

# ANTARCTIC



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## McMurdo Fish May be a New Species



# ANTARCTIC



## COVER



*Stranded "Bergy Bits", King George Island, 2004. From the "Heart of Whiteness" Project.*

*Photo by Jean de Pomereu.*

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# Neutrino Observatory Takes Big Step Forward

IceCube's international team of scientists and engineers took a major step forward in building the interglacial observatory, which is designed to detect high-energy subatomic particles called neutrinos. The team harnessed a sophisticated hot-water drill to install hundreds of soccer ball-sized optical modules in the South Pole ice sheet that will eventually form a detector encompassing a cubic kilometre of ice.

The IceCube project is an international collaboration of scientists from more than 30 scientific organizations and more than a dozen US universities. The US National Science Foundation (NSF) is contributing more than US\$240m to the international partnership that is building the US\$272m detector. Germany, Sweden and Belgium are also contributing to the project. The University of Wisconsin-Madison, USA, is leading the drilling and science operations.

Neutrinos are created in galactic collisions, distant black holes, quasars and a host of the most violent events in the cosmos. When fully operational, IceCube will use 4,200 light-sensing modules to sample neutrinos from the sky in the Northern Hemisphere, using the Earth as a filter to exclude other types of neutrinos, such as those from the Sun.

Once the holes are drilled, 2.5km



*Above: Robert Paulos, Associate Director for Engineering and Project Support, holds one of optical sensing modules that comprise the detector. Photo by Peter West, National Science Foundation.*

(1.5 miles) cables holding the spherical digital optical modules—which are composed of electronics for sensing light and circuit boards for gathering and processing data—are frozen in place. The modules detect evidence of neutrinos when they collide with other particles. The devices then relay data to the surface where the information is processed and stored for analysis.

## CALL FOR FOOD GROWTH CHAMBER PROJECTS

The University of Arizona's Controlled Environment Agriculture Center (CEAC) invites students and professionals in the agriculture field to explore their programme of study and their current and developing projects. One of their projects provides support for development of soilless growing system prototypes that could be used in future space crop growing efforts and in the Antarctic.



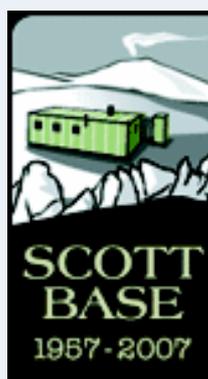
*Above: UA/NSF South Pole food growth chamber. Top: Lettuces almost ready for harvesting.*

Currently, CEAC and Raytheon Polar Services cooperate to hire qualified candidates to monitor and maintain the food growth chambers at McMurdo and South Pole Stations.

More information can be found at: <http://ag.arizona.edu/CEAC>

## 50TH ANNIVERSARY PLANNING UNDERWAY

New Zealand has begun planning for celebrating the 50<sup>th</sup> anniversary of Scott Base. A clever web page has been launched at [www.scottbase50years.co.nz](http://www.scottbase50years.co.nz) to provide information about the events and celebrations. It also answers frequently asked questions about Scott Base including "Why are the Scott Base buildings painted green?" Some wonderful photographs from the TAE/IGY expedition are also included.



# Hallett Station Exhibition CREATED FROM BASE REMNANTS

By **Natalie Cadenhead**. Curator of Antarctic and Canterbury Social History at Canterbury Museum.

Hallett Station was a joint United States and New Zealand base built in 1956/57 for the International Geophysical Year (IGY). The station was abandoned in 1973 although buildings, equipment and stores remained. Initial clean up began in 1984 when buildings were demolished and rubbish removed. Recent clean-up (remediation) efforts began in 2000 and the remaining buildings, rubbish and equipment were returned to New Zealand in the 2004/05 and 2005/06 seasons.

As part of the final clean-up, a significant number of buildings and artefacts including a D4 bulldozer were donated to Canterbury Museum by the New Zealand and United States Antarctic Programmes. The aim was to recreate the last remaining remnants of the original base to give visitors to the Museum the unique opportunity to experience an important era in Antarctic exploration and science.

The germ of the *Hallett Station, Antarctica* exhibition project began in March 2005 when over 10 tonnes of remediated materials were delivered to Antarctica New Zealand in Christchurch. There, a team of technicians led by Curator Roger Fyfe, listed the pallets, cargo boxes and piles of building materials and unpacked and wrapped the smaller objects for transport to the Museum.

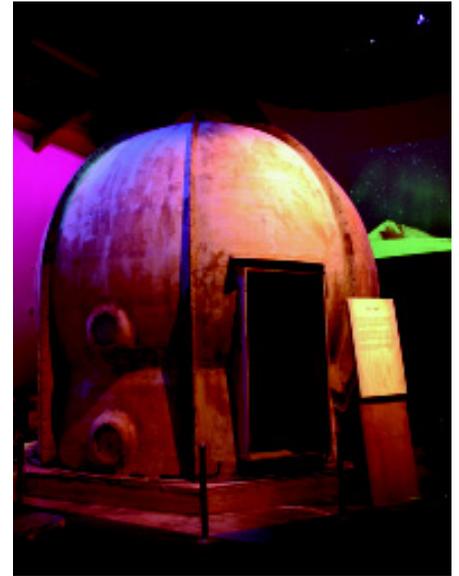
In mid-2005 the material was moved to the Museum and deposited in the Old Transport Gallery ready to be sorted, accessioned, catalogued and finally built and exhibited.

Several months were initially spent by the Antarctic and Canterbury Social History Curator, Natalie Cadenhead, on identifying the smaller items, numbering and entering them into the Museums object

database. Most items were then packed into storage until required for display. Concurrently much planning and research was conducted to figure out what was actually there, the size of the buildings and how the gallery space could be best utilized.

In December 2005 work began in earnest on the pallets of building materials. The initial plan was to identify all walls and roof panels and separate these by building. Flooring, unrecognizable parts and scrap metal were set aside. The sections of the geomagnetic dome were washed of guano and stored. At this stage the exhibitions project team realized the extent of the challenge in front of them. Putting the buildings together was like putting a jigsaw together when you have some idea of what it is meant to look like, haven't seen the whole picture, the pieces are spread through several boxes AND some pieces may be missing.

Beginning on what they thought would be the simplest building to reconstruct, the reassembly team began on the fiberglass geomagnetic dome.



*Above: The reconstructed geomagnetic dome. Photo by Michael Kean, Canterbury Museum.*

*Below: The fuel tanks, work benches and snow melter alongside the living hut. The positions were established using photographs from the 1980's clean-up. Photo by Michael Kean, Canterbury Museum.*

*Continued to page 4*



*Hallett Station Exhibition  
Created from Base Remnants  
Continued from page 3*

### **BUILDING THE GEOMAGNETIC DOME**

This sits on an octagonal foundation of angled timber beams. After unpacking all the pallets containing beams, two of the foundation beams were found to be missing. Upon investigation and close examination of photographic evidence it was determined that the beams were still in Antarctica and are underneath an emergency supply cache at Hallett.

Replacement 'fakes' were made for the exhibition. All the original beams had a range of bolts and nails in them which had to be removed before the dome could be rebuilt. The beams were photographed before removal of the nails and bolts to show their original condition and to allow the team to use the position of the nails to determine the correct position of the walls. The beams were arranged in the correct order based on bolt hole position, fading patterns due to sunlight on the outer edges (so the shape of the dome's base could be seen) and matching the angles of the ends.

The next step was to re-lay the tongue and groove flooring. At first it was thought that this should be quite simple as most of the ends were angled to match the edges of the foundation however not all the flooring was in the same pallet load. Again the pallets were spread out and the team began the puzzle to figure out which board went in which spot. This was done using the colour and wear patterns of each board corresponding to boards on each side along with nail holes, and matching end angles. To make this even harder some of the longer floorboards had been cut into pieces to fit them onto the pallets for shipping and had to be fitted together again by matching the grain in the wood. Some of the longer pieces required support to make the floor stable to walk on. As in any old jigsaw puzzle, one board is missing and a gap was left which allows the dome to be lit from underneath.

