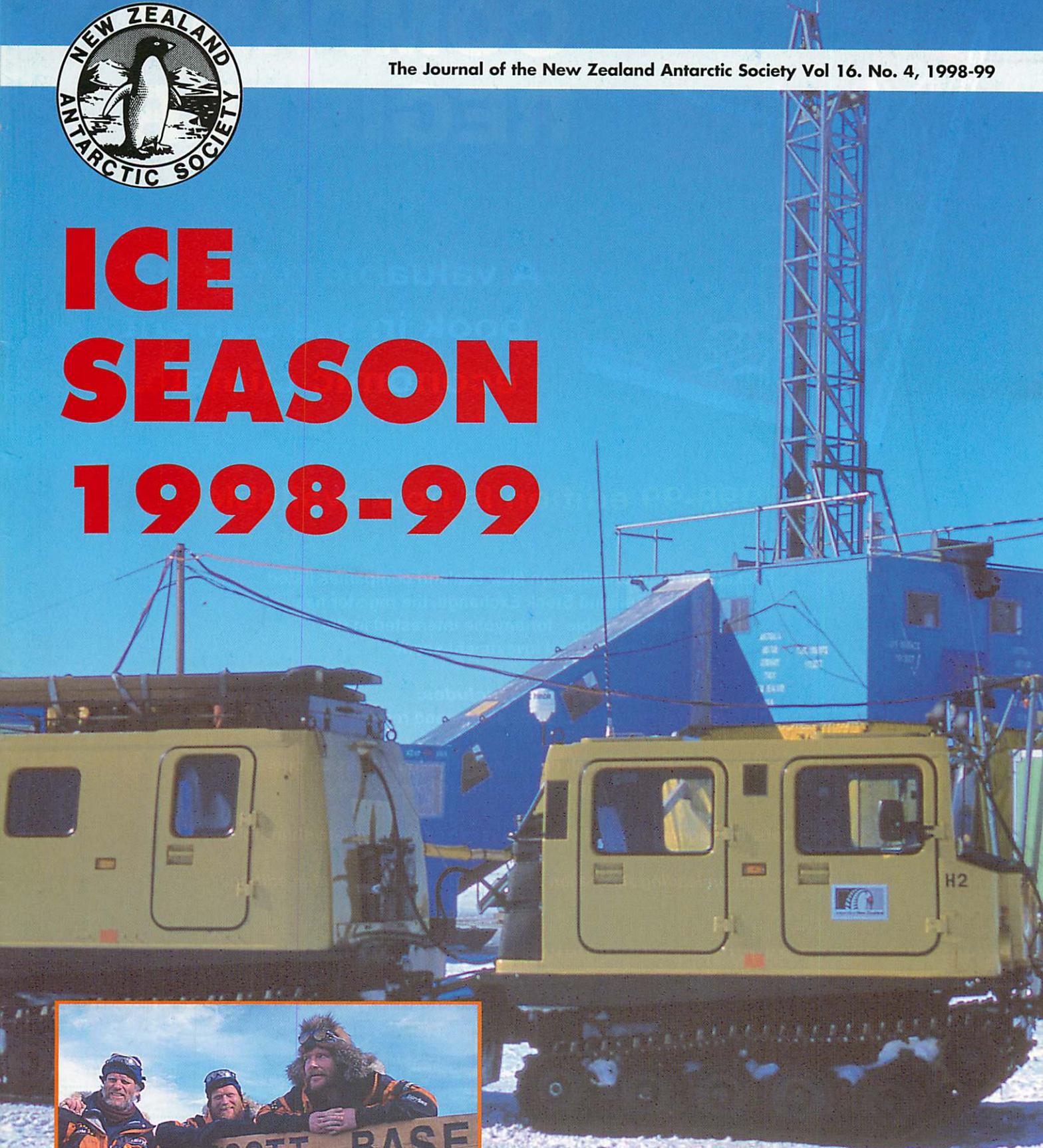


ANTARCTIC



The Journal of the New Zealand Antarctic Society Vol 16. No. 4, 1998-99

ICE SEASON 1998-99



IRIDIUM ICETREK

When that storm had passed the trio trekked to within 98km of the Pole, now only four days distant. Unbelievably, bad weather again struck and once more they pitched their tent in a fierce storm, unable to venture out in 60-100kmh gales with temperatures fluctuating between -30deg and -50 deg.

After a tortuous 84 days of battling blizzards, frostbite and illness the Icetrek trio arrived at the South Pole.

The initial transition from isolation was gradual. "The first people we saw were two people on a skidoo researching ice dust clouds then a lone skier came over," recalled Phillips. "We crossed another valley and then we saw the flags. And five minutes short of the Pole station the binding broke on my ski!"

Peter Hillary says "a small contingent from the American base were there to meet us . . . then we found a quiet spot to reflect on our shared experience and put up our own ceremonial 'South Pole' a piece of driftwood Jon Muir brought all the way from the Victorian coastline in Australia."

"I didn't sleep that night." says Phillips, "We had clean sheets and were warm but it was so alien getting back into the real world and was uncomfortable."

Queen Elizabeth II New Zealand PM Jenny Shipley and Australia's Communications

Minister each wired their congratulations. Ed Hillary, who had ridden a modified Massey Ferguson tractor to the Pole in 1957, told his son "Congratulations Peter on this marvelous achievement of reaching the Pole."

Ed Hillary had shared updates constantly throughout the expedition with Peter's wife Yvonne Oomen who wrote in a wife's perspective of the trek published in *'The Press'* "Not long ago we heard that due to the relentless blizzards, the delays and the resulting logistical problems with rescue requirements, the team would have to call a halt at the South Pole."

Crossing to the Pole, she wrote, had been "such an arduous affair with hugely heavy sleds and endless monochromatic flatness. The vast emptiness affected the team deeply. It required great physical endurance and mental discipline. Peter's calls would bring me shockingly into the reality of a wild, lonely and vicious place, and I would fret about dwindling food, their state of mind and the vastness of their task. But still they marched on inexorably . . ."

"Ironically the return part of the journey was always going to be the easiest, with the katabatic winds blowing the right way for the team to use the huge quadrifoil kites they were carrying. But every expedition must work with Nature.

"Triumphs are achieved not through conquering Nature but by being graciously blessed by her opportunities."

From South Pole Station it was a very fast transition back from isolation. Ferried by Hercules aircraft to Scott Base, they found the "Ministerial-on-Ice" meeting under way and participated not in "a quiet barbecue but in a full

banquet with a need for impromptu speeches." The expedition was flown with ministers to Christchurch and within 72 hours of ending the trek found themselves in a cauldron of controversy.

