with a satellite telephone and an inflatable life-raft from a height of about eight metres, while Smith "brought the helicopter to a final hover before (it) slid into the water". The helicopter sank very quickly.

The two men did not have time to fully zip-up their survival suits before

ditching, and consequently got soaked in the icy cold water. To compound their difficulties, the life-raft was blown down wind, and was retrieved only after a long and exhausting swim by Brooks. After boardin the raft, "desperately cold", the two men spent the next hour trying to erect a makeshift shelter for extra protection. Within seconds of setting this up, the shelter was obliterated by a large wave and the raft filled with water.

At this point, while the two men were sitting in 30 cm of "freezing wate", the decision was taken to use their satellite telephone to call Brooks' wife in London and initiate a rescue. The pair's emergency recue beacon, however, had already aerted British and Chilen authorities in the South Atlantic region and te Chilean Air Force immediately sent a Twin Otter from King George Island to locate the life raft and direct the Chilean aval vessel *Admiralte Viel* to he site.

Meanwhile, Brooks and Smih spent ten cold hours bailing out te raft before final rescue. The British Naal vessel HMAS *Endurance*, some 270 km away, launched a helicopter, but this was stood down by rescue authorities after the men were rescued.

The *Admiralte Viel* took the men to King George Island where they were later moved by helicopter to the *Endurance*, who landed them at Stanley in the Falkland Islands on 31 January. Both men are reported to be well.

The two British pilots were not without experience. Quentin Smith is believed to have flown twice around the world by helicopter, and to have provided air support when Steve Brooks and another man crossed the Bering Strait in a specially-designed amphibious surface vehicle last year. Both men had visited King George Island before their flight. A Preliminary Assessment of Environmental Impacts (PA) for the helicopter flight was presented to the Chilean Antarctic Institute four days before departure, and approval was given by Chilean Authorities, including the Navy, who examined the Robinson's emergency equipment, and the Air Force, who approved a landing at Teniente Marsh. UK government and British Antarctic Survey (BAS) personnel, however, do not seem to have been aware of the proposed flight until the ditching occurred.

News reports indicate that Chile will be investigating the cause of the accident.

## Captain's 100th Antarctic Voyage

Captain Heinz Aye completed his 100th voyage to Antarctica last month, this time as ice pilot for the cruise liner *Crystal Symphony*. Over the last 25 years Aye has commanded well-known Antarctic tour ships such as the *World Discoverer*, *Society Explorer*, *Hanseatic* and the *Bremen* (both under that name and as the *Frontier Spirit*).

Captain Aye, whose sea career started 50 years ago, first visited the Antarctic in 1977. Seven of his Antarctic voyages have involved long passages between New Zealand, the Ross Sea and southern Argentina. He also has extensive experience in the Arctic, having five times taken vessels through the Northwest Passage of Canada, four of those without ice breaker support, and has circumnavigated Spitsbergen three times, the 1996 voyage being the first by a passenger vessel.



# Heritage Conservation Report

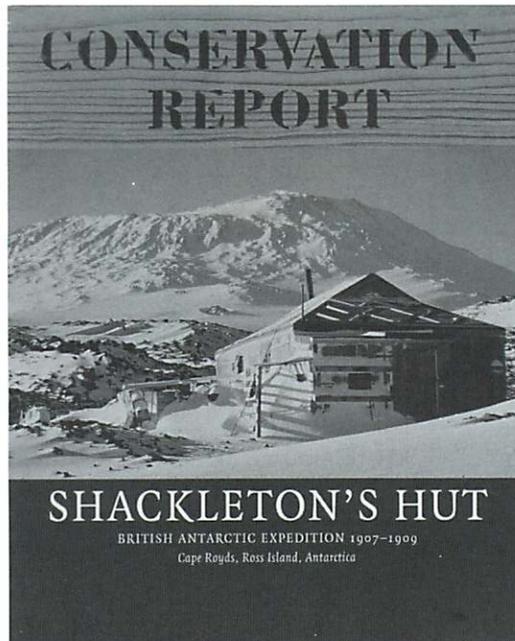
On 25 March 2003, one hundred years after Shackleton returned to Lyttelton from his first visit to Antarctica on Scott's Discovery Expedition, the Antarctic Heritage Trust (AHT) launched a Conservation Report on the hut Shackleton built three years later at Cape Royds. The report, produced for the New Zealand based AHT by a group of international heritage experts, was launched by the New Zealand Prime Minister and Minister for Arts, Culture and Heritage, Helen Clark, and the famous explorer's grand-daughter the Hon. Alexandra Shackleton.

The event was hosted by the Lyttelton Port Company close to Lyttelton's historic B jetty. March 25 is significant, given that on this day both 100 and 94 years ago Shackleton arrived back in Lyttelton port after separate Antarctic expeditions.

AHT chairman Rob Fenwick said the report established the immense significance of the building in heritage terms and established the principles for its conservation for future generations. He said it would also be used to assist in fund raising for the restoration project which he expected to commence this summer and would continue for at least five years.

The report has taken over a year to be developed by an international team of eleven heritage experts. Peer reviewed by senior British conservation architect, Michael Morrison, author of the conservation plan for the British Museum, and led by senior New Zealand conservation architect Chris Cochran the report represents a milestone in the protection of polar heritage.

"Unlike most other conservation reports, a range of disciplines have been involved in the compilation of this document, including historians, architects, professional conservators, and engineers. The Antarctic is a unique environment and heritage protection within that environment demands unique solutions", said Mr Cochran. "The cultural heritage is inextricably linked with the period of use by Shackleton's Nimrod expedition".



Left: The cover of AHT's Conservation Report on Shackleton's Hut at Cape Royds.

Below: Prime Minister Helen Clark, Hon Alexandra Shackleton (grand-daughter of Sir Ernest Shackleton) and Rob Fenwick, Chairman of the Antarctic Heritage Trust with the proceeds of funds raised by The James Caird Society (UK) for the Antarctic Heritage Trust. Photo: John McCoombe. Copyright: Antarctic Heritage Trust.



The New Zealand Government through the Ministry for Culture and Heritage and the New Zealand Lottery Grants Board had funded the report, which seeks to establish a framework for maintenance, repair and restoration of the hut to reflect its dominant period of occupation and in particular the period when abandoned by Shackleton's expedition in 1909. The report includes proposals for reconstructing lost elements of the stables and garage and considers limited use of replica artefacts. Many of the original artefacts have been lost over time due to the harsh environment and theft.

Antarctic Heritage Trust Director, Nigel Watson said the report reflected

the culmination of significant work over many years including workshops, site surveys and input from international experts across many disciplines. "This document includes for the first time, a complete list of provisions taken south on Shackleton's expedition, together with copies of the original building specifications that were uncovered in Britain by our polar historian during research for this report".

Because of the unique setting of this heritage site, the report has been circulated to approximately fifty international stakeholder heritage agencies for comment, and would be publicly available, reported Mr Watson.

AHT chairman Rob Fenwick said "the report establishes the heritage principles for a restoration project on the historic building and is a first step on the road to preserving an iconic piece of heritage on Antarctica for future generations. It does not address how we are going to approach implementation or fund the restoration work and this would need to be developed in association with the wider community of interests."

"There are many constraints around a project of this nature" Rob Fenwick said. "Environmental considerations in Antarctica and the Antarctic Treaty are highly sensitive" he said. There were logistic questions on how AHT could undertake this work in co-operation with Antarctica New Zealand who already have a busy scientific work programme. There is also a significant amount of money to be raised from the international community, particularly the UK. Mr Fenwick said an implementation plan would flow from these considerations, and he looked forward to working with the Ministry of Foreign Affairs and Trade, and Antarctica New Zealand and others on formulating the approach.

The development of an implementation plan will provide an opportunity for wider consultation among the Antarctic community and feedback from the initial report. Mr Fenwick said the project is particularly challenging because of the many complexities of working in Antarctica. He also said that the conservation of Antarctic heritage did not mean there would be an influx of tourists to the continent. "Our Trust does not believe it is in the best interests of the fragile Antarctic environment for tourist numbers to increase."



## Conservation Principles of the Report

1. The major period of occupation of the hut was during the British Antarctic Expedition, 1907–09. The focus will be on repairing, maintaining and restoring the hut to reflect the dominant period of occupation, and, in particular, the time when the hut was abandoned in March 1909.
2. The hut, artefacts and environs, will be treated to show the place, as far as is reasonably possible, as it would be today if the degrading effects of time, environment and human interference, including modern interventions and pilfering, had been minimised.
3. Work proposed includes reconstructing lost elements of the stables and garage, and reconfiguring the original layout inside; all these elements having been significantly altered since 1909.
4. Evidence of change during the latter part of the heroic era of Antarctic exploration (1895–1917) will be respected. Evidence of change in the modern era (post 1957 when the hut began to be visited regularly) will be recorded, but for the purpose of the Conservation Plan is judged to be of slight heritage value.
5. All authentic material will be retained to the greatest extent possible, and will be treated according to internationally accepted conservation practice within the constraints of the Antarctic climate. Processes of conservation be recorded and reversible.
6. Repair of the building to ensure that it is structurally and functionally sound.
7. Repair materials not to be artificially aged, but be carefully chosen to match the original materials and to weather over time to blend with adjacent authentic material.
8. Iconic objects will be conserved and repaired, where feasible in situ; other authentic objects will be conserved where possible or replaced with replicas where appropriate; modern fabric may be removed.
9. A higher degree of replication of artefacts at this site is envisaged than at other historic huts. Stores and supplies outside the hut, depending on their condition and the risk they pose to wildlife, will be restored or replicated as appropriate.
10. The choice of materials for the replication of artefacts stored outside will follow the philosophy outlined above for the repair of the building.
11. Replicated objects inside the hut to blend with authentic artefacts. Objects for replication will be chosen from the best remaining examples of that artefact, whether from the site or from the off-site collection. Replicas to be identified in a permanent way.
12. Subject always to historical authenticity, treatment will aim to give visual unity and comprehensibility to the site.

# Route to the Pole

Work began this season on a proposed overland route to the South Pole, but it will take three years to complete.

Even then there has to be an initial proof-of-concept traverse with tractor trains during the fourth season before the National Science Foundation (NSF) will commit itself to a permanent highway. If the final traverse is successful, then it will be the first over-snow, heavy-equipment traverse by the US Antarctic programme since 1968. The route will be 1600 km long, and will allow tractor trains to carry fuel and supplies to the pole, reducing reliance on flights. The journey from McMurdo to the pole is expected to take 14 days, with a return journey of 12 days.

Every kilogramme flown to the South Pole by Hercules costs at least US\$25 compared to about \$1.50 per kilo by road, resulting in massive savings for the US program. NSF sees the main benefit of the road as freeing up planes for science. The rebuilding of South Pole Station has taken up more than half of the 150 flights south each year. When the road is operational, these flights will become available for important science projects, such as "ICE CUBE". This is a massive Neutrino detector planned for the South Pole that would require nearly 300 flights to carry in the drilling equipment, fuel and scientific instruments. Poor visibility that might ground Hercules flights, should pose no problems for a tested and marked ground route.

Between October 2002 and mid February 2003, a small group pioneered a path across the first part of the route. The most difficult area lies beyond Minna Bluff, 50 km from McMurdo, where the McMurdo Ice Shelf meets the much faster Ross Ice Shelf. Here there is a dangerous shear zone, 5 km wide, and full of large crevasses. The surface looks flat, innocent and blemish free, but beneath the snow is a belt of huge crevasses that runs 120 km from Minna Bluff to Cape Crozier. Anyone wanting to travel up the Ice Shelf from Ross Island has to cross this zone. Only a



*Using explosives to open up crevasses in the Shear Zone. Photo: John Wright/Shaun Norman, courtesy The Antarctic Sun.*

slight problem if you are on ski or snow toboggan, but a 182.6 tonne bulldozer would not fare so well.

In 1991 a D8 bulldozer was lost in the shear zone when a snowbridge collapsed. Fortunately, the two men in the machine were safely rescued, but the bulldozer is still down a crevasse. This year the shear zone took the road party three months to cross, and 2.5 tonnes of explosives had to be used to make the route safe. The group worked from "Shear Zone camp", which comprised a Jamesway and several tents. More than 30 crevasses were encountered, the largest being eight metres wide and 30 m deep. This mammoth crevasse required 10,000 cubic metres of snow to fill it before the route could cross it. Some of the crevasses have earned their own names, such as "Hummer", "Strange Brew", "Personal space" and "Mongoo". As Project Manager American John Wright said "We're going to take any crevasse head-on and we're going to gut it and we're going to fill it and we're going to cross it."

The building party used a ground-penetrating radar sensor to find the crevasses. This was mounted on a boom that projected out in front of a jeep-sized tracked vehicle called a Pisten Bully that led the party, travelling at 5 kmph. Initially a hole was made into the crevasse and a climber descended into the icy depths on a rope to determine the slot's vital statistics. A hot-water hose was used to drill down to the crevasse, sometimes

up to 11 m, and explosives were then set off to expose the crevasse. Twenty four hours were needed to allow noxious gases to clear after the explosion before roped workers could define the edge of the crevasse. Once assessed, the crevasse would be filled with snow. One of the biggest challenges for the team was to find a "safe zone" for the D8 to collect the snow needed to fill the crevasse without going into a crevasse itself. Each crevasse took one to six hours to fill depending on size, and a further hour to extend the route across the man-made plug. The route is now completely safe, but like a minefield, it's a different story if you step off that path.

The overall safety of the party was in the charge of sole New Zealander Shaun Norman, an Alpine Guide from Twizel. At 60 years of age, Shaun's experience is impressive and includes 39 ascents of Mount Cook, 15 Antarctic summers and climbs in the Himalayas, including Mt Everest. He has a reputation for toughness and determination. Shaun's mission was to keep everybody safe on the job, and to assess all problems that the location threw at him. Despite a serious injury on Mt Cook (March 2000) when a client pulled him over on a glacier and he slid into a crevasse, Shaun hasn't let that put him off crevasses.

After finally crossing the shear zone, the group tested the autumn Ross Ice Shelf with the "Pisten Bully" and Challenger 95 pulling two laden

sledges. In four days they made a return trip of 160 km without encountering any crevasses. The next 1000-1200 km is expected to be smooth and flat as far as the Leverett Glacier. The ascent of the glacier will mean a climb from 500 m to 2000 m above sea level, where colder temperatures are expected to make progress more difficult. Forty glaciers were considered for the route before the Leverett was chosen. It is well south of the various routes used by Shackelton, Amundsen, Scott and Hillary's TAE party, lying not far from the Reedy Glacier at the head of the Ross Ice Shelf. The route has the advantage that heavily-loaded convoys will spend the maximum amount of time on the flat Ross Ice Shelf, becoming lighter as they burn and cache fuel for the return trip. By the time they have to climb the glacier they will have dropped a significant amount of weight.