The wall sections could now be

lifted into place. Photographs showed the walls on each side of the door and some of the back, however, confusion reigned initially as some of the photographs had been reversed when digitized. Once the first wall panel positions were established they had to be held into position and stabilized while bolting them together. This was crucial as some of the sections were very fragile and have stress fractures in them.

Each section was stabilized using plywood supports bolted to the sides. Pieces were lifted into position and attached to a separate fiberglass ring at the apex of the dome. This ring was attached to one dome piece which was raised upright and supported while the second wall panel (on the opposing side of the dome) was lifted up and bolted on in its place. At ground level each panel was eased into place so that the bolt holes in the dome matched the existing bolt holes in both the tongue and groove and the foundation beams. Once two pieces were in place they were stabilized and the next two panels were raised up into position. Once bolted together the dome stabilizes itself. The dome is fitted out with a set of bunks, and some stores and equipment.

### **ACCOMMODATION AND STORAGE HUTS**

Once the dome was completed, work began on the main living and sleeping huts which were joined together with a small passageway. It was discovered that the living hut was built with an internal framing system unlike the other huts which had a tongue and groove system and could be built more quickly. Foundations for both huts were positioned to ensure that there would be enough access for the public once the huts were constructed.

Once the foundations were laid, the walls of the sleeping hut were raised into position. Again the correct position for each panel was discovered using weathering patterns, paint colour and wear and the position of nail holes. The roof of the sleeping hut is also constructed of panels which had to be supported into position along a central beam. The cross beam which stabilizes this central beam was miss-

ing and had to be constructed from new materials. Any new materials which were incorporated into the buildings are labeled as display props to distinguish them from the original materials which are part of the museums permanent collection.

This building went up relatively easily. As some of the tongue and groove flooring was missing, wood was used from the original garage to complete the floor. Due to space considerations the garage was not incorporated into this exhibition.

For speed and safety, new internal framing was constructed for the living hut. Once the internal and external wall panels were put into order it became apparent that some of the building, notably some floor, external wall and roof panels were missing. For this reason the end is left open, with the advantage that visitors can see the construction of the building including the insulation, and had better visibility into the passage and sleeping hut.

Once the main buildings were complete the storage sheds were quickly constructed. Luckily, most of the shower which was built into one shed in the 1980's was recovered. The shower head and water container had been reused during the Latitudinal Gradient Project at Hallett and came back on the ship in early 2006 which added to the overall effect. One hut has been fitted out as a tool shed and contains a large amount of tools, the original hut paint, bulldozer and vehicle parts and a tool box. The other hut contains the shower, tents and storage for extra supplies. The sleeping hut is fitted out with bunks, made up with US Navy sheets, blankets and bedcover while another bed has the double layer Arctic and Mountains sleeping bags used in the field.

### **D4 BULLDOZER**

In the midst of the rebuilding the D4 bulldozer had arrived in New Zealand (in twelve parts). The 'dozer' had not been expected to arrive until early 2007 so had not been factored into the final exhibition layout. Some redesign was completed and once the dozer arrived it was reassembled in situ by

*Continued to page 12*

# Faster Sea Level Rise is Projected

Computer modelling based on paleoclimate studies show that ice sheets covering both the Arctic and Antarctic could melt more quickly than expected this century. Scientists at the National Center for Atmospheric Research (NCAR) and the University of Arizona, have shown that by 2100, Arctic summers may be as warm as they were nearly 130,000 years ago when sea levels rose to 6 m (20 feet) higher than they are today. The research was to be published in the March issue of *Science*.

The findings are based on data from ancient coral reefs, ice cores, and other natural climate records, as well as output from the NCAR-based Community Climate System Model (CCSM), a powerful computer modelling tool that can be used to simulate past and present climates and

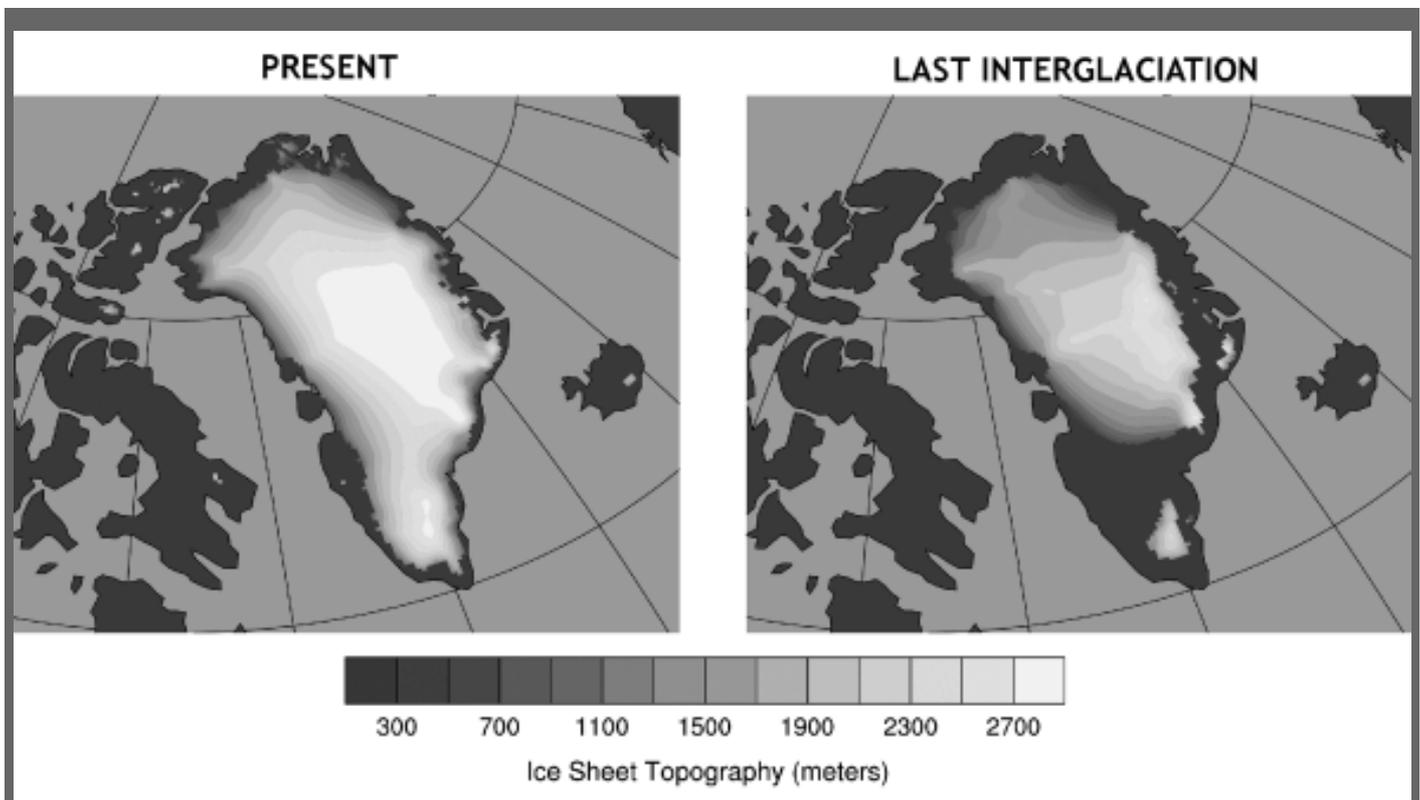
therefore assist in predicting future climates.

The studies show greenhouse gas increases over the next century could warm the Arctic by 3 - 5°C (5 - 8°F) in summertime. This is about as warm as it was 130,000 years ago, between the most recent ice age and the one before it. Changes in Earth's tilt and orbit caused the warm Arctic summers during this last interglacial period.