Suddenly, the heroic achievement of the inwards trek (and the sponsor's new satellite-direct mobile phone) was overshadowed by media generated allegations of a rift in the team.

'Damage control' by Iridium's public relations advisers salvaged the inner integrity of the overarching achievement of Icetrek but internal disagreement by the trekkers over the causes of the decision to halt at the Pole now emerged.

Whilst all were frustrated that the return journey was abandoned, Phillips, his undoubted skills in using quadri-



Eric Phillips towing a sledge.

foils so superbly demonstrated on an earlier solo crossing of Greenland, publicly showed the intensity of his disappointment. "As with every expedition you plan and train but you never have enough time. Our quadrifoiling and kiting skills were not as good as they could be and the fact was we weren't fast enough — we went through a learning curve and started slowly."

Muir was deeply introspective and declared at a media conference in Christchurch's Rydges Hotel that going back was not a burning ambition

and he was now planning solo journeys across deserts and along remote coastlines.

A perplexed Hillary diplomatically played down the apparent dissension, thanking Antarctica New Zealand for its confidence in supporting "something less mainstream, a small group facing the elements in a place of great epics and dramas and communicating this back (to the public)."

For him the highlight of Icetrek was the journey through the Shackleton Glacier. "On the eastern side it reminded Jon and I of the Himalayan peaks, vast and stunning, while the western side was like the incredible terrain of the American Rockies. At the top of the Glacier in the camaraderie of the climb we all told each other Monty Python jokes."

"The Polar Plateau went on forever, an absolutely astonishing place, the harshest place I've ever visited, a surface etched by wind. We encountered not one but five storms and it was quite incredible putting up a tent in a 50 knots gale . . . knowing that if it blew away it might tumble for 1000kms."

"The actual snow does not pose a problem. At no stage is it deeper than six inches and not difficult on skis."

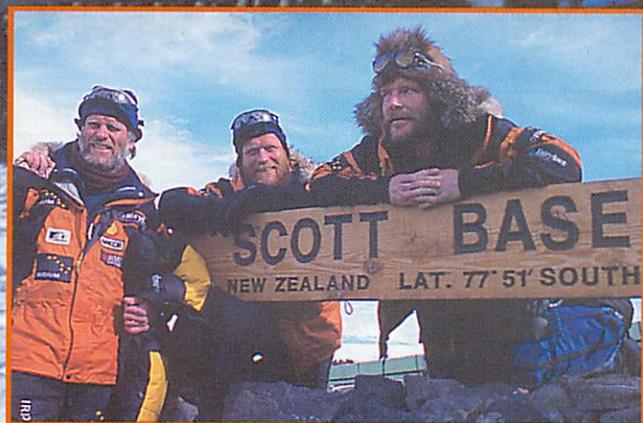
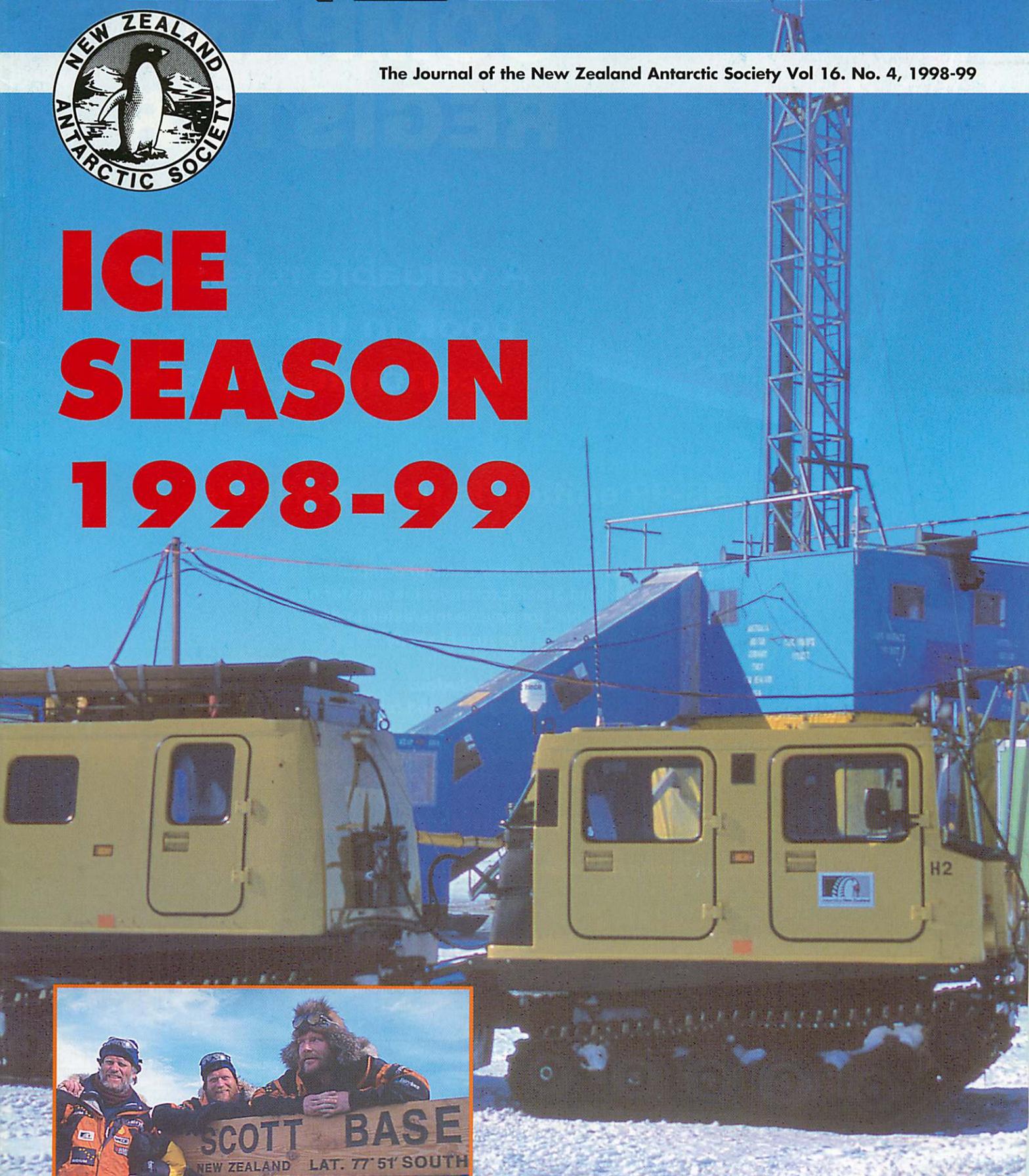
But the kites proved difficult to deploy to best advantage. The quadrifoils were in various sizes, operated like a parachute or flown higher to generate greater speed and lift. Hillary says that as a qualified pilot he was aware of how air works "but nothing beats specific training." Or, of course, wind from the right direction. There were few northerly winds en route to the Pole and Hillary says there is little existing evidence of wind coming from the North