If the trial run in 2004-2005 is successful, NSF will begin evaluating the environmental impact of six tractor train traverses to the Pole and back every year. Each tractor train would comprise six tractors and a mix of 21 sledges and tracked trailers. As well as fuel and non-perishable food, the tractor trains could also carry large scientific instruments to the South Pole that don't fit through the 3 m by 3 m door of a Hercules plane.

The route is not without opposition. Some believe that a route onto the Polar Plateau seriously compromises the wilderness values that the Treaty is trying to preserve. It is not clear whether there has been enough discussion at Treaty meetings about such a major Antarctic project, or that



*Opening up the Mongo Crevasse in the Shear Zone. Photo: John Wright/Shawn Norman, courtesy The Antarctic Sun.*

the environmental impact of the first three seasons' work has been analysed in depth. Others point out that the ice of Antarctica is a "living entity" and is never still. Crevasses that are filled one year may well have opened up again a few years later because of ice movement. The ice in the Shear Zone is known to be moving north towards the sea at about one metre a day and a grid of marker poles left this season will almost certainly show significant movement next season. Pollution resulting from large tractor trains travelling with fuel across the ice shelf and icecap is a potential threat that no one wants. On the other hand supporters emphasise the potential of the route, how areas that have been almost prohibitively expensive to fly into, or for which flight experience has been lost, will now become far more available.



# Heavy Ross Sea Ice Causes Problems

Sea ice in McMurdo Sound has been particularly thick this season, and officials hoped that a late summer storm would clear the ice away to make it easier to bring supply ships into the ice wharf at the end of the season. Unfortunately this did not happen, and for the second season running two American icebreakers were needed to break a channel through the base. The *Healy* sailed from Seattle on 9 January 2003 to join the *Polar Sea* in the Ross Sea. In previous years only one icebreaker was necessary.

The American cargo vessel *Tern* was able to complete its delivery to McMurdo via the channel and was on its way back to the United States with recyclable materials for processing when the tanker *Richard G Matthiesen* arrived at the ice edge. Even with two Coast Guard icebreakers in attendance, the freezing of brash ice in the channel made the entry of the tanker too risky.

Consequently, fuel lines had to be rigged across 5 km of ice to pump approximately 6.2 million gallons of fuel to McMurdo station. The tanker is operated by the Military Sealift Command and carries the fuel necessary for both McMurdo and Scott Base to survive the polar winter. McMurdo personnel worked with NSF officials and NSF's Antarctic logistics contractor, Raytheon Polar Services, to transfer the fuel safely.

*Using the bulldozer to fill in the crevasse. Photo: John Wright/Shawn Norman, courtesy The Antarctic Sun.*

*Sea Swells and Pack Ice -  
Continued from Page 31*

owners, Ocean Frontiers Pty Limited (Don & Margie McIntyre), in June 2000. The McIntyres are best known for their year at Commonwealth Bay in 1995, especially for the wintering-over. As *Tutka*, the vessel had a celebrated past, hosting a meeting in neutral Finland between the leaders of the United States of America and the former USSR.

*Sir Hubert Wilkins* finally sailed from Hobart on Monday 5th February 2001, bound for Ross Island, Antarctica. On board were seven Expeditioners and sixteen crew. As soon as the mooring lines were cast off from the wharf, it became apparent that this was a "stiff" ship.

Extra ballast had been placed in her before use in Antarctic waters and in anything other than a slight sea, the ship was very uncomfortable to sail in because of the awkward sea motion. A premonition of what was in store came when the ship's owners presented each crew member with a "Huey" cap prior to departure. The ship soon became known, affectionately, as "*Huey*" by its crew! Another warning was the very brief time that the Hobart harbourmaster spent on board as pilot leaving Hobart.

Even in the sheltered passage down the Derwent River from Hobart to the open sea, most Expeditioners and crew alike headed to their cabins as the vessel began its continuous dance-of-the-waves from crest to crest. For most on board, calling to "Huey" at regular intervals from the lee side of the vessel became the social meeting point for the first few days of heading south.

On Day 5, the frontal clouds partially cleared and we were all thrilled by a spectacular display of Aurora Australis. Mattresses were brought up onto the helicopter deck so that the sickly and the romantic could lie and gasp at the magic light-show taking place above. More excitement followed with the sighting of the first ice-berg at 61° 30' South the following day.

On the morning of Day 9, there was a further thrill on the bridge when a very large berg was picked up on the radar. From a distance, it looked like any other berg. When the

vessel came abeam, it was discovered that we had been looking at the northern end of a long narrow slice of broken-off ice shelf, a good 10 miles in length. The master, Captain Craig Rogers, manoeuvred the vessel along the sheltered western side of the berg. Here, under the towering cliffs of an icy "island", the vessel became a steady platform for a couple of hours. After the uncomfortable southern passage, this was a very welcome respite.

Late that afternoon, we arrived at the edge of the Ross Sea pack ice. Reflected sea swells had forewarned us of its approach. There was no apparent lead through it, so we turned and steamed slowly east along its edge, looking for a possible opening or channel heading south. Because of the inclement weather and the continuous layer of cloud over the western approaches to the Ross Sea, the ship had been unable to obtain a reliable satellite picture of ice conditions in the area.

We found out later that turning west would have proven a better option because that year a clear channel of water had opened up along the northern Victoria Land coastline of the western Ross Sea. However, after two hours steaming eastwards, a likely opening in the pack ice to the south was sighted and the vessel turned slowly into it.

This was the beginning of over two days of slow weaving in and around close and very close pack ice, often proceeding from one berg and its associated pool of open water to the next - these were our navigational landmarks in a landscape of white pack ice as we meandered in a generally southerly direction. As the bergs remained in view for quite some time they acquired names as we created our chart of the immediate area.

Fortunately when we entered the pack, the cloud layer from over the sea dispersed and there was excellent visibility. The lookout from the masthead had a reasonable view of where open water was or where a lead might be heading. For the first time, all Expeditioners surfaced from their burrows and took an active interest in the wonderful glistening white landscape around them. The vessel had arrived in the environment it was built for and the pack ice now pre-

vented uncomfortable seas and swells affecting the motion of the vessel. A respite from calling *Huey!*

After the first 14 hours of zigging and zagging our way slowly through the pack, we ran out of any visible open water to the south. It was time to launch "Jelly" for the first time, a Hughes 300C helicopter named after the product of a major sponsor of the ship (Dick Smith Foods). The vessel was fortunate in having the services of a veteran polar helicopter pilot, Australian Gary Dukes. With Gary at the controls, he and the Ice Pilot slowly spiralled upwards from the ship to 1,000 feet.

The rise in height changes the landscape below dramatically - where there appeared no water from ship level, open water and possible leads to it could clearly be seen. Jelly became a valuable tool for the Master and Ice Pilot.

Finally, on Day 11, *Huey* came out of the pack into open water. For the first time, the destination of either Cape Evans or Cape Royds looked feasible. On Ross Island to the south, Mount Erebus now beckoned encouragingly. There was still, however, a barrier of very close pack ice stretching across the northern entrance to McMurdo Sound, with no obvious way through it.

The small Russian polar research vessel *Akademik Shokalskiy*, chartered by Rodney Russ's Heritage Expeditions, was already in this barrier of pack ice outward bound and making very heavy going of it. It was also a more powerful vessel than *Huey*.

Onboard were two unexpected extra passengers, Norwegians Eirik Sonneland and Rolf Bae, who had arrived unannounced at McMurdo after skiing across Antarctica from Dronning Maud Land in 107 days. (see *Antarctic* Vol.18 No.2, p.43). We decided to wait and rendezvous with the ship to discuss ice conditions.

While we had made our way south through the Ross Sea pack ice, the American Charter Party had become concerned at the vessel's slow progress. The agreement included a condition that the vessel was to move north when the US Coast Guard ice-breaker left the area on its homeward journey. This time was getting very close.

Pressure was now on the Master



Helicopter "Jelly" landing on the Sir Hubert Wilkins. Photo: John Parsloe.

to give a "Yes we will make it" or a "Sorry we can't" decision so that the alternative arrangements could be finalized, namely, fly Ann Bancroft and Liv Arnesen out of Antarctica via South America out of an Adventure Network International (ANI) Twin Otter.

The *Akademik Shokalskiy* eventually broke through the pack ice barrier and launched an inflatable to rendezvous. The scene was from the heroic age of exploration! Standing in the bow of the boat, leaning back and holding on to a bow rope, was their Expedition Leader, Rodney Russ, with charts rolled and tucked horizontally under his arm, while son Aaron acted as boatman.

After introductions and welcomes, "exchanging-of-charts" took place in the chartroom and Rodney and Aaron were off, back to their own vessel bound for New Zealand.

It was obvious that *Huey* could not retrace the track of the *Shokalskiy* - the ice was too close. So we moved south along the ice edge towards the giant berg aground in Lewis Bay. Here we hoped to find ice-free water along its lee side, which might enable *Huey* to get to the coast of Ross Island, then hug the coast around Cape Bird,

where a strong tidal stream flows. The current, hopefully, would ensure a channel of open water. It worked - we were through into the open waters of McMurdo Sound.

The Master could now confidently confirm that the vessel would be in a position to pick up Ann and Liv from Ross Island. The ship had only just made the "cut-off" time. ANI's Twin Otter was already in the air to collect the women from the Ross Ice Shelf and bring them either on to McMurdo or the much longer return trip to South America via Patriot Hills.

Once round Cape Bird and out of the protection of Mount Erebus, the tranquil conditions changed dramatically to a strong sea. After the steadiness among the Ross Sea pack ice, it was a gentle reminder of what the Southern Ocean had been like.

*Huey* proceeded along the Ross Island coastline in very open ice to Cape Royds. Then to Cape Evans and on to the entrance of the ice channel to McMurdo Station, here reaching its most southerly latitude of 77° 44.6'. The Twin Otter had now reached Ann and Liv, but was grounded at their camp by whiteout conditions. We had time to spare.

Scott's hut at Cape Evans beckoned. There was a "lake" of open water in front of the hut but fast ice stretched across from Inaccessible Island to the Barnes Glacier, blocking the way. No vessel had managed to anchor off the hut this season. Here was an opportunity for the crew to test their knowledge and try out their ice-chipping skills, to cut a channel for the ship through to the open water in front of Scott's hut.

Although a mere mile of ice blocked the way, after five hours chipping the vessel had only penetrated about a quarter of the distance. Excitement and expectation had been replaced by despondency.

For most of the voluntary crew, visiting the historic huts had been the lure to join the ship and make the trip. Time had run out as it was necessary to reposition *Huey* out in McMurdo Sound where a clear line of sight could be established with the very low satellite, required by the media community on board for their live broadcasts to the outside world.

It was 10 p.m. before all broadcasts were completed, and we returned to the "under construction" ice channel at Cape Evans. Half an hour later the vessel had broken through, and two hours later we anchored off Scott's Hut. In the morning there was no wind, and a blue sky with a pristine Mount Erebus behind the hut, and the *Sir Hubert Wilkins* a painted picture on the water. Our visitors to the hut were both thrilled and moved to be there.

Meanwhile, our helicopter went to Willy's Field to meet the women who had come in by twin otter from the Ross Ice Shelf. Both planes landed safely just before whiteout conditions prevented further flights. Both parties were stranded there for the night. Meanwhile, back on the *Sir Hubert Wilkins*, we moved north to Cape Royds and dressed the ship with signal flags in anticipation of the arrival of Ann and Liv. Crew members visited Shackleton's hut while we waited on weather reports from Willy's Field.

Seventeen hours and 30 minutes after leaving *Huey* for a "short" trip to Willy's Field, Gary returned! At 10.53 a.m., on 19th February (Day 15), Jelly landed on board with Ann and Liv after their grand traverse of Ant-

*Continued on Page 42*

arctica. The main objective of the ship charter - to pick up Ann and Liv safely at Ross Island - had been achieved. Soon it would be time to consider the homeward journey, out through the Ross Sea pack ice and the return to Hobart.

But for now, it was time for celebration. Emotional reunions for those who knew Ann and Liv (especially a Norwegian husband - the film crew loved it!). They looked remarkably well but weary. Liv showed signs of their Antarctic traverse with badly blistered and peeling skin on her face. That evening, after Ann and Liv had visited Shackleton's hut, a celebratory dinner was held in the Expeditioners' saloon for the entire ship's company.

The next morning the ship returned to its anchorage off Cape Evans so that Ann and Liv could visit Scott's hut. Among the needles and thread, Liv sighted the "Norwegian rat" made by one of Scott's men after the presence of Amundsen was discovered at the Bay of Whales!

While Ann and Liv were visiting the hut, there was considerable air activity. Jelly was dispatched to Scott Base with BBC radio tapes and American television footage of Ann's and Liv's arrival, to be couriered to New Zealand on the next available aircraft. The Twin Otter did not have enough fuel to return to Patriot Hills on the other side of the continent and was off to Marble Point on the western side of McMurdo Sound to refuel.

Some years before, ANI had established a fuel dump by dropping off drums from a passing Russian cruise ship. When the otter arrived, it was unable to land safely near the fuel dump and had, instead, to land on the sea ice. A request came through to the ship for Jelly to be used to assist the Twin Otter crew move drums from dump to 'plane. When Jelly returned from Scott Base, it flew on to Marble Point to help, taking a crew member to help with the digging out of the drums. As the helicopter would need to refuel from the ship, *Huey* planned to move to the western McMurdo Sound area.

While this was being arranged, "Antarctic politics" were being temporarily ignored! An urgent message to the Master from the ship's owners in Australia curtailed Jelly's operations and a quick call to the Manag-

ing Director of ANI (Anne Kershaw) in England saw the Twin Otter being redirected back to Willy's Field, where "unavailable" American fuel had suddenly materialized! Jelly returned to the ship and the Twin Otter did a low pass down the side of the ship as it flew back across the Sound to the McMurdo airstrip.

For the first time the sea was noticeably freezing over. The summer season was drawing to a close. It was time to go. The icebreaker *Polar Sea* was leaving that day (20th February) and our ship's instructions were not to dally once the icebreaker had departed. *Huey* now steamed back across McMurdo Sound, towards Cape Bird, through a crackly mirror of new-forming sea-ice. Not a breath of wind, with glistening icebergs among very open ice. The backdrop of a spectacular and dazzling Mount Erebus, with its characteristic plume of volcanic steam, added to the vista.