The CCSM suggests that during the interglacial period, melt water from Greenland and other Arctic sources raised sea level by as much as 3.5 m (11 feet). Studies of ancient coral reef records indicate the sea level actually rose 4 - 6 m (13 - 20 feet) or more. The conclusion is that Antarctic melting must have produced the difference in this sea level rise.

The studies are the first to link Arctic and Antarctic melting in the last interglacial period. Marine diatoms and chemical isotopes found beneath the West Antarctic Ice Sheet indicate parts of the ice disappeared at some point over the past several hundred thousand years.

The theory is that the rise in sea levels produced by Arctic warming and melting could have assisted to destabilize ice shelves at the edge of the Antarctic ice sheet and led to their collapse. If such a process occurred today, it could be accelerated by global-scale, greenhouse-induced, warming year round. In the Arctic, melting would likely be hastened by pollution that darkens snow and enables it to absorb more sunlight.



This graphic shows the height of the Greenland ice sheet at present (left) and during the last interglacial (about 130,000 years ago), as simulated by the NCAR-based Community Climate System Model coupled with an ice-sheet model. Graphic supplied from [www.nsf.gov/news](http://www.nsf.gov/news). Credit: Bette Otto-Bliesner, National Center for Atmospheric Research.

# ANTARCTIC SOCIETY DELIVERS ORAL HISTORIES TO CANTERBURY MUSEUM



*Above (left to right): Julia Bradshaw, Margaret Bradshaw, Jacqui Foley, Anthony Wright, Natalie Cadenhead, Lesley Colsell and Paula Granger at the Canterbury Museum looking through one of the boxes containing the oral history materials.*

The New Zealand Antarctic Society handed over the audio tapes and summaries of oral interviews, of over twenty people associated with the New Zealand component of the 1956-1957 Trans-Antarctic Expedition and International Geophysical Year, to Canterbury Museum. After many years and many happy hours of interviewing, Julia Bradshaw and Jacqui Foley completed a series of oral histories with TAI/IGY members and their families.

The oral histories preserve New Zealand's contribution over this period and provide a historical review from a New Zealand perspective.

The interview tapes and summary transcripts will be deposited in perpetuity at Canterbury Museum. "This is a huge research resource for

future generations," said Natalie Cadenhead, Canterbury Museum's Curator of Antarctic and Canterbury Social History.

The New Zealand Antarctic Society Oral History Project was made possible by two generous grants from the Lotteries Board Environment and Heritage in 1997 and 2004.

Oral historians Julia Bradshaw and Jacqui Foley interviewed people the length and breadth of the country. Their interview subjects ranged from flight commanders to geophysicists to cooks and aircraft engineers plus the wives of those men who played their part in the Trans-Antarctic Expedition and International Geophysical Year.

"The people who participated in the expeditions of the 1950s and

1960s established the modus operandi for field operations and field research still in use today. They possess a wealth of firsthand information and perspectives about the development and history of Antarctic investigations that had never been completely recorded. Their stories, photos, and memorabilia are of historical value to New Zealanders and the New Zealand research community," said Margaret Bradshaw, Coordinator of the project for the New Zealand Antarctic Society, Canterbury Branch.

Director of the Canterbury Museum, Anthony Wright, and General Manager of Museum Programmes Lesley Colsell accepted the collection at a hand-over ceremony at the Museum.

# 'Second Cruise' for SHALDRIL

In 1994 a group of 14 scientists and a representative from the National Science Foundation Office of Polar Programs met for a two day workshop to discuss scientific questions that could be addressed by shallow drilling on the Antarctic continental shelf. The participants in the workshop identified a number of important scientific questions but also realised that the technology required for sampling the upper few hundred metres of the stratigraphic column was lacking. The group interested in shallow drilling on the Antarctic shelf remained active and evolved into a working group that now calls itself SHALDRIL.

SHALDRIL stands for Shallow Drilling Along the Antarctic Continental Margin. SHALDRIL has helped to advance drilling technology to the point where it is now a project which sees the outfitting of the icebreaker *Nathaniel B. Palmer* (NBP) with a modular drill rig to sample seabed sediments in the Antarctic Peninsula region. The first SHALDRIL cruise sailed during the 2004/05 season, with the purpose of testing the system. The purpose of



*Above: The SHALDRIL rig being lowered onto the Nathaniel B. Palmer. All photos by Walter Gallagher.*

the second cruise in 2005/06 was to collect sediment cores at 7 proposed drilling sites (see figure below).

Ice conditions in the northwestern Weddell Sea, however, were less than desirable during the most recent cruise, with 60% to 80% ice cover and persistent northerly winds that

moved the ice at rates of up to one knot. The crew also had to deal with heavy fog that, at times, reduced visibility to a couple of hundred metres.

The first attempt at the outer shelf site (Proposed Site 6) was aborted after reaching 7 metres depth due to ice moving over the site.

After departing Proposed Site 6 the NBP steamed westward to Proposed Site 4 where the crew found a lead in the ice and began lowering pipe. They did drill to a depth of 9.24 metres before abandoning the hole and moving on.

The objective at Proposed Site 4 was to sample the thick glacial section that rests above a prominent shelf-wide glacial unconformity.

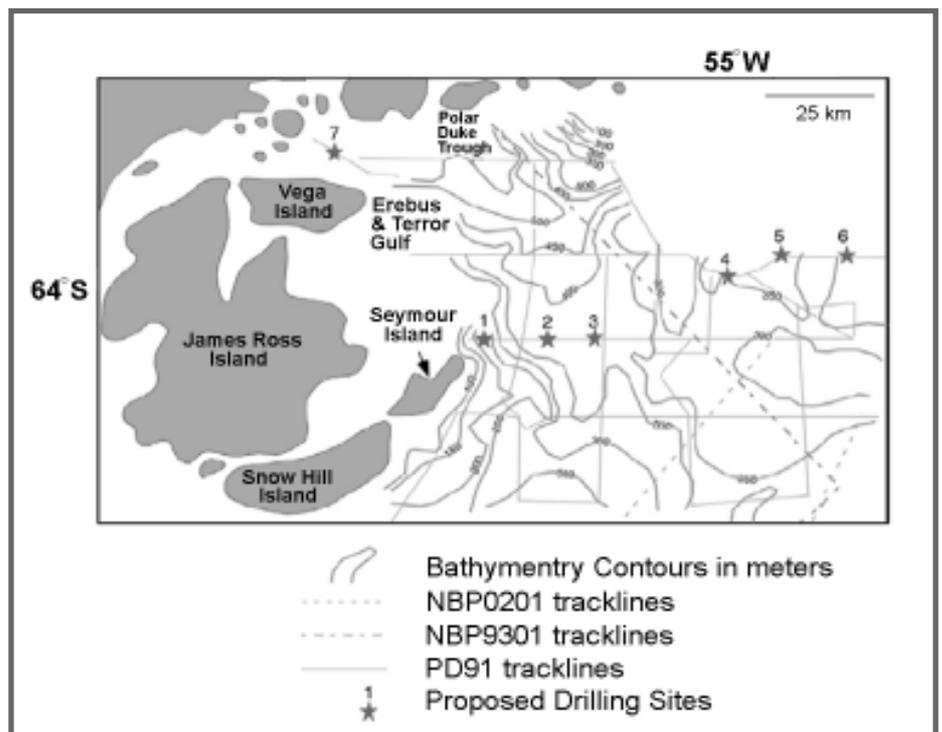
A seismic stratigraphic model indicated that this section is of Miocene age and the hope was to test and refine this model so that the timing of initial ice sheet grounding on the continental shelf can be constrained.

Again, ice floes caused the NBP to abandon the site after reaching a sub-bottom depth of 11.2 metres. A small amount of sediment was recovered

*Continued to page 20*



*Above: The icebreaker Nathaniel B. Palmer being readied for a SHALDRIL cruise.*



# Testing the Limits at Cape Hallett

Dr Don Jeanroy describes his experiences during Operation Deepfreeze II and the challenges faced by the *U.S.S. Arneb* which he served aboard during 1957 in this second part of a two part series.