ANTARCTIC

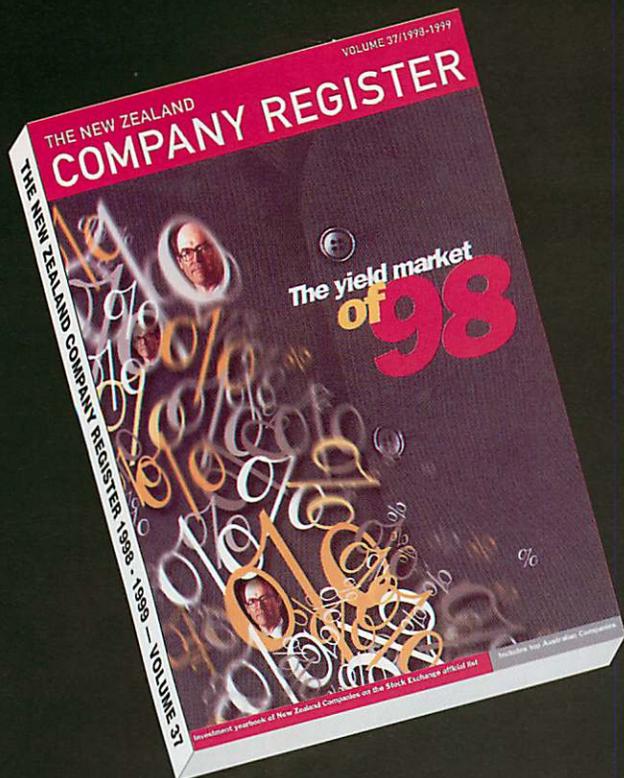


The Journal of the New Zealand Antarctic Society Vol 16. No. 4, 1998-99

ICE SEASON 1998-99



IRIDIUM ICETREK



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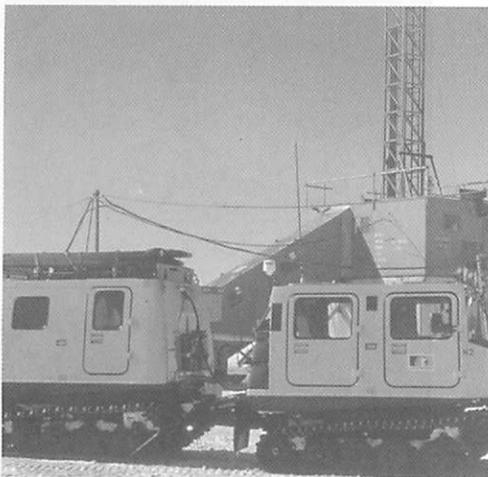
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The Cape Roberts Project was a highlight of the 1998-99 scientific season at Antarctica

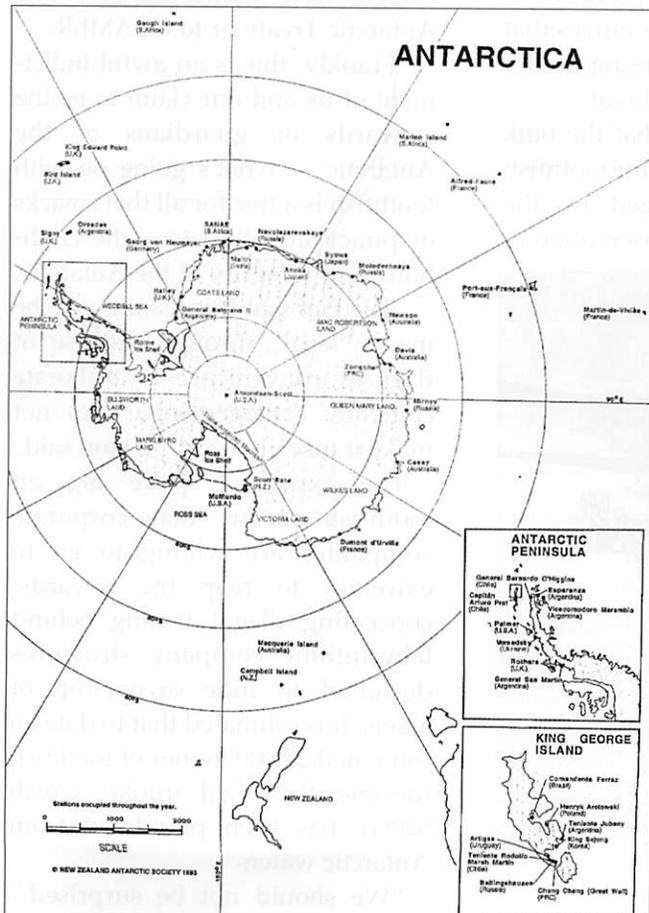
Volume 16, No. 4, 1998-99,

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LAW AND ORDER TO THE WILD SOUTH

MINISTERIAL ON ICE AT ROSS ISLAND

Bringing law and order to the wild south was the focus for a top level informal Government meeting held in Antarctica in January.

The meeting was the first of its kind for Antarctic Treaty Nations and it was hosted by New Zealand with assistance from the Italian and United States Antarctic programmes. Representatives from 23 parties to the Antarctic Treaty were present from 25-28 January.

New Zealand's Associate Minister of Foreign Affairs and Trade, with responsibility for Antarctica, Simon Upton led the forum and focused on the continent's dependent eco-systems saying that it was time for politicians to give some impetus to the conservation of Antarctica.

He used the what he termed "the toothfish-saga" to illustrate the growing pressure being brought to bear on Antarctica, a continent that is no longer as isolated from the rest of the world as it once was.

During January 1999 the New

Zealand Government "declared war" on toothfish poachers, flying a Royal New Zealand air force Orion surveillance aircraft over Antarctic waters and deploying the frigate "Te Kaha" into the New Zealand controlled Ross Sea to detect and deter poachers of Pantagonian toothfish.