*Huey* retraced its inwards track, back round Cape Bird on the northern tip of Ross Island, through the narrow tidal channel of open water to pass by the barrier of very close ice across the entrance to McMurdo Sound. Then it was northwards through open water until reaching the Ross Sea pack ice again, followed by the endless meandering through close and very close ice, from berg to berg, resting for awhile in a pool surrounding a berg, before proceeding to the next, or, waiting for better light conditions for sighting leads through the pack.

The New Zealand government research ship *Tangaroa* (Captain Andrew Leachman) had been working in this area, between Cape Hallett and Possession Islands, on a hydrographic survey (see *Antarctic* Vol.19 No.2). Radio contact had been made on the inward journey when we first entered the Ross Sea. After a nightly radio schedule with Mere of Bluff Fisherman's Radio, the various Ross Sea vessels would then make contact with each other for an unofficial reporting of vessels' whereabouts, ice and weather conditions. Bob Graham was the *Tangaroa's* Ice Pilot. We had sailed together many years earlier on the old *Tangaroa*, before Bob moved on to regular polar seafaring - he now had many "Seasons" under his belt.

Since the last time *Huey* was in this area, the winds had changed and the wide water channel off the Victoria Land coast had closed. *Tangaroa* had been forced to curtail its survey work and was now also attempting to make its way northwards out of the Ross Sea. We launched Jelly for a better view of our icy landscape and a way through to the north.

*Tangaroa* could be seen ahead and to the west, stationary in very close ice. *Huey* was still moving north in a reasonable lead that appeared to stretch to the open sea to the north. We passed our findings to the *Tangaroa*.

Later that day *Tangaroa* appeared on the horizon 12 nautical miles ahead, appearing then disappearing among sea-ice ridges, rubble and the occasional berg, as it made its way towards our lead. On reaching it, *Tangaroa* soon disappeared to the north with its better turn of speed in open water.

Finally the open sea. It was Day 19 and we had been among the Ross Sea pack ice for 10 days. The daily duties of the Ice Pilot were over. Now, back into the moods of the Southern Ocean.

Orders had been received for *Huey* to divert to Macquarie Island to pick up two ANARE scientists and deliver them to Hobart. This diversion would break the homeward voyage nicely. A visit to Macquarie Island was something to look forward to and a respite from the anticipated discomfort of the Southern Ocean passage.

Macquarie proved to be another highlight of the voyage. The general appearance of the island is barren in the extreme, but the abundance of animal and bird life removes any apprehension about its inhospitable appearance. The weather is characterized by persistent strong winds, cloudy skies and frequent showers of rain or snow. We were lucky. The island provided one of its rare fine days, with a gentle zephyr of a breeze. Perfect conditions for shore excursions. *Huey* anchored in Buckles Bay in the lee side of the island, under Wireless Hill near the ANARE research station.

A remarkable fringe of kelp ex-

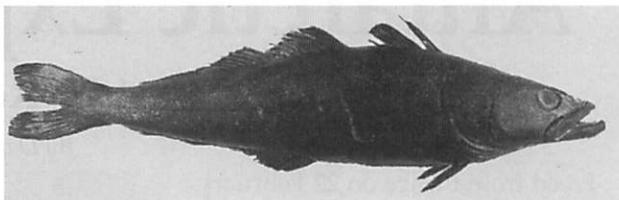
*Continued on Page 43*

# Fishing For Toothfish

New Zealand has been involved in the Ross Sea toothfish fishery for the last seven years under the management of CCAMLR, the Convention for the Conservation of Antarctic Marine Living Resources. Alexandra Edgar, International Advisor with the NZ Ministry of Fisheries, summarised New Zealand's involvement at a recent conference of Antarctic science at Otago University. CCAMLR manages all marine living resources south of the Antarctic Convergence, except for seals and whales. The CCAMLR Commission is made up of 24 countries, one of which is New Zealand, and each year representatives meet in Hobart to agree on conservation measures to control and regulate fishing and the effects of fishing, based on advice from specialist committees and working groups.

This season, nine vessels from South Africa, Russia and New Zealand took part in exploratory fishing

in the Ross Sea, seeking both the Antarctic and Patagonian toothfish. The total catch limit imposed by CCAMLR was 3760 tonnes, but the actual catch total weighed only 1600 tonnes, perhaps emphasising the difficulties of fishing in these southern waters, especially in a bad ice year such as this one. Exploratory fishing first started in the Ross Sea in 1996/97, and a total of 26 different vessels have fished there since. In all that time no seabird by-catch has been observed (where seabirds are attracted to the bait and accidentally get hooked onto the line), largely because of compulsory weighting of the long line. No illegal fishing by unauthorised boats has been seen. All legitimate fishing boats have to have two New Zealand observers on board to check that fishing is done according to CCAMLR rules. The spacing and



number of hooks are checked by the observer, as are overall catch weight and the location of the caught fish. A great deal of data collection and research is also done, including tagging of fishes. Any unusual catches (such as the 'Colossal Squid' – see article this issue) are sent to Te Papa, New Zealand's National Museum. The observer also checks that all food waste leaving the ship has been passed through a 25mm screen. As well as being compelled to have two NZ observers on board, the operator also has to report to the Ministry of Fisheries daily, five daily and monthly.

## SOUTHERN OCEAN TOOTHFISH STOCKS

At the same conference, Peter Smith of National Institute of Water and Atmosphere (NIWA) reported using molecular biology to determine genetic relationships amongst populations of Patagonian toothfish in the southern Ocean. These large fish are prized for their white fillets and high oil content, and sell well on the North American and Japanese markets. Unfortunately, this has led to excessive unauthorised fishing by vessels sailing under flags of convenience.

Smith's work has revealed the existence of three distinct genetic fish groups. The first lies in the Ross Sea and Macquarie Island segment. The second lies round Heard, McDonald, Kerguelen, Prince Edward and South Georgia Islands. While the third lies round the southern tip of South America. It appears that the Antarctic Convergence acts as a barrier to gene flow between the South American shelf and the Scotia arc, and that there is also restricted gene flow through the Southern Ocean, with different fishing grounds supporting independent stocks.

## Sea Swells and Pack Ice

*Continued from Page 42*

tended out from the beach and into the bay. The ship was quickly surrounded by an ocean of raucous squawking King penguins. A wonderful sight and only the beginning of an outstanding fauna and flora tour ashore around the base with the research station staff and, later, to major King and Royal penguin rookeries down the coast at Sandy Bay. After months of only snow and ice, the vegetation and wildlife seemed like heaven to Ann and Liv.

Four days later it was all over, bar the shouting. On the 5th March 2001, *Huey* returned to a media welcome at the berth in Hobart from which it had departed 29 days earlier. For Ann and Liv this was the beginning of the next stage of their expedition, namely, a circuit of media functions around the world to please sponsors and help sell the likely book or documentary about their trek across Antarctica.

That night, the Expeditioners took the crew to dinner at a fashionable waterfront restaurant. There, between the entrée and the mains, they gave a grand rendition of their recently composed "Huey" song, to the tune of "Oh Susanna". A verse was "dedicated" to each member of the crew!

Two weeks later, back at home in New Zealand, a letter arrived from the *Sir Hubert Wilkins*. Inside was a photograph of Ann Bancroft and Liv Arnesen at Macquarie Island, with the *Sir Hubert Wilkins* at anchor behind. Across the photograph was written:

"To John the Ice Pilot:

Thank you for bringing us through the pack ice onboard "*Sir Hubert Wilkins*" after our Antarctic traverse.

Liv Arnesen    Ann Bancroft".

# The Scottish National Antarctic Expedition 1902-04

## Part 2: Retreat to Suspense

By David E Yelverton FRGS

Freed from the ice on 22 February 1903, Bruce wanted at all costs to avoid being beset, and now had to decide whether to choose Biscoe's Enderby Land to the east for their winter base, or retreat to the South Orkneys.

Opting at first for an eastern base, the next three days saw painfully slow progress northwards to get clear of the ice, beset for most of the time, and frequently close to being permanently so.

The ice being continuous, Bruce and his wardroom companions were able to practise with their ski for the second time. All except Wilton and Bruce were novices, Bruce being the most experienced, having been sent a pair of ski from Norway as early as 1894. One of the pioneers of skiing in Scotland, Bruce had first tried them on Ben Nevis and narrowly avoided going over a 500ft precipice.

By 25 February the continually worsening ice conditions made the chance of reaching Biscoe's scarcely known Cape Anne increasingly like a forlorn hope, and when the captain at last got the ship into a series of open pools extending to the NW, it took Bruce little further reasoning to choose the land they knew and could reach, once clear of the pack. Out of it in another 24 hours, course was set westward for a return to the South Orkneys.

In a month-long voyage they made the first systematic biological and physical transect westward across 600 miles of sea south of the Antarctic Circle, and then, from 11 March, generally WNW over another 300 miles until ten days later they were once more in sight of the islands.

The Monegasque dredge was put over the side six times, of which three attempts succeeded. The first, after a 12-hour tow on 7 March, brought up 25 species, many fantastic in form and colour and some hitherto quite unknown. Bruce's log gave an insight



*Gilbert Kerr, in national attire, off Coats Land in 1904. Courtesy of the Hunterian Museum, Glasgow University*

into the exhausting effort involved in getting the dredge down and up again:

"We got the trawl over the side by 10.30am. For the first 700 fathoms we let out by the winch, and trusted to the winch-brakes and the newly devised block of wood jammed back on the drum. This requires the most careful and delicate manipulation, both below and on deck, and practise alone can perfect us. Already there is a great improvement in the working; but when a strain of three

tons and more is on the dynamometer, then there is very liable to be a racing that is very difficult to stop, and dangerous to those endeavouring to check the heavy gear in motion, with its tremendous momentum. Bottom was reached in three hours, viz. at 1.25pm and we began to haul up at 2.10pm, the trawl reaching the surface at 5.45pm. ... The heaving-in was again a splendid test of persistent energy on the part of the scientific staff and crew. There was

not a hitch in getting in the whole 3,000fms. The drum at the commencement weighed about 4 tons, and the weight was continuously increased, as the cable came in, up to about 6 1/2 tons.

"This heavy drum, 6ft in diameter, ... was wound in by hand by the scientific staff as well as by the crew, working in 1/2 hr spells". The cable was taken on board by an excellent 40 h.p. steam winch, but there was no money to get another winch for winding the wire on the drums. Consequently the scientific staff agreed to do this heavy work side by side with the crew ... Their persistent energy and good spirit did much to make the crew throw their whole soul into this stupendously heavy and monotonous work.. Side by side in the 'tween decks [they and the] crew, often stripped naked to the waists, and sweating at that, took in cable hour after hour without a break, and usually for 4 or 5 hours ... Some further idea of the heavy strain of this work will be had when I mention that on two occasions [men] fainted from over-exertion."

Early on 21 March, Robert Davidson, the 2nd Mate, sighted land on the port beam. After an abortive attempt to gain a safe anchorage, the captain took the ship out to lay-to in the pack edge for the night as the wind increased. With the sea still turbulent, the jostling ice damaged the steering gear. Repairs were completed just in time to avoid an iceberg making tracks directly towards them.

On 25 March, the way opened for a passage along the island's south coast (Laurie Island) and they steamed into a bay which at first appeared to be a strait leading through to the sea north of the island, but seemingly cut off from it by a glacier.

Anchoring in 60ft of water, they landed in the morning to find that the 'glacier' was really a snow-covered beach, piled up by successive assaults of sea and ice. It made the place into a reasonably protected anchorage, although open to invasion by the pack from the south, yet shallow enough to keep all but the smallest icebergs at bay. Bruce promptly named it Scotia Bay.

Bruce was already planning to leave a shore party in the spring while the ship returned for a refit. What he

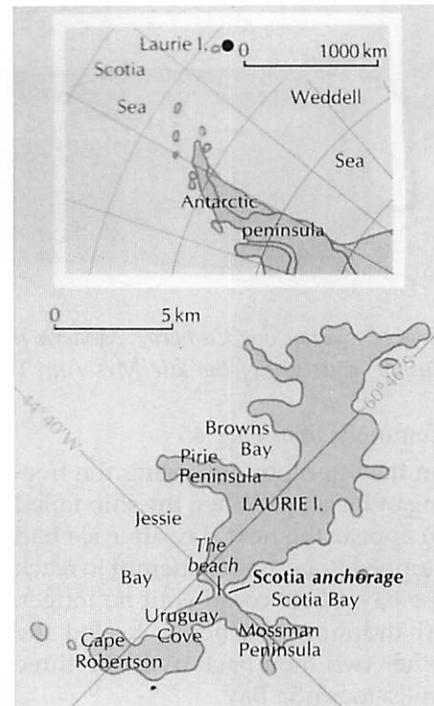
wanted was a second season and a second chance. However, the truth was that he was not even sure there would be money for more than just the 900 mile round trip to pick up the small party. As he put it in his first account, written the following spring, the *Scotia* would have to relieve the party, but he and his companions were trusting that their "countrymen will have got together such a sum of money as will enable us to carry on the work for another year." Like the leaders of the British and Swedish expeditions, he faced a season of suspense.

A snow-laden south wind having finally lodged the pack in place, they started work building a dry-stone house (Omond House) for stores and setting up the magnetic station on 1 April 1903. Not having figured in the final plan, no timber had been brought for living quarters. Building an adequate shelter required some 75 tons of stones to be carried from the nearest moraine, and they had had to borrow the ship's 'tween-deck hatches for the floor and the spare yard to support the canvas and felt sandwich that would form the roof.

While Mossman kept up the meteorology and magnetic work (they built him a separate magnetic house 140 yards along the beach), Bruce had begun a two-week struggle to cut the ship out during the second half of July, and abandoned the unequal contest when they encountered ice 25ft thick across their path to freedom.

Not that it was that thick everywhere in the bay, for holes were kept open towards its western shore where it was sometimes only 5ft thick. Off the port bow they had managed to keep the dredge operating along a 100 yard track, at first easily in an open lead, and then, when it froze over, through two holes with an igloo over the far one.

With little hope of blasting a way out for the ship before mid-September, the scientists had barely started on a programme of soundings and samples beyond Point Davis (named after the English director of the Argentine Meteorological Service) when tragedy struck. Called back when Allan Ramsay, the Chief Engineer, became seriously ill, Pirie arrived to find him in the last agonising stages of heart failure. By the following af-



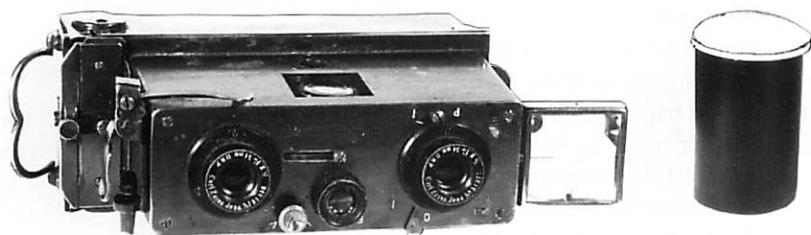
*Map of Laurie Island in the South Orkney Island Group. Readers Digest*

ternoon the cheerful Scot paid the final price for keeping quiet about the first symptoms when they had appeared on the voyage to Port Stanley.