PART ONE WAS FEATURED IN ANTARCTIC, VOL 23, NO 4, 2005

## A Ship Under SEIGE continued.....

Damage control crews ran throughout the *USS Arneb* checking for any water damage in the various cargo holds after it was caught in the ice. By midnight New Year's Eve, emergency welding crews had assembled in strategic areas of the ship and they began repairing several small cracked seams. But their efforts were not enough. Before long, the small cracks had grown into much larger ones. Then thousands of gallons of seawater began flooding through dozens of ruptured seams in the hull.

Outside, the wind increased and the sea ice began to compact around the ship. The distinctive sound of crushing ice was heard over the roar of the wind and the ice cascaded over backward into great mounds against the hull.

Throughout the night, the icebreaker *Northwind* circled the *Arneb* as it attempted to break up some of the major ice sheets and thus reduce the pressure on the ship's hull. The icebreaker bucked and churned the ice into smaller sizes, but it could not keep up with the severity of the storm. During this time, the *Northwind* severely damaged its starboard propeller and thus effectively reduced its own power by 50 percent or more.

Somewhere around 8:30 the next morning, 1 January, Captain Johnson ordered the crew to man their emergency stations. They were instructed to standby for any type of critical situation. The following description was provided by this author from a letter

he later wrote to his family about the events that took place on that New Year's Day:

"I ran back to after-steering and took over the watch. I heard the propeller turning so I knew we were underway. The after-steering navigator and myself were the only ones on duty there.

When we first got underway, the hydraulic steering machinery was working normally. Then all of a sudden, the equipment started to groan. This meant the ice was jammed up against the rudder. Then the ice began working against the hydraulic machinery. The entire after-steering space began shaking. We notified the bridge of our condition and I then ran over and tightened the brake on the rudder, effectively holding the rudder in place. By this time, it sounded like the place was going to explode. My knees were shaking so badly from fright I could hardly stand up.

The navigator and I then went into the farthest corner of our after steering space to insure that we would be safe if anything started to fly loose. Even through I had the brake on the rudder, the ice had control of the rudder and it was swinging the rudder from side to side. We again notified the bridge and they told us to stay clear of everything for our own safety."

The *Arneb* was hopelessly beset in the ice and the *Northwind's* efforts were futile. The heavy wind kept pushing the ice back into the pathways that the icebreaker had just cut around the *Arneb*. Then came the announcement that the wind was pushing a (700 foot) iceberg directly at the *Arneb*. Captain

Johnson tried to get the *Arneb* underway again, but this time the *Arneb* lost several large pieces of her four-bladed propeller. It became apparent to the crew that the ship had insufficient power to move very far.

But then, courageously, the *Northwind* cut a new path for the iceberg to follow - a path of least resistance - thus allowing the iceberg to alter its course by just a few degrees. During the next few hours, the crew anxiously watched as this huge and threatening iceberg passed within 50 metres of the stern of the *Arneb*. But, in the meantime, other dramatic scenes were being played out throughout the ship.

With the increased pressure of the sea ice, major sections of the hull in #2, #3 and #4 cargo holds began rupturing. Iron rivets popped out of their sockets and ricocheted around the cargo areas. Large quantities of frigid water began rushing into the ship. In the engine room, a large section of the starboard bulkhead was being pushed inward and several water pipes burst. The situation was grim and the ship did not have sufficient pumping capacity to adequately keep up with the flooding.

Then, over the ship's public address system, Captain Johnson announced that the *Arneb* was in an extremely difficult situation. He directed all ship's personnel to be prepared to abandon ship - if the circumstances became worse. He ordered the crew to dress warmly and to be prepared to take one blanket, one pillow and a maximum of two personal items. The crew was destined to ei-

ther go out on the ice for a period of time or to be transferred to the *Northwind*. The crew, many of whom were veterans of previous Arctic and Antarctic expeditions, remained calm and resolute. During the coming hours, they stayed at their emergency stations and they continued to work in whatever capacity necessary to help shore up the damaged hull and to keep the pumping equipment operating.

Later that night, as the repair crews were nearing exhaustion, the winds suddenly subsided and the ice pressure on the hull was significantly reduced. A shift in the wind's direction to the southwest began to slowly move the ice away from the *Arneb*. In the meantime, the *Northwind* came alongside and transferred several gas-driven pumps to the *Arneb*. Repair crews then began welding the ruptured seams from inside the hull. But there were still serious concerns regarding the seaworthiness of the *Arneb*. Late in the evening of New Year's Day, Captain Johnson announced that the ship would survive and the danger of the ship sinking had passed. He commended the ship's crew for doing a Herculean job in remaining steadfast to their responsibilities. In response to the captain's message, the morale of the weary crew soared and a genuine sense of pride and achievement became the prevailing attitude with the crew.

During the next couple of days, the crew continued to work hard — almost around the clock — controlling the flooding, repairing the damage and standing watch at their emergency stations. In most instances, the crew was on constant duty for almost three days.

Finally early in the morning of January 4<sup>th</sup>, the heaviest ice began floating out to sea and the ship had a clear passage to the planned landing site. Six days later, the shipboard crew had the Cape Hallett cargo off-loaded and the U.S. Navy Seabees had the construction of the base well underway.

While at anchor, the *Arneb* was again placed on a list position, first to port and then to starboard, to allow the repair crews to weld large plates of reinforced steel to both sides of the

ship at the waterline.

### DISCOVERING THE EXTENT OF THE DAMAGE WHILE UNDERWAY

By January 12<sup>th</sup>, the Seabees had completed the construction at Cape Hallett and the wintering party was safely housed in their new environment. Then the *Arneb* began a 2,500-mile journey to the Knox Coast, in the Wilkes Land sector of the Antarctic, where another base would be built. This base would later become a part of the Australian Antarctic program and become known as Casey Station.

Upon getting underway from Cape Hallett, Captain Johnson became aware that the ship was unable to maintain a set and intended course without making major navigational changes at the helm. The helmsman had noted that the ship had a steering capacity of 17 degrees right rudder and 53 degrees left rudder. Initially there was a concern that there was a serious mechanical problem with the steering equipment. But that proved false. Everything was functioning properly. It was finally determined that the heavy ice during the New Year's Day storm had permanently bent the rudder shaft 18 degrees to starboard and subsequently the *Arneb* had very limited steerage in that direction.

The water system that supplied the ship's boilers had also been seriously damaged when the engine room was under stress. The boilers were using more water than the ship's evaporators could produce. To alleviate this situation, the ship was put on a restricted or rationed water-use schedule, limiting all fresh water use to four hours a day and showers were only allowed every other day.

When the *Arneb* approached the Windmill Islands on the Knox Coast, the ship again encountered heavy sea ice conditions. This time, cracked seams were reported in the #1 and #2 cargo holds and another portion of the propeller was sheared off. Because these cargo holds were nearly empty, it was decided that only minor repairs would be made. The water coming through the hull would

be pumped back into the sea at a rate that would be equivalent to the incoming flow.

The *Arneb's* crew and the Seabees spent two weeks completing the construction of the Knox Coast station. Then the *Arneb* began its long, and this time uneventful, journey back to civilization. On February 28<sup>th</sup>, the *Arneb* sailed under the Sydney Harbour Bridge and headed to the shipyards at Cockatoo Island. The ship had been out at sea for 80 days and its crew, though weary and tested, were satisfied with their achievements.

The *Arneb* remained in dry-dock at Cockatoo Island for three weeks. During that time, the ship's propeller was replaced, additional plating was welded to the waterline and the fresh water system was repaired. An attempt was made to replace the bent rudder shaft, but an appropriate match could not be located. Therefore for the remainder of the journey back to the States, the *Arneb* maintained a steady course of 18-degrees right rudder - which got her directly back home.