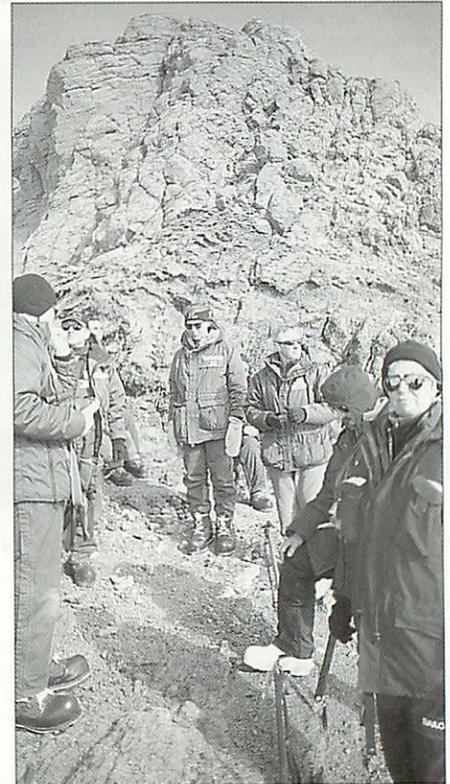
In a speech made at McMurdo Station on January 27 Simon Upton told delegates that vigilance by all signatory countries was required if illegal toothfishing and other exploitation of Antarctic resources were not to get out of hand.

"However comfortable we might have been in believing that our decision to impose a 50 year moratorium on mining has safeguarded Antarctica, pressures for resource utilisation are here and now. Given what is happening to fisheries elsewhere in the world, we cannot be surprised that it is precisely in the area of marine resources that the Antarctic is coming under greatest immediate threat"

Upton pointed out that the bulk of uncontrolled fishing for toothfish in the waters managed by the Convention on the Conservation of



Simon Upton



Members of the ministerial group pictured near Scott Base. Courtesy Antarctica New Zealand.

Antarctic Marine Living Resources (CCAMLR) has been and continues to be carried out by companies and citizens from parties either to the Antarctic Treaty or to CCAMLR.

"Frankly, this is an awful indictment of us and our claim to be the stewards or guardians of the Antarctic — what's going on with toothfish is a free for all that smacks of piracy and threatens the credibility and integrity of the Antarctic.

"The fact that this fishing may be made "legal" through the use of flags of convenience or elaborate company arrangements, does not make it morally right," Upton said.

The expensive price tag on toothfish means that corporate companies are willing to go to extremes to reap the rewards, concealing illegal fishing behind labyrinthine company structures designed to hide ownership of assets. It is estimated that to date an estimated 22,000 tonnes of toothfish (double the legal quota) worth \$200m has been plundered from Antarctic waters.

"We should not be surprised,"



The Ministerial-on-Ice party arrives in Antarctica by Hercules. Courtesy Antarctica New Zealand

NEW ZEALAND

Upton said, "money can talk just as loudly in the Antarctic situation as it does in others around the world in our newly globalised economy." Upton said while it made no difference to an albatross whether it died on the hook of a longliner flagged to a CCAMLR party or a non-CCAMLR party, it was several hundred times less likely to be drowned if the long-liner is working in accordance with the precautionary approach adopted by the CCAMLR.

"Eco-systems do not keep to neat boundaries which we as human beings like to in our efforts to bring precision to our world, and CCAMLR can work — if it is given a chance. If it does not a very dark shadow indeed will be cast on the entire Antarctic Treaty System."

A communique released by government representatives attending the meeting says they:

- Recorded the achievements of the Antarctic Treaty in keeping the continent free from discord and dedicated to peace and science;
- Stressed the importance of the Protocol on Environmental Protection to the Treaty promoting the protection of the Antarctic;
- Stressed the importance of scientific research being conducted in areas like global climate change;
- Expressed their grave concern at the continuing threat of illegal, unregulated, unreported fishing for toothfish.
- Pledged themselves to work to meet these new challenges and to maintain the integrity of the Antarctic Treaty System.
- Acknowledged the significance of the work of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and welcomed the prospect of close cooperation between the Committee for Environmental

Protection established under the Madrid Protocol and CCAMLR in addressing the threat to the Antarctic eco-systems.

- Looked forward to the 23rd Consultative Meeting of Parties to be held in Lima, Peru, from 24 May to 4 June 1999 and to the commemoration at that occasion of the 40th anniversary of the Antarctic Treaty.
- Twenty four ministers, deputy ministers and officials attended the two day summit. Those attending included: The Australian Minister for the Environment, Robert Hill; the United Kingdom's Minister for the Environment Michael Meacher;

Austria's Minister of the Environment, Martin Bartenstein; Finland's Minister of Foreign Affairs, Tarja Halonen; South Korea's Minister of Maritime and Fisheries, Kim Sun-kil; the Netherland's State Secretary of Transport and Water Management, Monique de Vries; Norway's Minister of Justice, Aud Inger Aure; Peruvian Foreign Minister, Fernando de Trasegnies; Sweden's Minister for the Environment, Kjell Larsson; and the United States' Assistant Secretary of State, Oceans, and International Environment and Scientific Affairs, Melinda Kimble.

ANTARCTIC TREATY MINISTERS MEETING

The first government-level meeting to be held in Antarctica on January 25-28 hopes to focus political attention on the frozen continent and its fragile environment

THREATENED ENVIRONMENT

The key environmental threats

- **Global warming** Temperatures are thought to have risen 2.5-4.5 °C over the past 20 years in the Antarctic peninsula and this may be causing changed pack ice and fishery patterns
- **Ozone depletion** The ozone hole above the continent each spring continues to expand since first discovered in 1985
- **Over fishing** Fish stocks, still recovering from over exploitation in the 1970s are now threatened by widespread illegal fishing

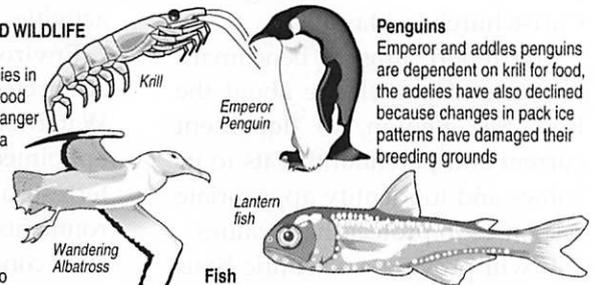
THREATENED WILDLIFE

Krill

This key species in the Antarctic food chain are in danger from rising sea temperatures and over fishing

Albatross

Seabirds are falling victim to snaring by long line fishing techniques used in fishing