Fifth victim of the new century's assault on the Antarctic — failing circulation and the cold had reduced him to sitting in a deck chair since the beginning of June — Bruce was in no doubt he had given his life for the expedition knowing that if he spoke out another engineer experienced with ice could not be found. They buried him on the north side of the beach with the lament of Gilbert Kerr's pipes echoing northwards towards the Scotland he loved.

Foiled again by the ice in another attempt to free the ship in September, Bruce, never one to stand idly by, had started his survey of the south side of the island. Returning to find the ice still holding, he had two boats dragged over to the north beach on 2 November and set off to survey the north coast. With that mission successfully completed using measured baselines, compass and sextant (one theodolite had been damaged and the other found faulty) he was on his way back when the pack trapped his party in Brown's Bay. Sending Pirie and Cuthbertson back overland, they arrived with news of his predicament

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*Bruce's Verascope Camera. Modern film canister for sale. Photographed by the author, courtesy of the late Mrs Ann W Bruce, William Bruce's daughter-in-law.*

*Continued from Page 45*

on the afternoon following the freeing of the ship. When the ship failed to appear the next day after ice had stopped Robertson's attempt to reach the bay, Bruce could wait no longer. Abandoning the boats, he led the other two men back over the three miles to Scotia Bay.

At last, the ship could leave, and after the six men of the shore party (Mossman, the surgeon Pirie, Cuthbertson and Ross, with William Martin and Bill Smith the second cook) had moved into Omond House, the *Scotia* weighed anchor on 27 November and sailed for Buenos Aires. It was an end, one way or another, to the suspense that had hung over Bruce all that southern winter.

Keen as he was to learn whether there was money for him to do more than just collect the shore party after the ship had been overhauled, he still insisted on slowing the voyage to sound and dredge in 56 fathoms on the Burdwood Bank south of the Falklands, there to be rewarded on 1 December 1903 with the richest catch of the expedition using the otter trawl — about 70 species were in the net when they got the 1/2 ton load up.

Before that the load on the derrick boom had nearly cost another life. Pulling the dredge, with 150 fathoms of wire run out, the dynamometer reading had risen to 4 tons when the bolt fixing the derrick heel to the mainmast sheared, and a tragedy was only avoided because the man reading the depth gauge had stepped aside a second before the boom hit the deck.

Arriving at Port Stanley the following evening, they learned of the disappearance of the Swedish ship and of the departure of the Argentine relief expedition, but for Bruce himself there was no news. He would have

to catch the next ship to Buenos Aires and leave the *Scotia* to follow on after the most urgent repairs had been attended to. If no money arrived there would not even be enough to rescue the men left at Laurie Island, and in that event he would be forced to ask the Argentine Government for help.

Sailing on 8 December, he reached Buenos Aires two days later, there to learn of the rescue of the Swedes and to find a cable telling him that money raised included a further contribution from James Coats, which was enough for a further season. Bruce's season of suspense was over. For him, if not for Nordenskjöld, there would be a real second chance.

But not before Bruce was faced with a grave threat to his ship. Sailing on the 9th, Captain Robertson had found himself stubbornly thwarted by the weather. Armed only with the little coal he could afford to buy at Port Stanley, his ship constantly had

to tack as she struggled northward against contrary winds. Using the engines only when absolutely necessary, what should have been a 6-day voyage dragged out to twice that time until, at last, he brought her to the mouth of the River Plate estuary after dark on the 21st.

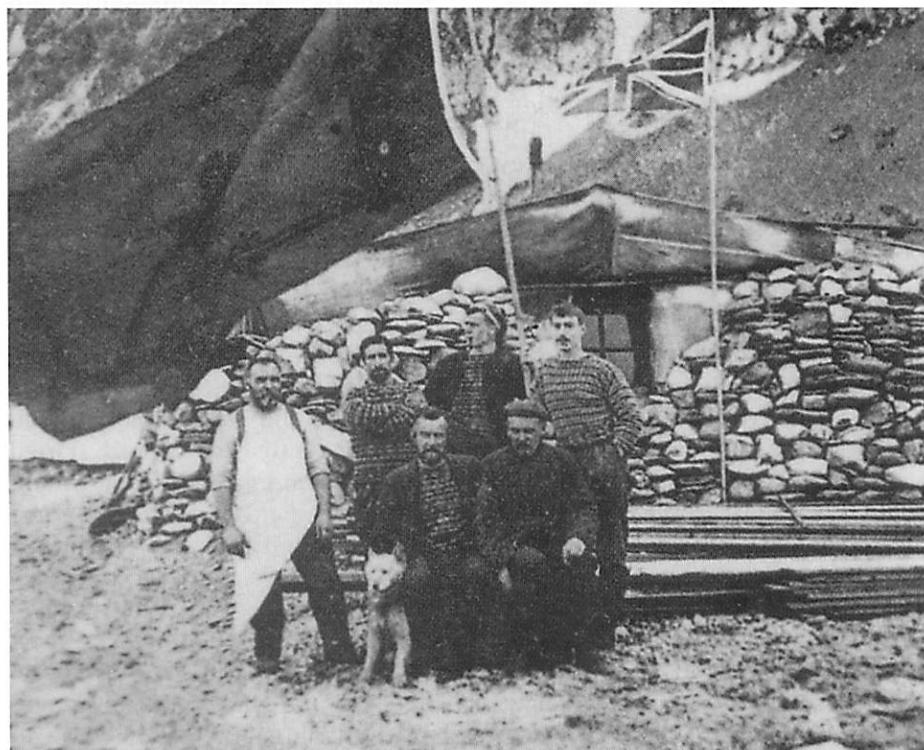
There the *Scotia* ran aground on the Ortiz Bank, and for nearly a day there was real fear aboard that she might never get off. News of her plight reaching Buenos Aires the next morning, a pilot cutter soon arrived and the cause of their predicament emerged. Two lightships had been moved since the chart they carried was compiled!

Floated off by the tide after two uncomfortable nights and forced to steam up the estuary against a westerly wind, she had reached to within 15 miles of the capital when she finally ran out of coal and had to be towed in on Christmas Eve.

Relieved of the anxiety over funds, Bruce was keen to see the work of the Laurie Island station continued, but the new money would not stretch to that. Broaching the idea to the British head of the Argentine Meteorological Office, the British Minister had joined them in persuading the Argen-

*Continued on Page 47*

*The six-man Scotia Shore Party at Omond House, 1903. Photo Readers Digest.*



# Pioneer Tour Ship Retires

The tour ship *Explorer*, which pioneered modern "expedition style" tourism in Antarctica, completed its last Antarctic season earlier this year. The *Explorer* was built in 1969 by Lars Eric Lindblad and made its first visit to Antarctica in 1970 as the *Lindblad Explorer*. Lindblad operated the ship until 1984 after which it was sold to the US company Society Expeditions and became the *Society Explorer*. Later, in 1992, it was acquired by Abercrombie and Kent who shortened the name to *Explorer*.

The ship is believed to have made over 200 visits to Antarctica

*Linblad Explorer at Deception Island c. 1980. Photo: Readers Digest.*



*Continued from Page 46*

tine government to agree to man the station if the *Scotia* would transport the men there and loan Mossman and one man to them for a year.

The deal was a splendid one for the expedition, for in exchange the the ship and gave the expedition 200 tons of coal, agreeing to collect the Laurie Island party in the *Uruguay*, freshly returned from the rescue of the Swedish expedition.

Bruce's satisfaction was soon replaced by a growing anxiety about the ship's late arrival, and then, the day before the news that she was aground on the Ortiz Bank, prospects of an early start were dashed by the outbreak of a dock strike.

As a result the *Scotia* only cast off on 21 January 1904, now with three Argentineans and several other new faces aboard, for, while some resigned, including the bosun and the chief steward, four others had been sacked before the long month in Buenos Aires was out. Altogether there were 11 new crew members including the new Chief Engineer, Charles Haymes.

*(To be continued)*

# McMurdo Oil Spill

A leak from an oil tank at the McMurdo Station helicopter pad on 19 February caused the spillage of approximately 6500 gallons (25,000 litres) of diesel fuel onto the surrounding ground. As soon as the leak was discovered, absorbent booms were put into place to prevent the fuel spreading away from the tank.

Within 30 minutes McMurdo Station's spill-response team was in action, attempting to recover and remove the fuel.

"The response was immediate and aggressive," said NSF Representative David Bresnahan at McMurdo Station, "and the cleanup will continue as long as weather permits it to be done safely."

The fuel, together with contaminated soil and snow, has now been removed for disposal in the US. Fuel spillages in Antarctica are taken very seriously, due to the extremely long period of time that petroleum products take to break down.

## Marco Polo Damaged by Rock

The luxury ship *Marco Polo*, operated by Orient Lines, suffered hull damage when it struck a rock as it left Half Moon Island in the South Shetlands on 13 February 2003.

The ship appears to have been pushed by the wind into shallow waters after the anchor was raised for departure. The ship was on its fifth and last visit of the season to Half Moon Island when the accident occurred and was carrying 538 passengers and a crew of 320.

Instead of going to Punta Arenas as planned, the Captain decided to head for Ushuaia instead to assess possible damage. On 16 February inspections of the hull by divers revealed three separate cracks, one and a half, three and four metres in length.

The cracks appear to have affected only the outer bottom hull, and as no water is reported to have entered the ship, safety was not compromised. Repairs were necessary, however, and divers welded 8 mm thick plates over the cracks so that the ship could continue to Valparaiso, arriving there 21 February.

# Perfect flying weather

By the Late James Lennox-King

*This article was submitted to the Society some time before Lt Commander Lennox-King passed away. Earlier "Over my shoulder" articles written by Lennox-King include "Hound of Scott Base" (Antarctic Vol 17 (3) p.69) and "Dogs on Ice" (Antarctic Vol 19 ((2) p. 127). (Ed.)*

In the latter part of 1959 I was appointed Leader of Scott Base, and in the next two summers had reason to be grateful for the willingness of the airmen to tackle all sorts of flying problems to help reposition or resupply the several parties operating with dog teams or snowcats in the field. The season for operations was short. New Zealand and United States main bases were stretching every effort to establish new bases in the hinterland and to resupply the bases that were already there. The US military were using its many aircraft, either for parachute drops from the large cargo carriers or by landing their smaller ski-equipped planes. The small aircraft of New Zealand's Antarctic Flight of the RNZAF were also making every moment of the 24 hours of daylight count. Then suddenly, in the height of that Antarctic summer of 1959, all flying stopped.

The sun shone from a cloudless sky, not a breath of breeze blew, the snow surface lay smooth and untrammelled, and not a plane left the ground. The airmen waited in readiness, the planes stood loaded and fuelled, the operations staff fumed in silence or otherwise as their natures dictated. The men for the relief of those who had wintered at remote bases sat impatiently by their kits or wandered about, wondering. Perfect flying weather, yet no plane flew.

It was the sun that was to blame: a massive sunspot had burst upon its surface and all radio communication disappeared in the ensuing magnetic storm. Field parties were unable to communicate with base, and not knowing the cause or how long it might last, put themselves on reduced rations. We learned later that

it had also disrupted cable communications throughout the world and in lower latitudes, that is, further north, it had produced spectacular displays of the Aurora Australis.

Without radio communication it was unthinkable to send an aircraft into the 'wild white yonder' for in case of mishap not only would the base be unaware, but it would have no idea where to search for an overdue plane. So day after clock day, the piles of stores unloaded from the supply ships at the ice edge, and the backlog for distribution, grew. For 15 days the frantic supply officers cursed the immobile aircraft, and then gradually the radio waves carried messages again to the outer world, and to the planes now flying round the clock. By outstanding endurance and determination the aviators slowly but surely caught up and the summer ended with the programmes of both countries completed.

During the winter the scientists at New Zealand's Scott Base put on a film show. Not one that laymen in the outside world would ever see, but a dramatic documentation of those perfect, unflyable days.

Part of the scientific programme was to investigate the behaviour of the layers of the upper atmosphere, from the Heavyside Layer at about 95 kilometres above the earth's surface to the Appleton Layer at about 300 kilometres. The characteristics of the various layers are vital to radio communication. Each layer responds to its own individual frequency and their reflective capacity bounces radio waves back to earth. Without the reflective layer, radio waves would just carry on out into remote space and be lost. As part of their investigations the scientists sent radio pulses skyward on different programmed frequencies at regular intervals, and the reflection of each from its own layer was recorded by 35 mm camera.

After the magnetic storm was over and normal circumstances had returned, the scientists ran as a continuous film the periodic exposures that had been made during the storm. As

an example of time-lapse photography and as a visual presentation of the magnetic effect of the sun's outburst it was riveting. In the beginning all the layers could be clearly seen as lines across the screen. As the storm developed the layers rolled up like a carpet and disappeared one after the other, starting with the bottom line, the lowest frequency. The 'rolling up' so clearly shown was a remarkable sight. It went on at a uniform rate for each layer until the upper atmosphere was entirely bereft of reflecting layers, and once they had gone they 'stayed went', as a Russian described it to me, for the whole of those 15 days. Then slowly, gradually, the carpets unrolled in succession, the top layer first, until they were all back and radio communication was normal again. The storm was over. As a record of a normally unseen scientific phenomenon the film was a masterpiece.

Loss of radio contact also occurred on another occasion that summer. The New Zealand Antarctic Flight's Beaver aircraft was carrying out a reconnaissance flight for suitable dog team routes in the glaciers of the Royal Society Range. When no radio contact had been made with the aircraft for some time I sought the help of the US Navy's VX6 (later VXE6) Squadron, who flew from the American McMurdo Base. Eventually an aircraft picked up a faint signal from the missing pair and they were lifted out. In bad visibility the Beaver had flown into a narrow cleft in the mountains and was completely wrecked. Fortunately the crew had been strapped in firmly and were uninjured, but the terrain made it difficult for an emergency signal to be heard. The Beaver was left where it lay. The site of the crash can be found on Antarctic maps, designated 'Beaver Valley' – which must puzzle those who don't know the story.