## CRYOSAT IS BACK

The Cryosat mission, a 690 kg satellite that was lost in the Arctic Ocean last year, minutes after launch from northern Russia, will fly again.

The European Space Agency (ESA) has agreed to build a copy of the original £95m (140m-euro) craft. Early estimates suggest Cryosat-2 could be ready to launch in three years.

The satellite's mission will be to determine variations in the thickness of the Earth's continental ice sheets (Arctic and Antarctic) and sea ice cover. This supports research into how the Earth's ice is responding to climate change.

For more information see: <http://www.esa.int/livingplanet>.

# Treasures from Canterbury Museum: Alton A. Lindsey

By Natalie Cadenhead

Now on display in the Antarctic Gallery at Canterbury Museum, Christchurch, New Zealand, are a shotgun, wind-proof woollen helmet, silk overshirt, Leica camera and two trail flags that belonged to Alton A. Lindsey. Lindsey was the vertebrate zoologist in the shore party of Byrd's 1933 – 1935 British Antarctic Expedition (BAE) to Little America II and the Bay of Whales.

Lindsey, the son of a Methodist minister, was born on 7 May 1907 and grew up in Pennsylvania, USA. He earned a degree in botany, ornithology and entomology from Cornell University and his doctoral degree specialised in plant ecology.

Not originally listed as part of the winter-over crew for the Little America II expedition, Lindsey said in correspondence to friends that he was selected by Byrd because of his "practical electrical skills and his versatility". He was also vouched for by scientist Paul Siple, who personally requested that Lindsey work alongside him in the expedition (Canterbury Museum: MS350 item 21).

His particular area of study on the expedition involved recording the life histories of Weddell and Crabeater seals. This job included collecting skins, skulls and embryos for future study back in America. He also collected and prepared the skins of oceanic birds.

In addition, he had the task of capturing 19 Emperor penguins destined for the Brookfield Zoo in Chicago, USA. These birds were force-fed with thawed fish that had been shipped frozen from New Zealand.

The Emperor penguins along with 21 Adélie penguins, were housed on



**Above: Alton A. Lindsey with Emperor penguins. Detail from *The Star*, Washington DC, Tuesday March 12 1935. Lindsey papers, MS350 item 37, Manuscripts Collection Canterbury Museum.**

board the ship in a refrigerated room complete with swimming pool. The birds were exercised on a daily basis.

In his memoirs of this expedition, Lindsey noted that friction between the stiff tail feathers and the iron decking resulted in the bird's tails wearing down to stubs (*Naturalist on Watch*, 1983, pg 38). Unfortunately,

the Emperor penguins did not survive long once at the zoo, succumbing to a lung infection.

The best eight birds were stuffed and mounted for display – all facing forward to hide their damaged tails.

Lindsey's interest in Antarctica remained strong after the expedition ended. His letters tell of his involvement or interest in 22 other Antarctic expeditions. Highlights included participation in developing the American communications plan for the International Geophysical Year 1957 – 1959, and working with New Zealand teams on the heroic era huts at Cape Evans, Cape Royds and Hut Point.

Lindsey visited Canterbury Museum in 1987 and, along with the ar-

See photos on page opposite.

tefacts on display, donated manuscripts, copies of his diaries and photographs of his time in Antarctica. These can be accessed through the Documentary Research Centre at Canterbury Museum.

Two particular items of interest are his Leica camera and his wind-proof helmet.

## NATURAL HISTORY MUSEUM LAUNCHES ANTARCTIC WEBSITE



**Above:** Alton A. Lindsey's Leica camera. Canterbury Museum Collection: 19XX.4.13.  
**Below:** Two views of the woolen helmet made wind-proof with the addition of an outer layer of fabric. Canterbury Museum Collection: 19XX.4.17.



The Natural History Museum, London, has begun hosting an Antarctic Heritage and Conservation website. The site features regular postings from conservators working through the Antarctic winter for the Christchurch based Antarctic Heritage Trust (AHT) on the painstaking preservation of Shackleton's hut (See *Antarctic Journal*, Vol 23, No 4, 2005, page 63).

The website is part of an ongoing Museum programme, in partnership with AHT, to profile British heritage in Antarctic science through the use of interactive media.

It is hoped that the inclusion of conservators' stories, pictures of the surviving artefacts and stunning visuals of the environment will raise awareness about this preservation project and the history of scientific research in the Antarctic.

**The Antarctic Heritage and Conservation website is part of the Museum's main website and can be found at [www.nhm.ac.uk/antarctica-blog](http://www.nhm.ac.uk/antarctica-blog).**

## PENGUIN FOSSILS WORLD'S OLDEST

An article in the Christchurch Press by Matthew Torbit reports that four fossilised penguins discovered on a Canterbury, New Zealand riverbed back in the 1980s, have been confirmed as the world's oldest remains of the species.

The fossils were found near the Waipara River in the South Island of New Zealand in the mid-1980s and recent tests have determined they are between 60 million and 62 million years old – this is up to 10 million years older than any other penguin remains yet discovered.

The penguins lived in the shallow

seas just off the east coast of New Zealand just after the dinosaurs became extinct. Scientists believe these fossils could represent the missing link that proves modern birds lived along side of the dinosaurs.

The findings of the research project which investigated the fossils will be published in the international journal *Molecular Biology*. The fossil penguins show that the penguins were approximately the size of Yellow-eyed penguins and like modern-day penguins they did not fly, but had wing bones which were compressed and dense.

# HEARD ISLAND: SOUTHERN OCEAN SENTINEL

Edited by **Ken Green** and **Eric Woehler**.

ISBN 0 949324 98 1, 280pp, Paperback, A4, Aud \$77.00.  
Surrey Beatty & Sons Publishers - [surreybeatty@iform.com.au](mailto:surreybeatty@iform.com.au)

Heard Island has been forged by fire and ice from the sea floor in one of the most isolated places on Earth. It lies 1500 kms from Antarctica, 4000 kms from Australia and 3750 kms from Africa. Its discovery, post-dating that of Antarctica by 33 years, was not until 1853 when the Master of the *Oriental*, Captain John Heard was advised to sail a Great Circle route to Australia. This discovery was one of the few recorded occasions when an island was mistaken for an iceberg. Usually, and possibly in the case of Kemp's putative sighting of the island in 1833,

the reverse was true.

As on most subantarctic islands at the time, the action of sealers had a major impact on its pristine fauna resulting in near-extinction of some species within just a few years.

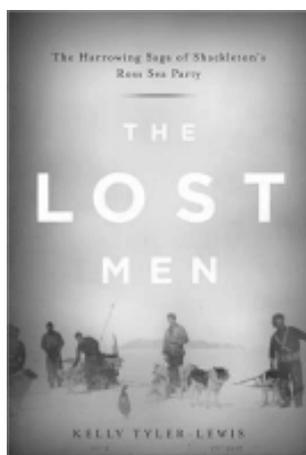
There is a wealth of information on the physical environment and the plants and animals on Heard Island buried in books, sealers' log-books, scientific papers, climbing journals and geographical magazines. This book, brings these disparate sources together in 15 review chapters with associated appendices to form a cohesive whole.

## THE LOST MEN

Written by **Kelly Tyler Lewis**. ISBN 9780670034123, 320pp, Hardcover.

More information on purchasing a copy of the book can be found at [www.thelostmen.com](http://www.thelostmen.com)

Published to glowing reviews is Kelly Tyler-Lewis' book *The Lost Men* which tells the dramatic story of the Ross Sea party, the support party associated with Shackleton's 1914 Imperial Trans-Antarctic Expedition. Researched in Antarctica, Britain, Australia, and New Zealand, *The Lost Men* is the definitive account of this long overshadowed expedition. Kelly Tyler-Lewis throws Antarctic exploration into new perspective as the unforgettable protagonists of the Ross Sea party come alive in this astonishing chronicle of unsung heroism. National Geographic Adventure has reviewed it as "One of the most compelling tales of polar exploration".