Penguins

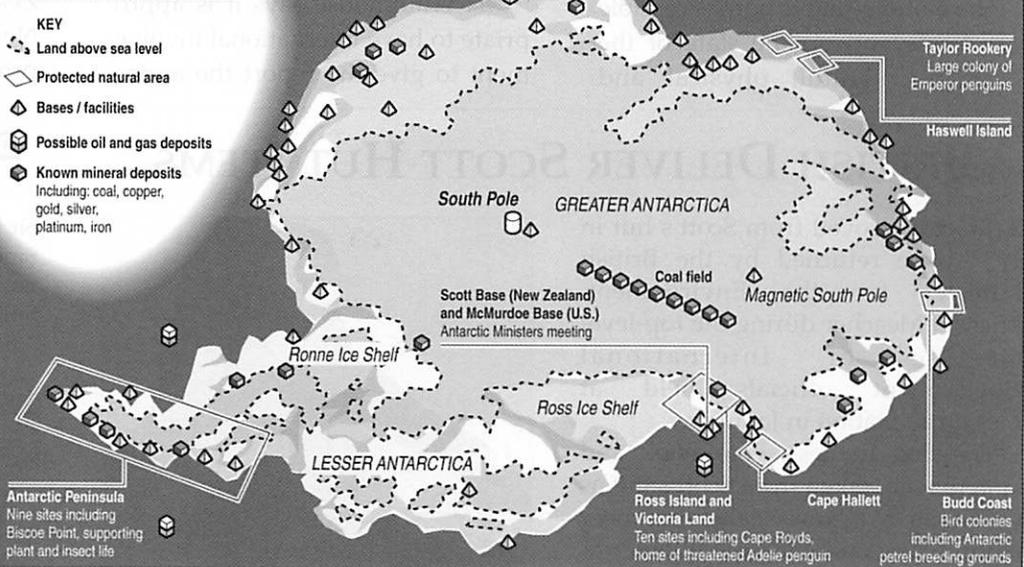
Emperor and adelles penguins are dependent on krill for food, the adelles have also declined because changes in pack ice patterns have damaged their breeding grounds

Fish

Antarctic fishing has boomed in recent years and now some species stand at only 5% of their original numbers

THE ANTARCTIC CONTINENT

- KEY
- ▲ Land above sea level
 - ◊ Protected natural area
 - △ Bases / facilities
 - ⊕ Possible oil and gas deposits
 - ⊖ Known mineral deposits Including: coal, copper, gold, silver, platinum, iron



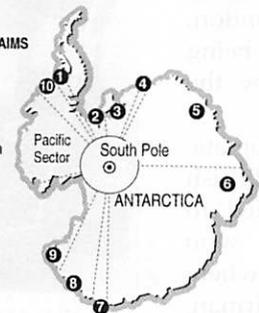
SIZE

Antarctica compared to the United States



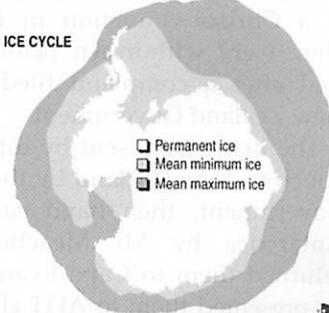
TERRITORIAL CLAIMS

1. Chile/Britain
2. Argentina
3. Argentina/Chile/Britain
4. Britain
5. Norway
6. Australia
7. France
8. Australia
9. New Zealand
10. Chile



ICE CYCLE

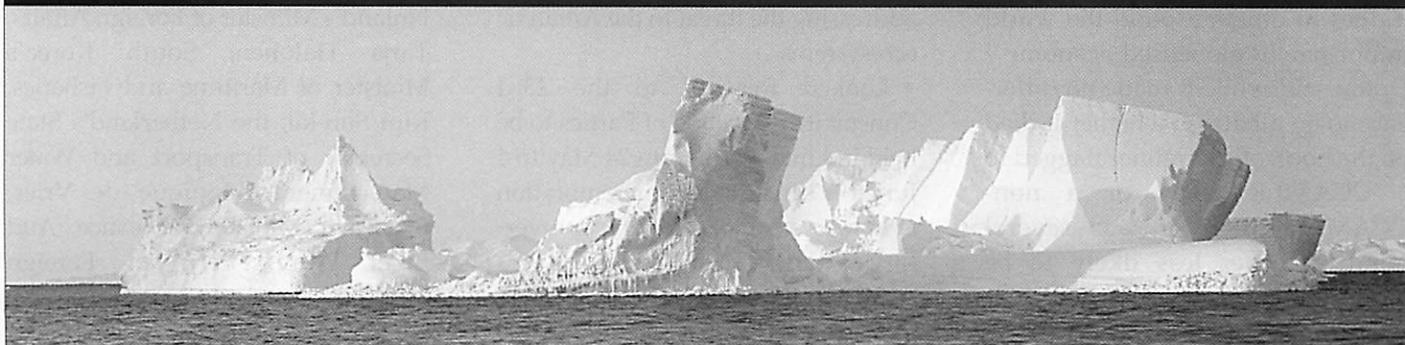
- Permanent ice
- ◻ Mean minimum ice
- ◻ Mean maximum ice



Sources: British Antarctic Survey / The Greenpeace Book of Antarctica, Dorling Kindersley / The Antarctica Project

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ROSS SEA REGION ENVIRONMENTAL REPORT UPDATING



Drafting of the Ross Sea Region State of the Environment Report has commenced and it is expected to be published by December next year.

The New Zealand initiative was announced at an Antarctic Treaty consultative meeting in Christchurch in May 1997.

The report aims to benchmark the state of knowledge about the Ross Sea Region, to document current and potential threats to its values and to identify appropriate responses to protect these values.

It will provide a scientific basis for future management of the region by pulling together key information (that is both accessible and relevant) on the state of the region's natural, physical and

historic features and values. The report will also help to identify any significant gaps in our understanding about the ecosystems of the region and human impacts on them and will provide a basis for identifying potential indicators for monitoring the effects of human activities.

Environmental manager for Antarctica New Zealand, Emma Waterhouse says authors have been appointed for chapters on marine, terrestrial and atmosphere and environments. Drafting has commenced and consultants operating in the region are being approached for their advice and input.

Ms Waterhouse says it is appropriate to have international involvement to give the report the appro-

priate regional flavour. Experts from Australia, Italy and the USA, among others, will have input. However, she says, all the authors will be New Zealanders because the report is a New Zealand initiative.

The group had a workshop at the end of April to update people on the project's progress.

They now have a website within the Antarctic NZ website and enquiries can be sent via E-mail to rsr-soer@antarcticanz.govt.nz

An executive committee chaired by Antarctica New Zealand's CEO Gillian Wratt with members drawn from Antarctica new Zealand and the Royal Society of New Zealand, will oversee the production of the report.