At the end of the summer the Antarctic Flight personnel returned to New Zealand. Meanwhile a detachment of the Royal NZ Engineers had been busy erecting a hangar for the aircraft of the Flight, which was now

occupied only by the Auster, tucked in one corner. VX6 Squadron asked me if they could use the remaining space to store their Otter for the winter. They had found it did not suit their purposes, anyway, and sold it to the RNZAF. When summer came a team from VX6 descended on the Otter and dismantled and crated it for transfer to New Zealand on one of the returning ships. They put the massive crate on an enormous sledge for towing to the ship's side.

On the morning of the loading I was with the commander of VX6, standing on the hillside overlooking the ice between McMurdo Base and the ship's berth, waiting for the appearance of the sledge train from Scott Base. Behind and to the left of us and a hundred metres or so above our position, was a heavy tractor that had been collecting snow for the Base water supply melters in its front-end scoop. Now it stood driverless, facing downhill. As was the rule in the Antarctic cold, the engine had been left running, but contrary to orders the bucket boom had been left raised. As the tractor and sledge with the huge Otter crate appeared round the base of the hill a movement caught my eye. I glanced round to see that the snow gatherer had begun to move. I realised there was still no driver – I suppose the vibration of the engine had eased off the brakes. It gathered speed as it went, the driver of the sledge tractor oblivious of his danger. There was nothing we could do. By great good luck the runaway tractor missed the driver, but it drove its bucket above the sledge deck and eviscerated the crate and the Otter. The fragments were carefully gathered and shipped to Christchurch. I heard nothing more of the incident, but I could imagine the reaction of the RNZAF when their beautiful recently purchased aircraft reached Wigram.

As a footnote, it is ironic to recall the isolation and darkness of those winters at Scott base in the '60s. We speculated then whether, if some disaster were to strike in McMurdo Sound, a rescue flight would be attempted in winter. We concluded that perhaps the risk would be taken, but it would have to be a cataclysmic disaster to justify it. Today, winter replenishment flights by US and RNZAF aircraft are routine.



*New Zealand's Beaver at Plateau Depot IGY & TAE, 1957-8.  
Photo: Trans Antarctic Expedition.*

## Fashion Medium for Antarctic Science

Since Antarctica New Zealand initiated its Artists to Antarctica programme in 1997, our culture has been enriched by the experiences of writers, poets, artists, a ceramicist, a dance choreographer, and this season by a fashion designer. A proposal to use fashion as a medium to explore and represent the work of science in Antarctica led to Fieke Neuman of Dunedin being chosen for an Antarctic Arts Fellowship with support from 'Creative New Zealand'. Fieke, a well established fashion designer, spent two intense weeks in Antarctica during November liaising closely with six New Zealand marine science events and designing art-clothes that represent the elements of each group's results in terms of form and colour.

From drawings and photographs taken in the field, she has hand-made six striking garments, each of which contains representations of some morphological feature of the animal involved. One dress had white matted elongate wool structures that are dotted with small pearls representing Antarctic sponges and the bacteria that symbiotically live in them. Another dress shows a hand painted silhouette of a diver below the ice. Another a ruff and intricately folded narrow train of pink lace symbolising the gills of icefish, with thin, red-filled plastic tubes radiating across



*Gown inspired by the Antarctic Icefish.  
Photo: Antarctica New Zealand.*

the bust of a white filmy fabric to represent the ice fish's incredible anti-freeze system. A red patterned swim suit under a streamlined seal-skin-like cape symbolised the focus of a group who were working on Weddell

*Continued on Page 62*

# Another Heavy Ice Year

Several ships were hindered this season by heavy ice in the Ross Sea. At the start of the New Year, two-year old ice remained stubbornly attached to the coastline of McMurdo Sound, and the giant C16 and B15 icebergs were still grounded against Ross Island. An even larger iceberg, C19, partially blocked the western side of the Ross Sea, and southwards lay a tight mass of large ice floes right into McMurdo Sound.

In early January, after successfully landing passengers at Cape Adare and on the Possession Islands, The *Academic Shokalskiy*, under contract to Heritage Expeditions, was unable to break through the dense ice south of Coulman Island, and after several attempts was forced to retreat northwards in front of a severe southerly storm to spend the extra time in the Subantarctic Islands. The retreat meant the cancel-

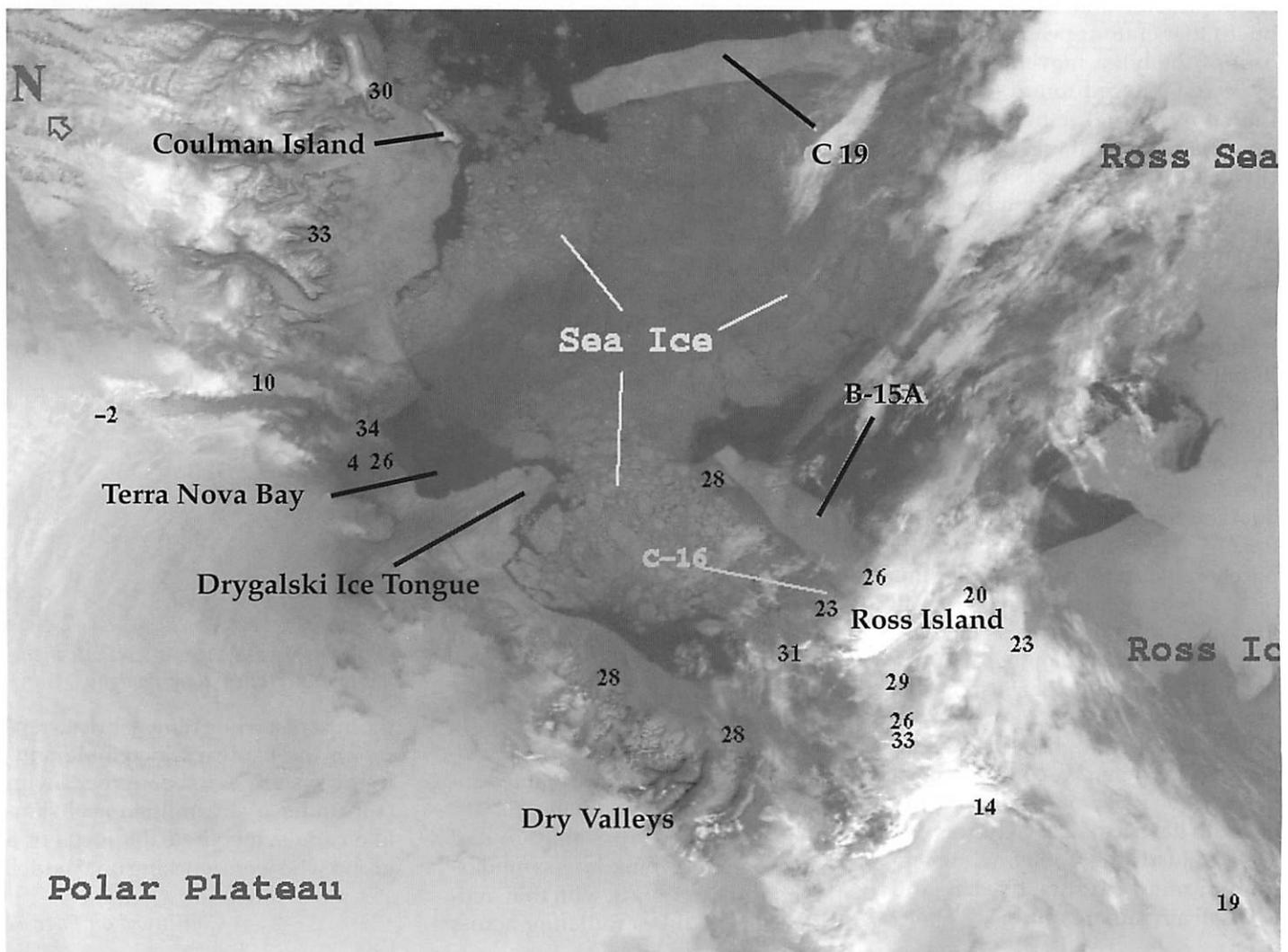
lation of the Extreme Skiing Expedition to Mount Erebus (see story this issue). Ice conditions were still difficult along the eastern coastline of the Ross Sea when the *Shokalskiy* returned for its second Ross Sea voyage in February, and although this time landings could not be made on the mainland, Cape Evans and Cape Royds on Ross Island were visited by passengers.

At about the same time in January the *Kapitan Klebnikov*, of Quark Expeditions, encountered severe ice conditions on the last part of its circumnavigation of Antarctica. The ship was beset for 12 hours off Marie Byrd Land and after finally reaching the Ross Sea was forced to battle, with some difficulty, the same southerly storm that had marked the turn-around of the *Shokalskiy*. The storm, with winds up to 100 knots, blew some of the

ice out of McMurdo Sound and the *Klebnikov* was able to get close enough to Ross Island to use its helicopter to land people at the historic Huts and Taylor Dry Valley. However, neither McMurdo Station or Scott Base could be reached. Further heavy ice was encountered near the Drygalski Ice Tongue, and a very slow voyage was made up to Cape Adare, on the way helping the Italian programme ship *Italica* which had become beset in ice out from Terra Nova Bay.

The dense McMurdo ice also caused problems for the US icebreaker *Polar Sea*, and the supply tanker *Richard G Matthiesen* (see story on page 39).

*Below: The massive C16 and B15A icebergs are shown trapped in the western area of the Ross Sea and further north C19 blocks sea ice.*



# Russian Climbers Stranded

A successful Russian climbing expedition in Dronning Maud Land, organised by Russia's International Mountaineering Club (IMC), ran into problems during February after they became stranded when their vehicles broke down. Before their stranding, nine mountaineers from the club managed to climb five peaks during a single week. The climbing party had been flown to the runway near Russia's Novolazarevskaya Station on the northern edge of Dronning Maud Land by a DROMLAN flight from Cape Town on 25 January.

Bad weather kept them at the station for a while, before they travelled 150 km to a base camp in the Wolthat Mountains at 1,600 m. Two six-wheeled 'snow buggies' were used. The climbers focussed on the dramatic, sheer granite cliffs that occur in Dronning Maud Land, concentrating on a group of peaks within a 12 kilometre radius of their base camp. During a reconnaissance trip to view the granite walls, one of the snow

buggies broke down, and from then on the party had only the remaining vehicle.

On 30 January, Yevgeniy Vinogradsky, Valeriy Pershin and Alexandr Foigt climbed a peak that they named 'Georgi Zhukov'. Two days later, Vinogradsky and Pershin, together with Georgi Gatagov and Yuriy Baikovsky, reached the top of a 2,355 m peak, which they propose to name 'Holy Boris and Gleb'. A large oak cross of the Russian Orthodox Church was set up by the climbers on its summit. On 3 February, Vinogradsky, Pershin and Foigt reached the summit of a 2,239-m high peak, four to five kilometres from camp. Two days later Valeri Kuzin together with Maxim Volkov, Gatagov, Baikovsky and Vinogradsky climbed 'Geser Peak' a short distance away. Finally, four climbers claimed the 2,585-m spire of rock called Mount Schwarze.

With temperatures rapidly falling in early February, the party prepared

to return to Novolazarevskaya as soon as the climbing was finished. They planned to use the snow buggy to ferry people and equipment the 150 kilometres north to the Russian base, and three round trips were anticipated. Problems began when the snow buggy became seriously damaged after it fell into a crevasse a short distance away from the base camp. Attempts to repair the vehicle failed and an Antonov-2 aircraft belonging to the Russian National Program was called in.

The snow buggies were first used in Antarctica three years ago by the Russia organized 'Millennium Expedition', when four of them made a return trip to the South Geographic Pole from the Patriot Hills. Reports from that expedition indicate that the drive units on each of the six wheels were "plagued with problems" (ANAN source).

The climbers were flown back to Cape Town on 10 February, and Russian newspapers report that the mountaineers were well pleased with their achievements, and believed that the sheer mountains of Dronning Maud Land will become a mountaineering 'Mecca' in the next 10-20 years.

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## Late N.Z. Flight for American Refuellers

Thicker ice than usual in the Ross Sea led to 50 American workers having to be airlifted out of Antarctica on a special New Zealand Air Force Hercules flight on 9 March.

Late each summer, a fuel tanker is usually able to dock at the McMurdo Ice wharf with the assistance of an American icebreaker. There, fuel is offloaded for McMurdo and Scott Base stations so that they can survive the winter and following summer programme. This year the ice has been thick in the Ross Sea region and did not break out from McMurdo Sound for the second season in succession. As a result, a pipe had to be run over the ice for 5 kilometres to supply the tanks at McMurdo (see accompanying story).

Because of the extra time taken, 50 fuel workers missed the last official flight from McMurdo before the start of winter, and an additional flight was arranged. A New Zealand Air Force Hercules plane flew to McMurdo on

Sunday 9 March with a double crew to share the 16-hour return flight. Temperatures of  $-30^{\circ}\text{C}$  were encountered at McMurdo during the short turn-around. The plane returned to Christchurch during the early hours of Monday 10 March.

Before the flight left New Zealand, the commander, Squadron Leader Ian MacPherson, said that the plane could operate at low temperatures, but to prevent instruments freezing and fuel thickening it has to get in and out as quickly as possible. "We will spend at most an hour on the ice. The aim is to get in, refuel, and load passengers as quickly as possible before making the eight-hour return flight," he said.

Arthur Brown, the U.S. National Science Foundation representative in Christchurch, said that the flight was not an emergency, but a straight forward special flight because the delivery of heating and aircraft fuel to McMurdo station and Scott Base had taken much longer than expected.

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## Russian Station Winter Closure

Vostok Station, established in 1957 and perhaps the remotest Antarctic base, was forced to close in March when it became obvious that fuel could not be supplied to the base in time for the winter. Professor Valery Lukin of the Russian Institute of the Arctic and Antarctica on 18 March announced the decision to "mothball" the station and transfer its personnel to Mirny station on the coast. Speaking from St Petersburg, Professor Lukin said "there is no question of completely shutting down the station. The necessary amount of reserve fuel is expected to be delivered in October-November, and in December, Vostok should be reactivated".

# A Wise Adventure: New Zealand and Antarctica 1920-1960

Malcolm Templeton

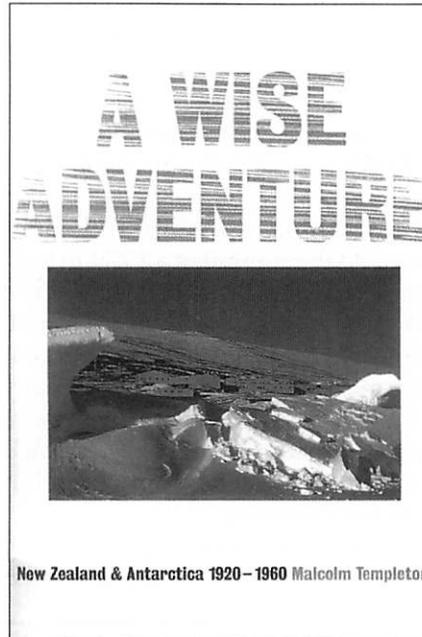
Victoria University Press in Association with the New Zealand Institute of International Affairs, Wellington, 2000. 328 pp. ISBN 0 86473 403, paperback, \$39.95.