### *Hallett Station Exhibition Created from Base Remnants Continued from page 4*

Gus McAlister who had disassembled it in Antarctica. Issues around the dozer included looking at floor loadings, as it weighs around 9 tonnes! Temporary walls were established through which visitors to the museum could watch the reconstruction of the dozer. The dozer was reassembled in operational order so that in the future it may be started if required. In total four huts, one geomagnetic dome, and one bulldozer were rebuilt and fitted out with over 1100 objects ranging from dart boards, to camp ovens; pick axes to sleeping bags; novels to tinned whole boneless chickens. Finishing touches to the exhibition included building a small penguin rookery complete with Adélie penguins (both taxidermy and skeletal) and skuas. Behind the rookery is a large screen which shows photographs of the rookery and the station from the clean up project of the 1980's. Drifting through the area is the noisy sound of a busy rookery, captured on tape by Donald Reid, a member of the clean up crew in 1987. Adding atmosphere to the geomagnetic dome is time-lapse photography by Anthony Powell, former telecom technician at Scott Base. Finishing the experience, for those with good noses, can be discerned the faint aroma of salt winds and guano – direct from Antarctica.

The exhibition is open everyday to Canterbury Museum visitors.

Natalie requests those who spent time at Hallett Station, particularly from 1957 to 1973, to contact her by email [ncadenhead@canterburymuseum.com](mailto:ncadenhead@canterburymuseum.com).

# Art Fellows awarded for 06-07 by Antarctica NZ

A leading New Zealand installation artist and a prominent Hawkes Bay textile artist have been announced as the successful applicants for the 2006/07 Artists to Antarctica programme, a joint initiative between Antarctica New Zealand and Creative New Zealand, that is open to all established New Zealand artists and writers.

"We are thrilled to have had such a high calibre of candidates for this year's programme and it's fantastic that we have been able to select two artists with strong science backgrounds," said Antarctica New Zealand CEO Lou Sanson.

"This scheme gives New Zealand artists a rare opportunity to experience the greatest wilderness on earth. The Arts Fellows interpret that inspiration and share their unique experience for the benefit of other New Zealanders," said Elizabeth Kerr, Chief Executive of Creative New Zealand.

Joyce Campbell is internationally renowned for her sculpture, photography and time-based media works. She has exhibited extensively in New Zealand, Australia, the US and Europe and received critical acclaim for her abil-

ity to portray difficult and obscure environments through her work.

Textile artist, Clare Plug is the second Antarctic Arts Fellow for 2006/07. Clare's work reflects an affinity with her natural environment and critics often refer to her intriguing, almost poetic ability to capture the essence of a particular environment and to lure her viewers to it. Clare has exhibited her quilts - abstract and often enigmatic - both in New Zealand and extensively in the US.

"Both artists were an obvious choice given their knowledge of science and their desire to explore scientific principles and images in their work," said Mr Sanson. "In terms of providing education and understanding of the continent, they will use their scientific knowledge to tell the story of the Antarctic environment and its role as an indicator of the health of the rest of the planet."

Previous Antarctic Arts Fellows include author Margaret Mahy, fashion and wearable arts designer Fieke Neuman, furniture maker/sculptor David Trubridge and poet Bernadette Hall.

## WARMING IMPACTS WALRUSES

North American researchers have found a surprising number of abandoned baby walruses and suspect melting Arctic sea ice is to blame. The extent and duration of sea ice was known to affect Polar bears and it now appears other species will be adversely affected by sea ice reduction. Rising ocean temperatures may be forcing walruses to abandon their young as they follow the retreating ice edge north to colder waters.

## CARGO AND FUEL SAFELY OFFLOADED

Overcoming challenging ice conditions, ships safely delivered cargo and fuel to McMurdo Station in February, necessary to supply National Science Foundation (NSF) research stations in Antarctica through the winter and into the next research season.

NSF chartered the Russian icebreaker *Krasin* to cut and maintain a channel through the thick, multiyear ice covering the Ross Sea and the sound into McMurdo Station.



**Above: The tanker Lawrence H. Gianella sits along side the ice pier at McMurdo Station.**

**Photo from US National Science Foundation.**

The cargo vessel *American Tern* followed and arrived at McMurdo Station's ice pier on 2 February 2006. With its cargo safely off-loaded, and with recyclable materials and other goods stowed aboard for the return trip, the *American Tern* was escorted out of McMurdo Sound by the *Krasin* about a week later. The *American Tern* then steamed safely beyond the ice-clogged region and headed north.

Following that, the tanker *Lawrence H. Gianella* off-loaded the fuel required to heat the stations and power aircraft and other vehicles from its tanks into storage tanks on the land near McMurdo. After the off-load, it too headed north.

With the safe arrival and off-load of the ships, preparations for the long, dark Antarctic winter on the ice were completed.

# Mine Antarctica

Australian federal senator Barnaby Joyce, from Queensland, is reported to have said Australia should mine Antarctica before another country gets in first.

Mining is currently banned on the Antarctic continent under the Protocol for Environmental Protection to the Antarctic Treaty. Australia has signed and enacted this Protocol. Australia, in the recent past, was also one of the Antarctic Treaty states that refused to sign a legal document which would have allowed mining to take place in Antarctica.

Senator Joyce recently returned from a month-long trip to the Antarctic, as a member of the Australian Parliament's External Territories Committee. During his trip, he kept a video diary, filming himself and his impressions of life on Australia's

Casey Station and Macquarie Island, and his thoughts on Antarctica's future.

He said on an Australian television

programme upon his return, Australia may have no choice but to allow some form of development in Antarctica.

Australia, one of the seven claimant states, claims 42 per cent of the Antarctic continent.

"There's minerals there, there's gold, there's iron

ore, there's coal, there's huge fish resources and what you have to ask is: Do I turn my head and allow another country to exploit my resource ... or do I position myself in such a way as I'm going to exploit it myself before they get there," Joyce said.

The Environmental Protocol to the Antarctic Treaty, is a international legal document which designates Antarctica "as a natural reserve, devoted to peace and science." It also prohibits "any activity relating to mineral resources" in the Antarctic region. The document was agreed in the early 1990s.

## GOOGLE EARTH

If you have a reasonably fast computer, broadband access and you love to surf the web, then check out Google Earth, which even includes views of the polar regions.

Google Earth data can be used to examine the daily development of ice cover in the Southern Ocean.

This tool was tested on board of the Norwegian research vessel *Lance* in December 2005 enroute from Cape Town in South Africa to Dronning Maud Land in Antarctica.

You can also view the locations of identified larger icebergs, locations of research vessels, and drift buoy locations provided by the Russian Arctic and Antarctic Research Institute in St. Petersburg.

See it via the Polar View website at: <http://www.seaice.dk/polarview/google.s/>

## INTERACTIONS BETWEEN HUMANS AND LEOPARD SEALS REVIEWED

Following the tragic death of Kirsty Brown, who was attacked and drowned by a Leopard seal in July 2003, a one-year study, sponsored by the Kirsty Brown Fund and hosted at the British Antarctic Survey, was set up to review the available information on humans and Leopard seals in the Antarctic.

Data on interactions between humans and Leopard seals, from over 180 questionnaires and in-



terviews, were analysed to provide the information required for an assessment of the risks posed by Leopard seals to people working in the Antarctic.

The results have been published in the journal *Antarctic Science* and the full report is available to download from the BAS website at <http://www.antarctica.ac.uk/>

# McMurdo Fish May be a New Species

By Emily Stone  
Courtesy of the Sun.

You can count the variety of visible animals in McMurdo Sound near Scott Base and McMurdo Station on one hand, so the idea that a new species would wander up to the station might initially seem absurd. But there's a whole world living next door to the two bases in the ocean that still yields many surprises — such as the mysterious fish found in front of McMurdo recently.

This critter was captured in the water near the McMurdo Station jetty in 15 m of water in November 2004. It may prove to be a new species of fish.