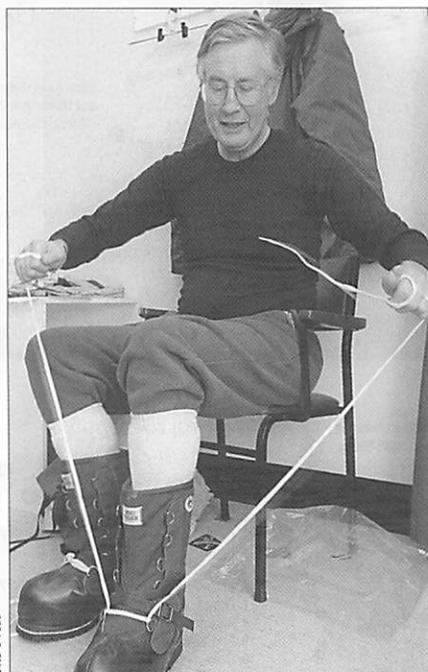
BRITISH DELIVER SCOTT HUT ITEMS

Artifacts removed from Scott's hut in 1957 were returned by the British Minister for the Environment, Michael Meacher during the top-level meeting of International Government officials held at McMurdo Station in January.

The dog harness, coat hook and lantern were taken from Scott's hut as souvenirs by a New Zealand member of the TransAntarctic expedition.

Late last year, the items showed up at a Christies' auction in London. They were withdrawn before being sold after a complaint filed by the New Zealand Government.

The items were sent by diplomatic pouch to New Zealand by the British Government, then hand carried to Antarctica by Mr Meacher, who returned them to Cape Evans where he presented them to AHT chairman, Dave Crerar.



Michael Meacher, British Minister for the Environment, boots up for Antarctica.

ED HILLARY HONOURED BY SMITHSONIAN

Sir Edmund Hillary was honored by the Smithsonian Institution last year when he was presented with the James Smithson Bicentennial Medal for his "monumental explorations and humanitarian achievements".



Warren Head

In Washington to receive the award in November Sir Edmund told reporters that Virgin routes and untried techniques are the Everests for today's explorer.

"For explorers in general, the challenge is not just getting there, but doing it in a more difficult way," he said.

Smithsonian director, Milo Beach said the medal also honoured Sir Edmund's unwavering commitment to the region centred on Nepal, where his efforts have helped build schools, airfields, and hospitals, started reforestation projects and improved the living conditions of Himalayan villagers.

FROM SEA-BED TO THE UNIVERSE FOR NSF

Research ranging from sea floor sediments to the origins of the universe was conducted by National Science Foundation during the 1998-99 austral summer research season in Antarctica.

Approximately 130 projects were supported by the National Science Foundation (NSF), the federal agency that funds and manages the U.S Antarctic Programme (USAP).

USAP also collaborates with other countries' Antarctic programmes.

Research was conducted in the earth sciences, glaciology, biology, medicine, oceanography, meteorology, astrophysics and agronomy (study of the upper atmosphere). During the season approximately 700 investigators and technicians were deployed to Antarctica. Highlights of the 1998-99 season included: The Cape Roberts Project, an international effort involving scientists from the United States, New Zealand, Italy, the United Kingdom, Australia and Germany who attempted to collect cores from the Ross Sea floor (see below).

A SEALS EYE VIEW

For an air-breathing mammal, seals forage for food in an unforgiving environment-under water covered in ice. Researchers attached a small video system and a data logger to Weddell seals backs and measured oxygen consumption during dives to determine how seals hunt for food and how efficient they are at doing so.

Using the data gathered, the researchers conducted computer analyses of data on depth, swimming speed, and bearing, enabling them to create a 3-D path of the

seals' dives and correlate that information with a video of the seals' heads and the immediate environment in front of the seal.

Other information gathered allows them to calculate how efficient the seals' foraging strategies are in different environments and when hunting for various types of prey.

FOSSIL FINDS

In conjunction with the Argentine Antarctic Institute, researchers excavated Mosasaur and Plesiosaur fossils and searched for Cretaceous age Hadrosaur fossils on Vega Island near the Antarctic Peninsula. The Mosasaur and Plesiosaur fossils will provide important information about this class of marine reptiles and about their geographic distribution during the age of dinosaurs. In the previous season, the same team discovered the only Hadrosaur fossils known in Antarctica.

Hadrosaurs were large land-dwelling, plant-eating dinosaurs and the Antarctic fossils are important because they demonstrate an easy connection between the Americas and Antarctica.

They are also evidence for a complex and extensive plant ecosystem in a region which was then at a high southern latitude, not unlike its current position.

SULPHUR AT THE SOUTH POLE

Microscopic sulphur particles in the atmosphere are some of the major components in climate change scenarios-both naturally produced and man-made

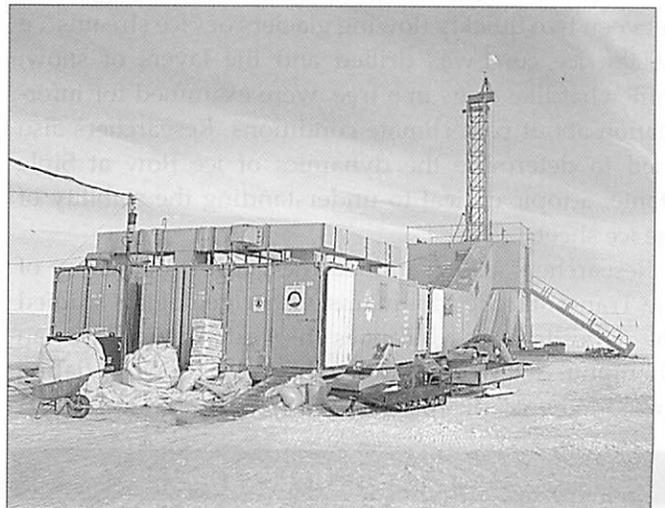
CAPE ROBERTS PROJECT

The team drilled through sea ice and about 170m of water into the underlying sea floor reaching a depth of 620m.

Ice at least 1.5m thick was required to serve as the drilling platform.

Sediments and fossils in the drill core will help provide information about conditions 25-70 million years ago, and fill in gaps in our knowledge of the Earth's climate. During this interval of time, the first ice sheets in Antarctica began to form. This period is particularly important as it covers a time in the earth's history when temperatures were as warm as those expected over the next few centuries due to greenhouse warming.

This season's drilling was crucial to the project, which has been plagued by poor sea-ice conditions in the two previous seasons.