Reviewed by Brian Hewson

New Zealand is, as someone facetiously observed once, a strategic dagger pointing at the heart of Antarctica, and our relationship with the frozen continent has ranged from complete neglect to great enthusiasm and back again over the years. Walter Nash, for one, felt that wise adventures in the Antarctic would bring increasing benefits not only for New Zealand, but indeed for all humanity. In *A Wise Adventure*, Malcolm Templeton explains the background to these sentiments and sets out a detailed history of New Zealand's Antarctic policy.

Templeton contends that a complete history of New Zealand's Antarctic policy would consist of three parts. The first would deal with the early assertion of New Zealand's claim to territorial sovereignty in the Ross Dependency, while the second would describe New Zealand's contribution to what he calls the 'internationalisation' of the Antarctic through the Antarctic Treaty of 1959. Templeton covers these two parts closely in his history and convincingly sees in them a case study of New Zealand's own evolution from a Dominion of the British Empire to an independent state. A third part would give account of New Zealand's role, at times a leading role, in negotiating a series of related treaties and agreements designed to protect the Antarctic environment and conserve its natural resources, and Templeton hopes another historian will cover this well some time in the future.

As a former senior foreign affairs official and later commentator, Templeton is certainly in a good position to write on New Zealand's Antarctic policy. The detailed notes confirm that this work is very solidly based on extensive knowledge of the government archives and as a result



is unlikely to be surpassed as a reference work on the subject. The chronology at the back is also extremely useful and could easily have been at the start of the book to guide the reader through the events.

There are some interesting insights into the personalities involved, from Walter Nash to Edmund Hillary and their international counterparts, and examples of the problems faced by New Zealand at the time. The government, for example, was not above issuing licenses to occupy land whose location, and in some cases even existence, was uncertain, or regulations for waters over which it had no hope of exercising jurisdiction.

At the same time, this is very much an official history and while Templeton warns that he is no legal expert, his close attention to legal and bureaucratic matters is such that *A Wise Adventure* is heavy reading and unlikely to appeal to as many people as it should. The book contains only two maps and, moreover, it is hard to believe that not a single photograph could be found to add some life

or at least to put a face to some of the names in the text. Like some of Malcolm Templeton's previous work, *A Wise Adventure* also contains a lot of very full and dense quotations. Depending on your point of view this either gives the work a rather unprocessed character, or nicely shows off the flavour of the documents.

These reservations aside, there is no doubt that this work is valuable and relevant. Early concerns about illegal whaling already hint at the issues to come such as 'scientific' whaling and the legal and illegal plundering of resources such as Orange Roughy and Southern (Patagonian) Toothfish. Despite the self-interest naturally guiding all the nations involved in the machinations described by Templeton, it is still a wonder to consider the agreement's tenets to keep the Antarctic de-militarized, free from nuclear testing, and relatively free of the environmental damage large scale mining or similar exploitation might have caused. Templeton reminds us that it is perhaps timely to revisit and reinforce the ideals that led to the signing of the Antarctic Treaty in 1959.

*Brian Hewson is a policy analyst in Wellington, and has a doctorate in history from the University of Canterbury.*



# Unlocking the Secrets of Earth's Climate

An investigative article by Joseph Frey

Joseph Frey was a participant in the *Antarctica New Zealand Media Initiatives Programme* and travelled to Antarctica in November 2001. Joseph lives in Toronto, Canada

Disembarking from a C-141 Starlifter onto the frozen Ross Sea, Antarctica, at latitude 77° S, is a surreal experience. On landing only minutes before, the sky was blue and unclouded. Suddenly it is overcast, and snow is blowing horizontally. For some reason, we "first-time" visitors assumed that the United States Air Force Reserve C-141 Starlifter would be the only plane for miles. To our amazement a small international airport, complete with passenger terminals, a control tower and repair sheds, bustles with activity before our eyes. Six LC-130 Hercules ski-mounted cargo planes from the New York Air National Guard are parked beside the runway—or "iceway", as the airport is built on seven metres of sea ice—as well as a C-130 from the Royal New Zealand Air Force. In the distance, several Twin Otters from a Canadian charter company sit idle.

I have come to the ends of the Earth to seek out some of the world's foremost scientists of polar climate research. By 2010, researchers from more than a dozen countries will have completed two decades of large-scale climate research in the Antarctic. What they hope to uncover is nothing less than the climatic workings of Earth.

Arriving with me on the C-141 from Christchurch, N.Z., is Paul Mayewski, a traverse expedition scientist who is spearheading Antarctic climate research. Mayewski is head of a team that is gathering ice cores from across the continent. By studying the Antarctic ice, 200-1,000 years old, the scientists hope to glean insight into the history of the Earth's climate. They also want to come up with a way to accurately differentiate between natural climate controls and climate changes due to human influences on the environment. Ultimately, they believe they can develop a tool for predicting climatic trends that will answer our current quandary: Is Earth warming or are we heading into another ice age? The key to it all, many scientists believe, is Antarctica. As Mayewski puts it: "If we don't understand the Antarctic, it's impossible to fully understand Earth's overall climate."

Driving over the sea ice in a pickup truck towards Ross Island, the snow squall starts to lift, just as suddenly as it descended. Abrupt shifts in weather are a fact of life here. The temperature today is -15° C; thank God it's early summer! Throughout our nine-day stay the

temperature will range from -7 to -15°C, except for the night we have to sleep outside in makeshift snow huts during a survival-training course, when it drops to a bone-piercing -35°C.

Back at the airport, we are hustled into two groups. The larger is heading to McMurdo Station. "MacTown" is an American base, run by the U.S. National Science Foundation (NSF), that boasts the largest laboratories in the Southern Hemisphere and can house as many as 1,200 people. The group that I am part of is travelling to New Zealand's Scott Base, two kilometres away from MacTown, and home to 70 Kiwis.

As the sky clears, the majestic Transantarctic Mountains appear in the distance. Our driver asks us to guess how far away they are. About 15 or 20 kilometres, we reply, and are dumbfounded to discover that the range is a full 70 kilometres away. The Antarctic atmosphere is so unspoiled that from time to time you can see the Earth's curvature.

Nearing Ross Island, we pass a hut where in a week's time we will go ice fishing with marine biologist Craig Marshall from the University of Otago, New Zealand. While we fish, a huge Weddell seal, maybe two metres long, pops its head through a hole in the ice. Starved of oxygen, it inhales so hard it sounds painful. The seal breathes heavily for a while, oblivious to us, before swimming off. On other excursions we are entertained alternately by haughty emperor penguins or their cousins, the much smaller, clown like Adélies.

Mayewski is temporarily based at McMurdo Station before departing on his expedition. He has led more than 30 scientific expeditions to the continent during his 34-years working in the Antarctic, and even has a mountain peak named after him. A native of Scotland, Mayewski chairs the 19-nation International Trans-Antarctic Scientific Expedition (ITASE) that is collecting ice cores. He is also director of the Institute for Quaternary and Climate Studies, University of Maine. During the early 1990s, he led the NSF's Greenland Ice Sheet Project Two (GISP2), which involved 25 universities and led to the development of new techniques for extracting and understanding information from glacier ice cores.

The GISP2 team drilled 3.2 kilometres down into the Greenland ice sheet and was able to recover ice cores dating back 100,000 years. Ice sheets record climatic and atmospheric changes over eons, and scientists can "read" their layers in much the same way they can read tree rings.

Both GISP2 and ITASE have provided significant new data for the field of paleoclimatology—the history of Earth's climate and for understanding climate stability and weather patterns, which Mayewski outlines in a book, *Ice Chronicles: The Quest to Understand Global Climate Change*, released in February 2002. "ITASE will try to understand a minimum of 200 years of climate change in Antarctica, as well as changes in the chemistry of its atmosphere, largely by collecting ice cores every 100 kilometres across a series of coordinated traverse routes," explains the soft-spoken scientist.

Antarctic climate research has been patchy until now, and there are only five or six instrumental records going back 50 years. "The scientific community doesn't have much in terms of data for the Antarctic," he says.

What Mayewski's research clearly shows is that temperature shifts of 10°C to 20°C can occur in as little as 20 years and may last for hundreds of years, along with corresponding changes in precipitation and atmospheric circulation. Events of this magnitude ended with the disappearance of northern hemispheric ice sheets about 14,000 to 15,000 years ago. Now the events are smaller, but still of major significance to humans and ecosystems. Closer to home, this means that within a generation southern Canada could go from having a four-month winter to one lasting 11 or 12 months. This would indeed have occurred 14,000 to 15,000 years ago when ice sheets were still around.

For about 600 years, the Earth has been in a Little Ice Age (LIA). The LIA "is the most recent of a series [of changes], called Rapid Climate Change Events, that repeat about every 1,500 years," Mayewski says.

"If we looked at any analogue of this kind of event, the LIA should probably not end for another 200 to 500 years. But clearly we are no longer in a LIA in terms of temperature. Glaciers are melting, without a doubt, but our records of sea-level pressures are indicating that we have not come out of this Little Ice Age." So, time-wise, the Earth is an ice age, even though temperatures are rising. But Mayewski suggests that, temperature-wise, the LIA has been superseded by human production of greenhouse gases.

"If that is correct," he says, "it means that greenhouse gases may in fact be as strong as people thought, but it's the natural climate that is holding them back from showing their full effect. And it means that some of the models that suggest the effect should have been greater

*Continued on Page 54*

# Palmer Station - United States

Palmer Station is the smallest research station operated by the US Antarctic program and it the only US base north of the Antarctic Circle. The station lies in the protected Arthur Harbour on the southwest coast of the mountainous Anvers Island, off the Antarctic Peninsula.

Palmer Station was named for the American sealer Nathaniel B Palmer, who sailed his 14 m long ship *Hero* from South Georgia to the Antarctic Peninsula in 1820 in search of new sealing grounds. Anvers Island was discovered in 1832 by Captain John Biscoe who thought it was the mainland and claimed it for Britain.

The British established "Base N" at Arthur Harbour in 1955 and manned it for three years. Subsequently, the US erected prefabricated wooden huts (Old Palmer) in 1964/65 and turned the old British "Base N" into a laboratory annex. The present station was built over four seasons during 1967-1970 on the solid rock of Gamage Point, and was officially opened in March 1970.

The new station is regarded as a superb site for biological studies and has the bonus of having easy ship access, and it is this last feature that attracts the numerous tour ships that visit the station each season.

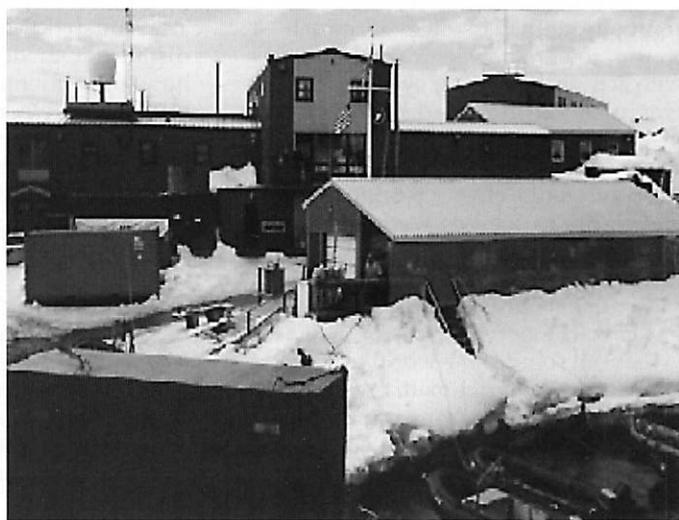
The base consists of two main buildings and three smaller ones, plus two large fuel tanks, a helo pad and a dock. Forty five people can be accommodated during the summer, and in the winter the population is usually around 10. The largest structures are the Biolab Building and the GWR (garage, warehouse, and recreation) Building, with enough space between them to serve as a firebreak. The

smaller buildings include a carpenter's shop, pumphouse, boathouse and storage.

Electricity is provided by large diesel generators (250 kw), the heat from which augments that produced for heating by diesel-fired boilers. Water production is by reverse-osmosis from sea water and consumption is between 25,000 and 45,000 litres per week. In-house water testing is done weekly and samples are sent to the US for quality testing twice a year.

Kitchen and human waste is macerated and disposed of in a high dispersal area of Arthur Harbour. Other material is shipped off the island.

*Palmer Station in winter.*



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## *Unlocking the Secrets of Earth's Climate*

*Continued from Page 53*

might be true, but they didn't work out that way because nobody took natural climate into account."

According to Mayewski, there are several natural events that can cause long-term changes to climate. These include changes in the relationship between the Earth and sun, changes in the radiation output of the sun, changes in ocean circulation and changes in the way ice sheets expand and contract.

He believes humans also have an impact on both the physical and chemical workings of the climate system. "It may not be a giant physical change, but it is a change," he says. "But I would contend that the more important issue is human-induced change to the chemistry of the atmosphere and air quality."

As for scientist's plans for predicting future trends, he says changes in the climate system may soon be predictable. "Absolutely, depending on what time frame you're looking at," he says. "I think that in the not too distant future it may be possible to predict what, generally, the next ten years will hold."

Mayewski says a person could do worse than consult *The Farmers Almanac*, a good oracle for weather because the predictions are based on solar cycles.

For this reason, he is keenly interested in the research being carried out under the auspices of Antarctica New Zealand.

As our helicopter deposits us and heads out over the Ross Sea, the five of us stand silent and motionless, watching our link with the outside world vanish over the horizon. Only a

dozen or two people a year get to visit this ice-free corner of the Antarctic mainland. We are standing in Wright Valley, named after the Toronto native Charles Wright, the only Canadian on Scott's ill-fated 1912 expedition to the South Pole.

About 25 kilometres away is Nancy Bertler's team. Bertler, a native of Munich, is working on her doctoral degree at Victoria University of Wellington, New Zealand, trying to find evidence of solar cycles in ice cores from the Holocene era—our present period. Her research could provide data that will allow scientists to develop models for predicting general weather patterns decade by decade.

She and her team arrived the previous day at the Victoria Lower Glacier, to drill for ice cores. The Lower Victoria Glacier is part of the McMurdo Sound Dry Valley system, most of which has been free of ice for at least 2-million years.