Paul Cziko and Kevin Hoefling spotted the fish immediately. It was a purplish-gold colour against a big brown rock and it looked like nothing the two divers had ever seen before. Nor does it look like anything anyone had recorded seeing before.

A year after the divers caught the mystery fish, they've done enough research that they're convinced it's a new species. Cziko is working on a paper to submit to a peer-reviewed journal, which, if accepted, will introduce the new species to the rest of the world.

The men saw the fish during a dive at the McMurdo Station jetty in November 2004. They were in about 15 m of water collecting fish eggs for Art DeVries' fish biology group. They didn't have a net with them, but Hoefling was able to catch the fish in his hands and Cziko put a mesh bag around it so they could bring it to the Crary Lab aquarium.

They showed the fish to DeVries, who has about 40 years of experience with Antarctic fish, yet he'd never seen this type before. That's when Hoefling said he started wondering if they'd found something new.

"You just wouldn't think, 'I'm go-



ing to find a new species today,'" said Hoefling.

Cziko and Hoefling looked through "*Fishes of the Southern Ocean*," the bible of Antarctic fish species, and didn't find anything that resembled their fish. Hoefling took pictures and videotaped the fish in the aquarium. Cziko, a visiting research specialist at the University of Illinois with DeVries, planned to look into the issue back home. With only 300 or so species of fish in the Southern Ocean, it was relatively easy to see that the fish didn't resemble much that was already cataloged, he said. "There was only one that looked even remotely similar," Cziko said. That fish, *Cryothernia peninsulae*, had been caught during only one expedition in 1975, off the Antarctic Peninsula.

The next step was to ask museums for samples of *Cryothernia peninsulae* to compare the known species to the mystery fish. Museums around the world collect plant and animal species to document past and present biodiversity, and to help scientists with their research.

Four samples arrived, and Cziko did a series of comparisons between the fish. He counted the scales and bones in its fins and calculated body measurement ratios, such as how big the head and fins are compared to the body.

About 90% of the measurements were the same between the two fish. But there were some important distinctions.

The mystery fish is much larger — 32 cm compared to 15 cm at the same life stage. The mystery fish has a large pit between its eyes, which is used to sense movement in the water around

it. The pit is wider than the other species' pit and has a slight ridge in the middle. The new fish also has an unusual coal-black lining of its mouth and gills.

Cziko said he's done about 80 measurements comparing the new fish and the *Cryothernia peninsulae*. He's confident that they're in the same genus but are different species. He's hoping to write up his paper to submit to the journal *Copeia*, a publication that focuses on research about fish, amphibians and reptiles.

If the panel decides to accept Cziko's theory that the fish is a new species, he and Hoefling will get to choose a name for it. They have some ideas, but nothing they're set on yet.

They both want to pick a name that's descriptive and will help other researchers quickly identify the fish if they see it, rather than naming the fish after a person (many Antarctic fish bear the name of polar explorers and scientists).

The giant *Dissostichus mawsoni* is named after Australian explorer Douglas Mawson who sailed with Ernest Shackleton and was part of the first ascent of Mount Erebus. *Trematomus bernacchii* is named after Louis Bernacchi, who was part of Robert F. Scott's 1901 foray to Ross Island. And, *Pagothenia borchgrevinki* honours Norwegian Carsten Borchgrevink, the commander of the British Southern Cross Antarctic Expedition of 1898, which established the first winter station on the continent. The custom is not entirely dead, as DeVries has a fish named after him as well, the *Paraliparis devriesi*.

Cziko and Hoefling said they may focus on the pit in the fish's head, its iridescence or black gills and mouth. The genus, *Cryothernia* means "from the cold" in Greek.

The jetty where the men found the

*Continued to page 20*

# Noela Winifred Claydon

**FTCL, LRSM, FELLOW IRMT**

7 May 1923 - 26 January 2006

Noela Claydon, a woman of warmth and joy, passed away in January, she was 82.

Born Noela Borrow, in Dunedin, New Zealand, she lived most of her childhood life in Mosgiel.

She attended Otago Girls' High School and maintained a link with that school throughout her life through meetings with "old girls".

Noela studied music at Dunedin's Barth School of Music and at Otago University. She was a very skilled pianist and a teacher of piano and music theory.

Her appointment as a Fellow of the Institute of Registered Music Teachers of New Zealand was no surprise to her Professor of Music at Otago.

Noela served with the Women's Auxiliary Army Corps during World War II and it was during this time that she met her husband-to-be, Wing Commander John Claydon, who is now a life member of the New Zealand Antarctic Society, and was then a flying instructor at Taieri, near Mosgiel.

They became engaged at the end of the war and were married for 59 years.

John and Noela had two children, Helen and Richard, and Noela raised the children and taught music when she found the time. John, Noela and the children moved to Wigram Air Force Base during the time John was involved in the Commonwealth



Trans-Antarctic Expedition (TAE).

While living at Wigram, she recognised the need for a kindergarten and organised the successful fundraising for one. She also became involved with the New Zealand TAE party, as Wigram became the base for the flying support portion of the expedition. In 1956, the expedition set up a training camp on the Tasman Glacier, where all expedition members lived while they were taught snow and ice techniques.

Not to be left out, Noela and many of the other wives joined the group based at the Malte Brun Hut and lived in the tents that were pitched on the glacier.

Noela often told members of the New Zealand Antarctic Society's Canterbury Branch her stories of delivering mail and freshies to Harewood Airport for transport to the TAE party, in her Morris Minor with the children coming along for the ride.

Career appointments for John saw the family live in Wellington, Washington DC, and Nepal. In Nepal, Noela worked on various medical and social committees and was co-chair of the American Clinic which immunised Nepalese people against cholera, typhus and typhoid. She also somehow managed to hire a piano while she was there from one of the wealthier Nepalese families and she used

it to teach piano to those who wanted lessons.

John and Noela took up retirement in the mid-1970s, they moved to Merivale where Noela then taught music at St. Andrew's and St. Margaret's Colleges.

She was an avid bridge player, a grandmother and great-grandmother.

She was a staunch supporter of the New Zealand Antarctic Society, especially the Canterbury Branch, and she regularly attended branch functions and events. Her smiling face will certainly be missed at branch meetings.