*Drilling site at Cape Roberts on the Ross Ice Shelf.
Courtesy of Antarctic New Zealand*

FROM SEA-BED TO THE UNIVERSE FOR NSF

Continued from page 77

sulphur compounds reflect solar radiation, produce atmospheric haze and acid rain, and affect ozone depletion.

Sulphate particles are very good at acting as condensation nuclei for water vapour, creating clouds.

Researchers sought to improve understanding of the atmospheric chemistry of sulphur compounds (some of which are produced by oceanic phytoplankton) and the climatic interpretation of sulphur-based signals in Antarctic ice core records.

BALLOONING OVER ANTARCTICA

A major long-duration balloon flight circled the continent gathering data at an altitude of approximately 120,000 feet for about two weeks before being parachuted to the ice for recovery. The balloon, supplied and launched by NASA, has a volume of about 30 million cubic feet and can lift payloads heavier than a ton.

The project measured, with unprecedented sensitivity, the temperature variations across the sky of the cosmic microwave background radiation. Details about these relic photons left over from the beginnings of the universe will help scientists discriminate with extreme sensitivity among various models of the cosmos.

WEST ANTARCTIC ICE SHEET

The West Antarctic Ice Sheet, which rests on thin continental crust, may be an important contributor to a future global warming-induced sea level rise. A number of studies are adding to our knowledge of the history of the ice sheet, which has implications for understanding the Earth's past climatic conditions and for models predicting future climate changes.

At Siple Dome, an enormous semi-circular ridge of ice between two quickly flowing glaciers or "ice streams", a 1,000m ice core was drilled and the layers of snow, somewhat like rings in a tree, were examined for information about past climate conditions. Researchers also tried to determine the dynamics of ice flow at Siple Dome, a topic critical to understanding the stability of the ice sheet.

Researchers also examined the glaciologic history of the Transantarctic Mountains. Other geologists studied the deposits from volcanoes in West Antarctica in an attempt to determine past ice sheet elevations by dating imbedded volcanic rocks.

ULTRAVIOLET

In this multi-disciplinary cruise, researchers studied the effects of solar ultraviolet radiation on bacterioplankton,

zooplankton as well the photochemistry of bacterial growth processes in the ocean.

They examined how biological responses to ultraviolet radiation are affected by ozone, and explored interactions with marine viruses. They also studied the interplay within the food web.

INTERACTIONS BETWEEN ATMOSPHERE AND OCEAN

The ROAVERRS (Research on Ocean-Atmosphere Variability and Ecosystem Response in the Ross Sea), conducted a multidisciplinary study of the atmospheric and oceanic interaction while on board the *Nathaniel B. Palmer*.

The research aimed to lead to a better understanding of the polar marine ecosystem in response to climate variables. Ship-based scientists measured wind and air temperature; ice cover, ice movement and sea surface temperature; small-scale water circulation in the top layers of the sea; organic materials within the ocean circulation; and the amount, distribution and respiration rates of plants and animals on the sea floor.

Combined with meteorological data, scientists expected to be able to monitor changes in the airflow patterns in the southwestern Ross Sea to determine their influence on oceanographic and biological patterns.

CONSTRUCTION AT POLE

Construction of the new South Pole station has intensified, focusing on the completion of vehicle maintenance and ship facilities and the replacement of rubber fuel bladders with steel tanks.

These safety and environmental upgrades will complement the South Pole Station Modernisation—a US \$128m project to replace the existing station by 2005. The current station is 20 years old and nearing the end of its useful life.

GOULD

This was the first full season of the R/V *Laurence M. Gould*, after several initial expeditions the previous season. The research vessel embarked on expeditions in support of ultraviolet research, Long Term Ecological Research, marine geology and geophysics as well as providing logistic support to Palmer station.

The *Gould* is an ABS A1 icebreaker (capable of breaking ice one foot thick) and is 230 feet long with a displacement of 3,411 tons.

It was built in LaRose Louisiana and is owned and operated by Edison Chouest Offshore Corporation (ECO). The *Gould* is under a charter with Antarctic Support Associates (ASA). Both USAP Icebreaking Research Vessels — the *Gould* and the *Nathaniel B. Palmer*—are owned and operated by ECO under charter to ASA.

DUCK BILLED DINOSAUR BONES

A team of American and Argentinean researchers believe they are closer to proving their theory that once upon a time marsupials walked to Australia from South America passing through Antarctica on their way.

Their research on Vega Island (Antarctic Peninsula) this summer has found a tooth and several toe bones of a duckbilled dinosaur known as a hadrosaur.

The scientists believe that kangaroos, koalas, wombats and other Australian marsupials walked across a land bridge from South America, travelled across a relatively balmy Antarctica and into Australia, where they flourished, filling ecological niches that on other continents are held by birds, rodents, primates, and carnivorous placental mammals.

The finding made national news in the United States and whetted the excitement of team member and University of California (Riverside), palaeontologist Michael O. Woodburne, who had uncovered a number of fossil remains in Antarctica since 1982.

A paper written by Susan Sullivan for a University of California publication explains how the research is coming along:

Woodburne and his colleagues have been slowly fitting together the pieces of an ancient puzzle that, when complete, will show a picture of continental connections and mass migrations of animals 65 million years ago, about the same time that dinosaurs went extinct.

"This is the first duck-billed dinosaur to be found outside the Americas," Woodburne claims. "This gives us more support for the idea of a land bridge between South America and Antarctica at the time.

"Working with colleagues from St. Mary's College, the Smithsonian Institution, the South Dakota School of Mines and Argentina's Antarctic Institute and La Plata Museum, Woodburne has been painstakingly gathering evidence that a land-bridge between South America and Antarctica

existed during the end of the Cretaceous period 65 million years ago, when marsupials are theorized to have been present in Australia.

"Fossils can tell you the age of land connections when geophysical evidence is vague," explained Woodburne, professor emeritus of geology.

Scientists believe that South America, Antarctica and Australia were once part of a large southern land mass known as Gondwana, parts of which began to break apart about 110 million years ago. Australia was believed to have broken away about 64 million years ago. South America and the tip of Antarctica's peninsula had been separated enough by about 50 million years ago that it is

Fossil is further evidence of a key land bridge in Antarctica

virtually certain that no land animals were travelling between those places by then, said Woodburne.

The fieldwork on Vega Island was designed to search for the fossil remains of marsupials which, according to current theories and evidence, would have dispersed from South America to Australia across Antarctica sometime between 64 million and 70 million years ago.