Bertler plans to extract a 200-meter-long ice core from the Victoria Lower Glacier, recovering paleoclimatic data reaching back 8,000 to 10,000 years.

Human civilization developed during this period, but accurate solar-cycle records date back only to the sixteenth century. Solar activity has long been known to have an effect on the Earth's climate.

Traditionally, scientists have traced solar-cycle activity by measuring nitrates in ice cores, a method prone to inaccuracy. But Bertler's work is unique: She is using the ice-free, thus dark, surfaces of the Dry Valleys as a solar-radiation meter. The Dry

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# Commander James Lennox-King

## 1914 – 2002

James Lennox-King joined the Auckland Division of the RNVR in March 1931 and was promoted to Sub Lieutenant in 1935. He was mobilised in 1940 and served in the Atlantic and the Pacific during the Second World War. He was mentioned in dispatches in August 1942 for services during the capture of Diego Suarez.

Lennox-King was demobilised in 1946, and in 1947 was appointed a lieutenant-commander in the Auckland Division of RNZNVR. He rejoined the Royal NZ Navy in 1952 and during 1955/56 was Staff Officer to the Canterbury Division of the RNZNVR. In this position he liaised with the headquarters of US Deep Freeze and during 1956/57 spent seven weeks in Antarctica.

He subsequently held appointments as senior officer of the Navy's Fishery Protection Flotilla and as commanding officer of the original New Zealand supply ship *Endeavour*. He went on to command the new *Endeavour* in 1963 and reported that it was a first-class ship for the job of travelling to McMurdo. He was commanding officer on the 7000 mile oceanographic cruise in April 1963, and brought back a live weka from Macquarie Island that had descended from birds liberated as food for castaways. (Ed)



when we requested a mechanical drilling machine from the Americans at McMurdo. The Americans were only too happy to lend us the machine to drill holes into the permafrost for the foundations, but the ground unfortunately proved too hard and we had to revert to the use of explosives and hard labour. Jim gave me every support to complete the building programme that summer of 1959-60.

Forty three years on, the hangar remains a prominent landmark at Scott Base, and while it was only briefly used for its original purpose, the modifications made over the years have made it a valuable asset to the base facilities.

My most vivid memory of working with Jim was the discipline he applied to one of my team who had had too many drinks one night and was unable to present himself for

work the next day. Both the man in question and myself as foreman, were summoned before the Base Leader, and what took place was almost like a mini-court martial. The civilian was given a stern dressing down after the explanation of his behaviour was heard, and somewhat to my astonishment, he was immediately dispatched to confinement on the naval ship *Endeavour*, tied up in McMurdo Sound. He was to remain there until the ship departed for the return journey to New Zealand.

I was somewhat taken aback by this series of events. I felt that this team member had been under stress, his work not up to standard and should not have been sent down to Scott Base in the first place.

I have further recollections of the leadership qualities shown by James Lennox-King. When the Beaver aircraft came down while flying in a whiteout, full emergency services were activated at Scott Base and McMurdo Station. Everyone on base was alert to the tragedy, and Jim's ability to organise and control rescue operations was an illustration of the character of the man himself when under extreme pressure and responsibility. I was saddened to hear of his passing away.

*Randal Heke was foreman of the team who erected the original Scott Base. He is a loyal member of the Wellington Branch.*

### A personal tribute by Randal Heke

James Lennox-King was Scott Base Leader in 1959-60 when I led a construction team of army engineers and specialised tradesmen to erect an aircraft hangar and other buildings as additions to Scott Base.

At that time there were two RNZAF aircraft at Scott Base that were used for supplying sledging parties and other groups in the field, as well as transporting surveying and scientific personnel around the Ross Sea region.

My task was to erect a hanger to protect an Auster and Beaver aircraft from the severe weather conditions that sometimes occur around Scott Base. Working conditions varied according to the weather, and sometimes it was necessary to work long hours in the time available. Without the use of a mobile crane we had to rely on Kiwi ingenuity, using a long pole, ropes and a series of pulleys.

During all of this activity I found Jim Lennox-King most cooperative and willing to assist wherever possible, especially

*Continued from Page 54*

Valleys border the small Lower Victoria Glacier, which was written off by other researchers as scientifically insignificant. Bertler is convinced that the Victoria Lower Glacier, due to its small size and proximity to both the radiation-absorbing Dry Valleys and the Ross sea, will record more solar-cycle activity than the nitrate content measured in larger ice sheets further inland.

"From our Victoria Lower Glacier ice cores, we can see seasonal, annual and the 11-year solar cycles," Bertler says. "This provides an independent measurement of solar activity separate from nitrate measurements, and they correspond to the known records."

Her team aims to produce long-term records of solar activity by using these shallow but high-resolution cores. "The sunspot data that we acquired over the last three seasons can be used to extend our records back prior to the sixteenth century."

If the scientists' findings prove accurate, they could help unlock the secrets of the Earth's climate. Within a decade, polar scientists hope to develop a model that combines natural climatic cycles with anthropologic—man-made—climatic influences. During this century, they say, we will see either the beginnings of a new ice age or the onset of human-influenced global warming.

"We have a lot more to study before we can develop a model that will generate general weather predictions decades into the future," Bertler says.

If they get it right, they will have a tool to predict how much of climate change is natural and how much is imposed by human activity. The information could be used to help public policy makers decide on the correct amount of legislation for green house gas emissions.

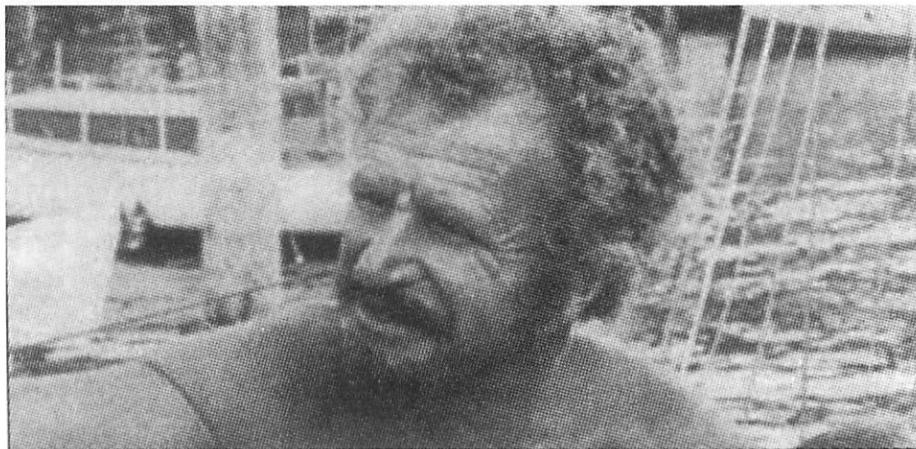
# David Lewis – Author, Adventurer, Antarctic Sailor

## 1919-2002

David Lewis was born in England of Welsh and Irish descent, but was brought to New Zealand as a child, moving later to Rarotonga and then to the Cook Islands where he went to school. Back in New Zealand, at seventeen he built a canoe and traversed on his own 725 km of waterways and coastline in the North Island from his boarding school to his home. Later he went to medical school at Otago University and his adventurer's spirit appeared again when, during this time, he climbed 19 unclimbed peaks in the South Island. He continued his medical studies at Leeds University, graduating in 1942, and becoming a parachute medical officer in the Second World War.

After the war Lewis married, had children and practiced medicine in England, but the marriage did not last. In 1960 he came third in the Trans-Atlantic single-handed yacht race, and in 1964 he gave up his medical practice to build the catamaran *Rehu Moana*, in which he, with his new wife and two small daughters took three years to sail around the world. He became the first navigator in modern times to follow a legendary Maori course across the Pacific using only the sun and stars to steer by. The voyages are summarised in his books *Daughters of the Wind* and *Children of Three Oceans*.

In 1968 Lewis was awarded a Research Fellowship in Pacific History at the Australian National University, researching ancient navigational techniques, and in 1972 he published *We, the Navigators* which led to further Australian research fellowships. By this time Lewis had become obsessed with the Antarctic and in October 1972 set out alone from Sydney in a 10 m steel sloop *Ice Bird*, the first man to attempt a solo journey to Antarctica. Thirteen days later he put in briefly at New Zealand, and then headed south. Four weeks later the *Ice Bird* capsized in a hurricane, splitting the cabin and breaking the mast



David Lewis - Photo courtesy History Now.

off at deck level. The radio and self-steering gear were destroyed. With frostbitten hands and a jury mast set, Lewis continued on towards the Antarctic Peninsula, suffering a second capsizing two weeks after the first. After several close shaves in the ice, the battered boat arrived at Palmer Station 29 January 1973. Here the ship was taken out of the water in a cradle for the winter and a new mast was made by the base carpenter. Lewis left Antarctica to honour magazine commitments and rejoined the ship the following December. After a complete refit with the help of willing Palmer Base staff, Lewis sailed for Capetown 11 December 1973.

Numerous icebergs created problems and the passage through the pack was difficult, and dangerous, and the ice smashed the new steering gear. Beyond the pack the *Ice Bird* met the full force of the Southern Ocean and was capsized for the third time on 24 February. Lewis reached Capetown on 20 March 1974. the book of this voyage, called *Ice Bird*, is an amazing story of one man's courage.

Back in Australia Lewis established the Oceanic Research Foundation for independent research and exploration, and in 1977 he left again for the Antarctic with seven others in the 19 m steel yacht *Solo* to demon-

strate the commitments of individuals to Antarctica. The *Solo* made the first sea-borne landing on the Balleny Islands. He led a further expedition to Cape Denison in 1981 to compare scientific data on wildlife, climate and the ice sheet with that gathered earlier by Mawson.

Lewis has written 12 books, his last an autobiography in 2000 called *Shapes on the Wind*. He was appointed a Distinguished Companion of the New Zealand Order of Merit in 2001.

By Margaret Bradshaw

*"Antarctic" was saddened to hear of the death of Father John Coleman who has been active for almost 20 years in the US and NZ Antarctic Programmes in his role as a priest at the Chapel of the Snows at McMundro Station. Father John was diagnosed with cancer the week after the service to open the 2002/2003 season. He died on the 9th of May at Nazareth House in Christchurch. A tribute to Father John's life will be included in the next issue of "Antarctic."*

# DANGEROUS CROSSINGS

by Professors John H. Bryant and Harold N. Cones.  
 Naval Institute Press, 291 Wood Road, Annapolis, MD 21402, 206pp. US\$27.95  
 Reviewed by Bill Cranfield.

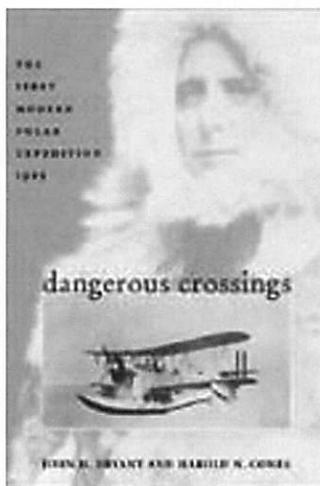
*Dangerous Crossings* is an exciting account of the officially titled "1925 MacMillan Arctic Expedition, under the auspices of the National Geographic Society". This was a private expedition planned and led by Lt. Cdr. Donald B. MacMillan ( Professor of Anthropology on leave for exploration work ) and assisted by Lt. Cdr. Eugene F. McDonald Jr. (Founding President of Zenith Radio Corporation and the National Association of Broadcasters). Both officers were members of the United States Navy Reserve Force who were ordered to active duty for the period of this expedition.

This was a brief expedition of 10 months, from initial planning to completion. It was the first modern geographic expedition to effectively use aircraft to systematically explore large areas of previously unknown lands and seas, and was the first polar expedition to have reliable two-way short-wave radio contact with much of the world as well as between its two ships and aircraft.

The expedition was financed with monies raised by Lt. Cdr. MacMillan from public lectures, undisclosed gifts from Lt. Cdr. McDonald and support from the National Geographic Society.

At the direction of the President of the United States of America, President Coolidge, the U.S. Army Air Corps provided three Loening open cockpit, single engine, amphibian aircraft, while the U.S. Navy provided a contingent of 8 personnel to operate them under the command of Lt. Cdr. R. E. Byrd.

These aircraft were the first production models made by the manufacturer. They had no operational proving, had no additional preparation for operations in the Arctic, the engines were fitted inverted with no changes made to the oil system and no oil dilution mechanism was fitted to assist lubrication during cold starts. Despite all three aircraft experi-



encing engine failure over some of the most unforgiving terrain in the world, the air operations proved a partial success and all aircraft survived the expedition. A total of 89 hours and 17 minutes were flown in 20 days covering some 6,000 miles over areas previously unseen by man.

The title *Dangerous Crossings* is taken from the aircraft crossings of Davis Strait from Etah in Greenland to Ellesmere Island. The title also recognizes the dangers and hardships, including two groundings, experienced by the two over-loaded expedition ships on their travels through gales and heavy sea ice to and from Etah after the coldest winter on record.

Before reading this book my knowledge and appreciation of early Arctic exploration, the political importance of discovery and the early experiments with long-range radio communications, was very limited. I suspect that this, at least in part, is due to my Anglo-Saxon heritage, being born in the Southern Hemisphere and subsequently brought up on a diet of Cook, Scott and Shackleton. *Dangerous Crossings* is a great introduction to early Arctic exploration. It is well researched and referenced, is full of 'daring do', political intrigue and introduces newly discovered documents which show Lt Cdr Byrd in a rather different light to that re-

corded in present history.

Donald B. MacMillan survives these pages as a man of probity and considerable leadership ability. He continued making annual trips to the Arctic until the age of eighty and was justifiably proud that he never lost a man to starvation, the sea, or to the cold. The U.S. Navy promoted him from Commander to Rear Admiral in 1954 on the eve of his thirtieth trip to the Arctic. He received many medals and awards, including the Peary Expedition Medal, the National Geographic Medal, the National Geographic Society's Hubbard Gold Medal, the Explorer's Club Medal, the Elisha Kane Medal and was elected to the Florence Nightingale Institute of Honorables. He died in September 1970 at the age of ninety-five.

I found this book a fascinating account of human endeavor. It dispassionately discusses the leadership conflicts that occurred and the compromise of personal ethics that one of the leaders made to further his ambitions for fame. "Fortune surely favors the brave!"

*Bill Cranfield wintered over at the newly established Scott Base in 1957 and flew extensively in small planes for the New Zealand component of the Trans-Antarctic Expedition, as well as supporting New Zealand's first deep field parties. He continues to be an active member of the NZ Antarctic Society.*



# Antarctic Giants at Risk from Global Warming

*Giant Proboscis Worms. Photo: Rod Budd, NIWA. Photo courtesy Antarctica NZ Pictorial Collection.*

New Zealand Research is indicating that Antarctic nemertean worms, unique because of their large size, will be at risk should sea temperatures rise as a result of global warming.