# Shackleton Writes...

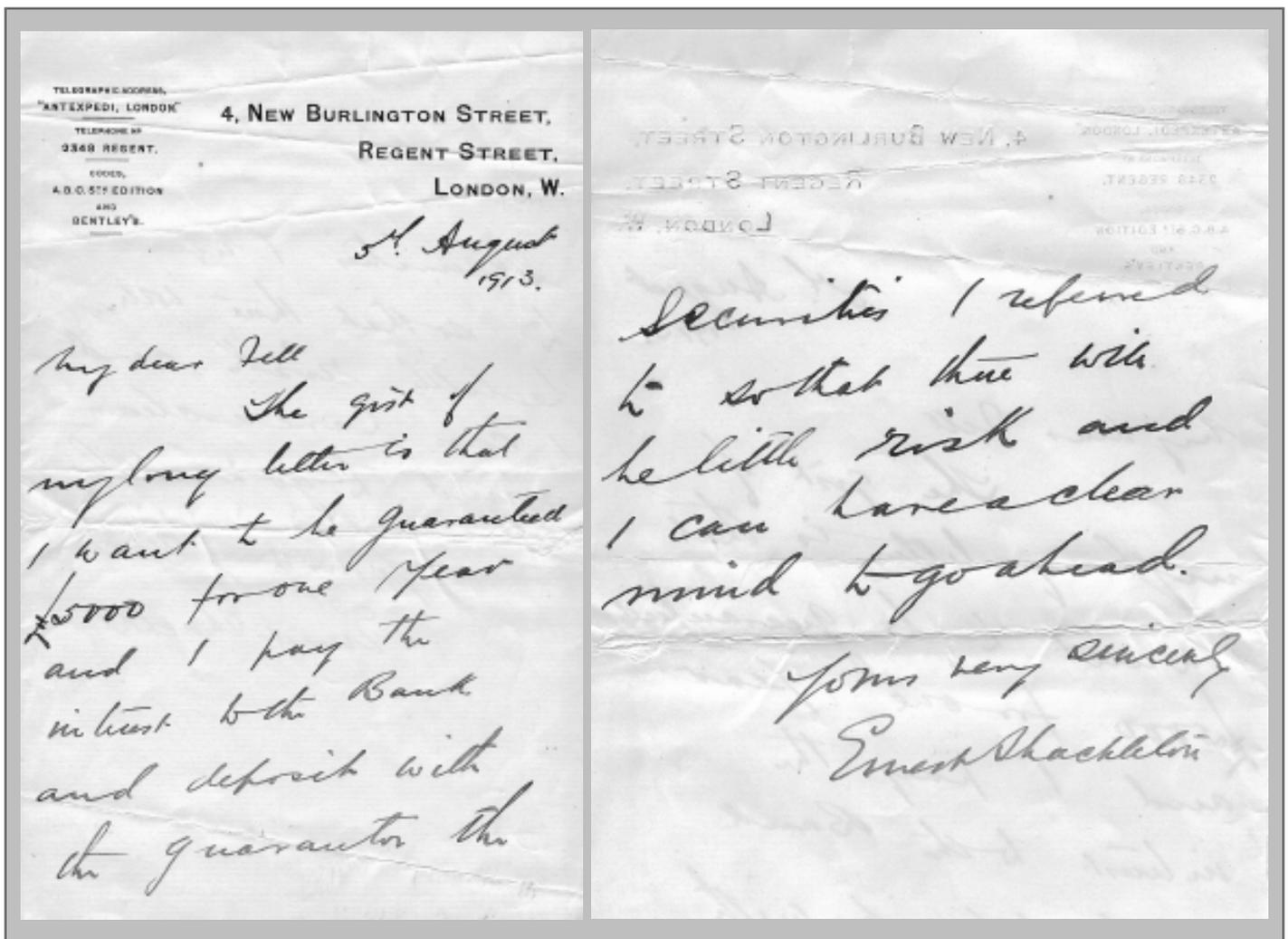
A recent purchase by Classic Stamps Ltd in Christchurch is a letter dated 5th August 1913 written by Earnest Shackleton.

The text reads:

My dear Fell

The gist of my long letter is that I want to be guaranteed £5000 for one year and I pay the interest to the bank and deposit with the guarantor the securities I referred to so that there will be little risk and I can have a clear mind to go ahead.

Yours very sincerely  
Earnest Shackleton



# Canterbury Club Marks 1904 Scott Dinner

Story and Photographs by Warren Head, Publisher of 'Antarctic' and a Member of The Canterbury Club.

The return of Robert Falcon Scott to Christchurch from his 1901-04 expedition to Antarctica was recalled at a commemorative dinner at The Canterbury Club in April 2006.

On 9 April 1904, The Canterbury Club hosted a dinner for Commander Scott, leader of the National Antarctic (*Discovery*) Expedition to celebrate their return from exploring the continent. Members of the expedition were 'signed in' for the evening by the club's committee.

Guests of the president of The Canterbury Club, Rick Hill, and his committee in 2006 included Paul Hargreaves, the chairman of Antarctica New Zealand and the organisation's CEO, Lou Sanson, Paul East, the chairman of Antarctic Heritage Trust, the Trust's executive director Nigel Watson, Lesley McTurk, chief executive of the Christchurch City Council and Anthony Wright, director of Canterbury Museum.

Paul East, chairman of Antarctic Heritage Trust, described Scott's expedition as akin to "space travel without a Mission Control."

"His expedition of 1901-04 initiated a frenzy of exploration that lasted a decade and Canterbury was at the heart of it all. Christchurch was the equivalent of Cape Canaveral."

East recalled how Scott worked at the Canterbury Museum after his return to the city and how the dinner of April 1904 was a highlight of the ex-



*Above: The Scott statue on the banks of the River Avon, Christchurch, with the Canterbury Club in the background.*

pedition's time there. Scott had written in his diary of "the warmth of welcome in New Zealand."

"As we entered Lyttelton harbour, each of us felt we were returning home. New Zealand welcomed us as its own."

East said the expedition budget was the equivalent in today's dollars to NZ\$18m.

Club President Hill noted that the proceeds of an auction of Antarctic memorabilia were to be shared between the Canterbury Heritage Building Trust (the Canterbury Club redevelopment) and Antarctic Herit-

age Trust, the Christchurch based charity dedicated to saving Scott's and Shackleton's expedition bases in Antarctica.

The Canterbury Club, located on Cambridge Terrace and Worcester Boulevard, is itself of historical importance to Christchurch and a significant refurbishment is planned. The club sits on the opposite bank of the Avon River to the statue of Robert Falcon Scott sculpted by his widow Kathleen Scott.

The Antarctic Heritage Trust is concerned with preservation work at Cape Adare Huts (Northern Victoria

Land Expedition 1898-1900) and British Antarctic (*Terra Nova*) Expedition 1910-13; Discovery Hut in the Ross Sea region (National Antarctic (*Discovery*) Expedition 1901-04 led by Commander Robert Scott); Nimrod Hut, Ross Sea Region (British Antarctic (*Nimrod*) Expedition 1907-09 led by Ernest Shackleton) and Terra Nova Hut, Ross Sea Region (British Antarctic (*Terra Nova*) Expedition 1910-13) led by Captain Robert Scott.

On display at The Canterbury Club were recently discovered relics from Scott's historic hut, a backpack and pony hood, excavated as a conservation team battled in early 2005 to shift tonnes of snow on and around the historic Cape Evan's hut.

These relics were conserved by AHT and then displayed at Canterbury Museum. The canvas pony hood is believed to have been an experimental facemask to protect ponies from snow blindness.

The Royal Geographical Society had played a significant role in providing support for the expedition and a letter from Sir Neil Cossons, President of the Royal Geographical Society was read to the 2006 commemorative dinner from the Society to mark the relationship. Sir Neil visited the Ross Island huts in January 2005 at the invitation of the Antarctic Heritage Trust and Antarctica New Zealand. He reported back to the British Government on the state of the historic sites.

East told The Canterbury Club dinner party that more support for the Hut Restoration Project from Britain was needed than has been shown so far.

The Ross Sea Heritage Restoration Project began two years ago with work at Shackleton's Hut, Cape Royds, during the 2003/04 summer season following two grants totalling US\$350,000 from the Getty Foundation.

The first major work on the conservation of the fabric and structure at Shackleton's Hut began in the summer of 2003/04. The World Monuments Fund lists it as one of the world's 100 most endangered assets.

The New Zealand Government is providing NZ\$356,000 annually in



*Above: The Canterbury Club which hosted Robert Falcon Scott in 1904.*



*Above: Discovery Hut, Ross Sea Region (National Antarctic (Discovery) Expedition) 1901-04, led by Commander Robert Falcon Scott.*

baseline funding. An international team of three conservators are wintering over this year as part of the Antarctic Heritage Trust's Ross Sea Heritage Restoration programme.

They will spend the winter at Scott Base, close to Shackleton's only Antarctic hut.

Lead conservator Australian Sarah Clayton has spent four summers on Trust work.

Conserved objects will then be re-

turned to Shackleton's Hut.

The conservation laboratory built and shipped to Antarctica for the project is funded in part by the New Zealand Lottery Grants Board. This expedition has also been made possible by funding from Hallenstein Glasson Ltd, from an ongoing donation of a percentage of sales from a specific brand of clothing.





*This flying-saucer-shaped iceberg near Petermann Island has been perfectly smoothed by wave action before rolling over to reveal its underside. Endless shapes allow an active imagination to create all sorts of fantastic images. Photo by Colin Monteath.*