Associate Professor Bill Davison from the University of Canterbury is studying the nemertean ribbon worm (*Parborlasia corrugatus*), which lives on the sea floor in McMurdo Sound, Antarctica.

Nemertean worms are found throughout the world and are considered to be extremely primitive members of the animal kingdom as they are not segmented, they have a very basic digestive system and lack a respiratory system. Instead of using lungs or gills they take in oxygen by absorbing it through their skin. The Antarctic worms are unique because of their size, growing to one metre in length and 100gms in weight. Their gigantism stems from living in cold water and having an extremely low metabolic rate. There is an inverse correlation between the oxygen content of seawater and its temperature, so that low temperature water has a high concentration of oxygen. This high oxygen concentration allows the worms to grow to giant size. In temperate waters nemertean worms grow to only 10% or less of the size of the Antarctic ribbon worm.

Very few scientists have studied this worm, but Professor Davison says that they.... "may be an excellent indicator of global climate change due to their extreme sensitivity to small changes in their environment. They are fascinating creatures, rang-



ing in colours from red, yellow, brown and white with a variety of patterns on their skin."

Professor Davison is conducting several related studies using the worms. His primary investigation is to look at the effects of small temperature increases, and consequent changes in oxygen, on the metabolic rate and survival of the animal. Antarctic nemertean worms are extreme oxyconformers, which means that the animals need fully oxygenated water in order to meet their oxygen requirements. Even small decreases in oxygen levels in the water cause the worms to reduce their metabolism.

The water temperature in McMurdo Sound is currently  $-1.86^{\circ}\text{C}$  all the year round and shows no fluctuation. Antarctic marine animals have evolved to survive in this extremely low but stable water temperature. The internal body fluids of the Antarctic nemertean worms react to the slightest changes of water tem-

perature. If the temperature lowers to the point where water turns to ice, the Antarctic nemertean worm will also freeze solid. Professor Davison is looking at the effects of small increases in temperature. He has discovered that the worm's survival rate declines markedly if the water temperature rises to  $+4^{\circ}\text{C}$ . Increased temperature causes changes in behaviour. In its usual water temperature a worm will contract into a ball when touched. However, with an increase in temperature the worm becomes flaccid and is unable to move.

Global warming suggests that temperatures may some day increase in McMurdo Sound. Professor Davison's research indicates that a significant change in the temperature will lead to a massive reduction in the nemertean worm's polar habitat. He says "the ribbon worms are giant because they live in the cold. If their habitat warms up the worms must either reduce in size, or die." Alternatively, they could simply move south into colder water.

## Bridge Windows Smashed

The bridge windows of the tour ship *Hanseatic* were smashed by a large wave during heavy seas while travelling from the Subantarctic Antipodes Island to Dunedin, New Zealand. The passengers and crew were never in any danger according to the operator, German company Hapag-Lloyd Cruises, but the bridge was

flooded. The ship was repaired in Dunedin, but a voyage from New Zealand to Ushuaia via Subantarctic Islands had to be cancelled. Later voyages to the Antarctic Peninsula were unaffected.

Last year the *Bremen*, another Hapag-Lloyd ship, also had its bridge

*Continued on Page 62*



*The Hanseatic in the Antarctic Peninsula.*

# South Pole Station Update

This winter will be the first in which people occupy the new South Pole Station building. Completion of the final stage will be in 2006, and building at the end of the Earth has not been an easy project.

The South Pole is very high (2800m) and very cold (average temperature  $-50^{\circ}\text{C}$ ) and it is not an easy place to get to (1100 km from McMurdo Station).

There has been an American base at the South Pole since the IGY (International Geophysical Year) in 1957 when 18 men wintered in the first South Pole Base. Today the old base is buried under 10 m of snow and has moved, in the ice, more than one km away from its original position.

A new base was built between 1971 and 1975. It was designed to house about 50 people in buildings sheltered under a large aluminium geodesic dome 50m in diameter and 15m high. In summer additional people were accommodated in buildings outside the dome.

After twenty years the dome too is becoming buried by snow, and will eventually be crushed by it. The dome is no longer large enough to house the complex science that is now being done at the pole, and there were also problems with fuel leaks and power shortages.

In 1997 the U.S. Congress voted funds to build a larger, more efficient and environmental friendly South Pole Base that would be completed by 2005 at a cost of US\$153 million. The new base was designed by a Honolulu-based architecture and interior architecture firm, Ferraro Choi & Associates Ltd and one of the requirements was that all materials used have to be of a size to fit into a LC130 Hercules.

First to be built was the power plant which went on line 20 January 2001, increasing the base's power supply to one megawatt, but solar panels will be incorporated into later buildings. The previous South Pole station used bladders for storing up to 225,000 gallons (852,000 litres) of fuel, but the new base will store fuel in 45 steel drums that will have a greater capacity, are less likely to leak



*One of the new fuel tanks being unloaded from a LC 130 Hercules.*



*The archway for the power station under construction.*



*The cramped galley in the old base will soon be a thing of the past.*

*Workers look out of the windows in the new dining room.*



*Continued on Page 62*

# The Coldest March: Scott's Fatal Antarctic Expedition

By Susan Solomon  
2001 Melbourne University Press  
RRP \$54.95 Review by Dr Ian Owens

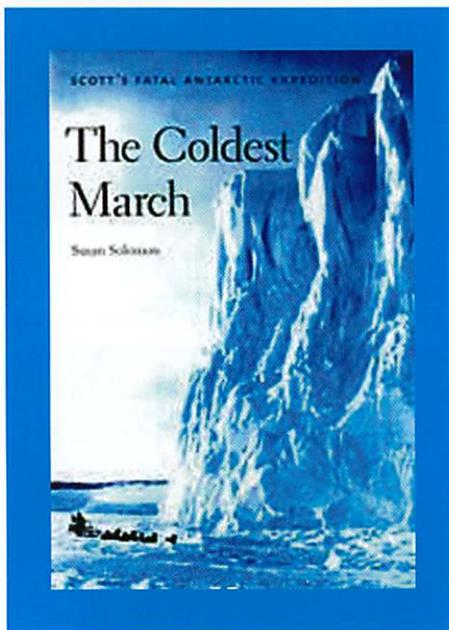
This book clearly sets out to redress the imbalance in the disparaging portrayal of Scott's demise as depicted in particular by Huntford(1979) and it does so by introducing new information, most notably about 15 years of recent meteorological data from automatic weather stations in the vicinity of the area where Scott and his men travelled and finally perished.

It is organised chronologically with increasing detail and increasing concentration on weather events as it progresses towards the events at the end. Chapters 1 and 2 deal with the *Discovery* expedition, sledging trips south in 1902/3 and include preliminary discussions on some of the other aspects of Antarctic exploration including man-hauling versus dogs, and problems with sleeping bags, finnesko, crevasses, fuel containers and scurvy. The return of Scott in the *Terra Nova* in 1910 is discussed in Chapters 3 and 4 which also recount difficulties with pack ice, the loss of one of the motor sledges and the shortcomings of the ponies selected.

Chapter 5 is the first of several chapters which focus on the weather and climate, in this case the Antarctic's 'coreless winter', so called because winter temperatures are similar to those of autumn and spring while warmer summer temperatures are relatively short-lived and drop quickly in mid to late March. Solomon views Scott's approach to this phenomenon positively, noting (p. 111): '.... Scott's scientific leanings and laying of key groundwork in the 1902-04 expedition meant that he was better informed than Amundsen about the conditions that were likely to be encountered – a stark contrast to the portrait of Scott as a bumbler whose ignorance is legendary and complete.'

Equally one might say that someone having this information should not have planned to be on the barrier (that is the Ross Ice Shelf) in late March.

In Chapter 6, the recurrent theme of Scott's concern with scientific matters is dealt with by recounting the winter trip by Wilson, Bowers and Cherry-Garrard to Cape Crozier along with discussions of winds and temperatures on the barrier and the poor quality of their footwear and sleeping bags. Chapter 7, 'In the footsteps of Shackleton', also focuses on weather by reporting Simpson's, now known to be accurate, estimates of the annual temperature regime, the observation of a winter minimum temperature of  $-72^{\circ}\text{F}$



( $-58^{\circ}\text{C}$ ) at One Ton Depot as the parties set off towards the South Pole, and the highly unusual wet warm blizzard of December 8-11, 1911 which slowed progress on the barrier and on the ascent of the Beardmore Glacier.

In Chapter 9, 'This awful place', the much more severe temperatures experienced on the polar plateau by Scott when compared to Amundsen are documented in relation to recent records showing that the former were about average while the latter were much warmer than average.

The arrival of the coreless winter, bringing with it very cold temperatures and a difficult surface for travel, along with only occasional helpful wind is discussed at the beginning of Chapter 10. The events of the last days are then recounted and the chapter ends with some

comments on Scott's message to the public with its emphasis on the role of the weather as a significant factor. Chapter 11 recounts the 'Anguish of helplessness' felt by Cherry-Garrard as he waited at one Ton Depot with the Russian dog handler Dmitri Gerof and records the events of November that year when the bodies of Scott, Bowers and Wilson were found.

In Chapter 12, a review of most, though not all, of the explanations previously offered for the failure of the expedition is given as a prelude to the final two chapters. The first of these suggests that the period February 27 to March 12, 1911 was far colder than normal (when compared to 15 years of automatic weather station data), while in the second an inference is made, again by comparison with present day records but also by considering some concurrent observations made at nearby locations, that a blizzard of the intensity and duration noted in the last entries in Scott's diary was extremely unlikely. This inference leads to the intriguing suggestion that the deaths of Wilson and Bowers were '...a matter of choice rather than chance'(p.327).

The book contains a prologue and epilogue and a brief section at the beginning of each chapter written from the viewpoint of a modern visitor to Antarctica. These serve to satisfactorily emphasise some of the difficulties that the environment imposes. The sources of information are well documented and a list of 'participants', a brief time line, a glossary and selected bibliography are also provided. It is a readable and in places absorbing book, especially for

*Continued on Page 62*

*Antarctic Bases No. 4: Palmer Station (United States)  
Continued from Page 54*

*Palmer Station and the Research Vessel Polar Duke.*



*The Nathaniel B Palmer and Palmer Station.*

*Aquaria in the Biolab Building.*



*Palmer Station on Gamage Point, Anvers Island. Photo: Skip Strout.*

*Tough Going on South Pole Station Update*  
Continued from Page 59

and will be environmentally more acceptable.

The "Beer Can" a tower-like stairway and elevator that links the power plant with the main building, was one of the first structures to be erected (see *Antarctic Vol 18, no 2, p. 45*).

The shell of half of the main structure is now complete and winter-over personnel will finish off the interior. The new base will contain 5600 square metres of space and will be the first one at the pole to be built with windows. It will house 110 people initially, but may expand in time to house 150.

The two storey modular structure is built on stilts supported on horizontal beams buried in compacted snow, rather like an enormous partially buried sledge. The stilts will allow the wind to blow under the building; increasing scour action and reducing snow build up.

Built into the supports are a series of 100 tonne jacks that have the capacity to elevate the building above the snow twice in its 40 year life time. The first "lift" period is predicted to take place in 2016.

Building the new base in such a

remote and alien environment is no mean feat. So far there have been 800 LC 130 flights carrying 21 million pounds of construction material, additional to the normal freight needed for base life and the science programme.

Each construction worker has to wear 17 kgs of clothing and frequent breaks are necessary because of the bitter cold. The building programme has been orchestrated by Construction Project Manager Jerry Marty, and life has not been without its frustrations. Construction can only be done during the three and a half months between November and mid February.

Poor weather at McMurdo can ground Hercules flights even when there is good weather at the pole, and this inevitably leads to shortages of building materials and frustrating delays. After delays like these, some materials were being mounted in place just as soon as they were offloaded from the plane.

Next season will be another busy one for the new base construction. But before then, this years winter-overers can take time off from their interior decorating to look out of the new windows and watch the stars in comfort.

*(The Editor would like to thank Jeff Rubins for factual help with this article).*

*Frocks for Antarctic Science*  
Continued from Page 49

seal muscle. A bright, flared sun dress was covered with line drawings of the benthic creatures found on the McMurdo Sound floor, all hand-painted. Another dress was edged with gauzy soft white wisps of fabric that were repeated in the back slit of a dress decorated with DNA patterns, reflecting the larvae and genetic structure of sea urchins.

The six dresses were placed on exhibition at the Hocken Library in Dunedin, together with some un-

sual black and white photographs of a black dress-maker's dummy serving as a black marker flag. The exhibition is entitled "Under the skirts of Mt Erebus: Frocks about Science" and is introduced by Fieke's prose.

*"Though winds aggrieve her heavy stays, Mount Erebus is held taut by a volcanic corset that claws into the ground shelf of ice, below which melting water sheets are warmed by spring's calling. Under these ruffled skirts there exists an antipodean Atlantis, whose waters are replete with complex sea life."*

*Bridge Windows Smashed*  
Continued from Page 58

window smashed in a similar incident during a storm in the south Atlantic. Modern tour ships tend to have a beautifully streamlined and

pointed bow, but in high seas these tend to cleave the water and do not deflect waves as well as broader, but less elegant, bows.

*The Coldest March:*  
Continued from Page 60

those interested in weather and climate.

A useful selection of maps and diagrams is included along with many familiar but nonetheless effective photographs. There are some minor points with which one could quibble. I would have liked to have seen double axes (a left hand one for °F and a right hand one for °C) on the temperature graphs rather than a very small graphical conversion scale, and on p. 208, 2835m is converted to 9,200 ft whereas 9,300 ft is much closer.

The balance from a view that saw Scott as a total bumbler and whiner about the weather to one which saw him as a reasonably good leader who made some errors and often frankly admitted them but was unlucky when forced to gamble with the weather has probably been restored by some recent biographies (e.g. Preston 1998).

Solomon's book provides a new context for looking at the significance of the weather events, but it certainly does not completely explain what happened. As she herself admits on p. 297, the length of record from the automatic weather stations is too short for exact statistics, and the weather events acted in concert with other factors. For example, if Wilson and Bowers really did choose to die with Scott, then it was a choice brought about partly by what Scott himself referred to as '... the bald state of our finnesko' while still on the plateau. These sorts of combined effects may never be untangled.

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*Dr Ian Owens is a Senior Lecturer in the Department of Geography, University of Canterbury, Christchurch. He is a Physical Geographer who researches snow and ice, and has a special interest in past weather patterns. He has made several trips to Antarctica and teaches in the University's Gateway Antarctica programme.*

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