Because Woodburne's team knew that some dinosaurs and birds had been preserved in rocks dating back 65 to 70 million years ago on Vega Island, they spent January and February prospecting those rocks in hopes of discovering the sought-after marsupials. Although none have surfaced to date, the discovery of a hadrosaur dinosaur in these deposits is not only a first for Antarctica, but demonstrates that a land animal of the time was capable of walking from the tip

of South America to the Antarctic Peninsula, the route that would have been followed by marsupials.

The next step, one that Woodburne will participate in next January when he returns to Antarctica for fieldwork, is searching for marsupial fossils at the Vega Island site. Such a discovery would provide the missing link to this biological and geological puzzle.

Woodburne and his colleagues found the first fossilized remains of a land-based marsupial in Antarctica in 1982, a jaw and teeth of a creature slightly smaller than an opossum. However, it was only 45 million years old, an era when the land bridge from Antarctica to Australia was already under water.

In the past 16 years, they have found the fossil remains of an amazing assortment of other creatures, including an enormous, flightless bird with an 18-inch-long skull that was clearly carnivorous. They have found now-extinct placental mammals, hooved creatures, ground sloths and insectivorous marsupials, but none old enough, yet, to prove the continental connections.

In fact, Antarctica tens of millions of years ago had a surprisingly temperate climate and was carpeted by Southern beech forests, according to Woodburne. Antarctica was at that time warmed by equatorial currents. Once it separated from the South American land mass 36 million years ago, it became completely encircled by the much colder Antarctic current, as it is today.

Next January, during the Southern Hemisphere's summer Woodburne and his fellow researchers will painstakingly sift through the frozen, sandy soil with dry screening and sieving equipment in search of pieces of bones and teeth from ancient marsupials.

As there is no other logical way for marsupials to have migrated to Australia, the work amounts to "definitively proving that something that likely happened did indeed happen," Woodburne said.

(From the University of California, Riverside, website)

TRIBULATIONS FOR THE AURORA AUSTRALIS

Australia's Antarctic ice-breaker, *Aurora Australis*, has set sail again after being plagued with problems since its journey to Antarctica in July 1998.

A fire in the vessel's engine room in July required it to return to Hobart for repairs, but it left again in October 1998 to deploy expeditioners to Australia's stations, including re-supply of Davis Station.

However a serious break down in its main propulsion system left *Aurora Australis* ice bound about 75 nautical miles off Davis station at the beginning of December.

Japanese icebreaker *Shirase* came to the vessel's rescue, arriving to release the trapped ship from the sea ice on December 13. The rendezvous was made at 69 deg 9'S, 75 deg 12'E, in sunny, still conditions.

The Director of the Australian Antarctic Division, Dr Tony Press said the Division was very grateful to the Japanese Government for agreeing to make *Shirase* available and also to "our Japanese Antarctic colleagues for their efforts on our behalf". "Their support is very much in the spirit of the Antarctic Treaty



The engine room of the *Aurora Australis*.
Courtesy of Aurora.

which is based on international cooperation in the Antarctic," he said.

"During the period of immobilisation the voyage leader aboard the *Aurora Australis*, Suzanne Stallman said passengers, 69 expeditioners and 24 crew, occupied their time with field training classes concentrating on basic knots. "Everyone is getting good at doing a one-handed bowline" she said. Other activities included bird and sea ice observations, deck tennis on the heli deck (in temperatures of -11 degrees), Japanese and Spanish lessons, aerobics and hackey sack coaching and film shows.

It took *Shirase* a full day to break ice around *Aurora Australis* after which a heaving line was passed

followed by towing ropes. The first tow rope broke after less than 30 minutes.

A second tow was started but the ice between the two vessels was too thick and towing was abandoned after an hour. *Shirase* continued to break ice around *Aurora Australis* overnight and the following morning before commencing towing in the early afternoon.

Aurora Australis's owners P&O Polar made arrangements for the *John Ross*, a 94.5m, 19,200bhp South African ocean-going tug to meet *Aurora* and *Shirase* at the edge of the sea ice for the 4700 kilometre journey back to Fremantle.

Shirase towed *Aurora Australis* through pack ice for two days, but advised that the prolonged slow running of its engines could lead to some problems. *Aurora Australis*'s smaller engine was engaged and the ship moved under its own steam.

Before leaving the *Shirase*, at the edge of the sea ice, *Aurora Australis*'s crew wrote 241 Christmas Cards, addressed with a message to each of the crew and expeditioners on *Shirase*. "We thank them for their assistance and company," Suzanne Stallman said.

The *Aurora Australis* berthed at Fremantle at noon on Sunday December 27, 1998 having completed the journey from the Antarctic ice edge under its own power, although escorted by the tug *John Ross*.

On January 13, after further repairs, the *Aurora Australis* departed Fremantle on its way back to the Antarctic, but was thwarted by another fire in the engine room. The fire occurred when the vessel was some 90 nautical miles (140km) southwest of Rottnest Island, off the Western Australian Coast. Emergency procedures were initiated immediately and once all on board were accounted for, the fire was extinguished with halon. There were no injuries.

MILLION DOLLAR UPGRADE FOR SUPER COMPUTER

The most powerful computer in Tasmania — and one of the most powerful 'number-crunchers' in Australia — has had a one million dollar upgrade which will boost the country's climate research effort.

The CRAY J 90 computer is used by climatologists to simulate how the behaviour of the Southern Ocean affects global climate.

Dr Nathan Bindoff, who chairs the committee which oversees the operation of the computer says the upgrade is a shot in the arm for Australian and International

research in climate change.

"To represent such a vast natural feature as the Southern Ocean and couple it with simulations of climate for decades or even centuries into the future requires tremendous computing capacity."

Dr Bindoff says the speed of number-crunching by the CRAY has increased by five times. Its data storage capacity has increased 200-fold to ten thousand gigabytes and its memory to 4 gigabytes.

The CRAY was originally installed in 1995 at a cost of \$1m.

CAPTAIN SCOTT'S BODY DRIFTS PAST DEPOT

Antarctic explorer captain Robert Falcon Scott has finally reached the place he so desperately needed to find in his last days.

His frozen body, along with two of his expedition party, chief scientist Dr Bill Wilson and Lieutenant Henry "Birdie" Bowers are thought to have drifted in the moving ice sheet forming their tomb past the depot of provisions they failed to reach in 1912, according to the *"The Press"*.

Scott's ill-fated expedition ran into early trouble. Equipped with ponies, motor sledges, and dogs, he and 11 others had started overland for the Pole on October 24, 1911. The untried motor sledges soon broke down. The ponies, useless in the extreme conditions, had to be shot, and the dog teams were sent back because Scott decided to man-haul the expedition's sledges.

By December 31 seven fortunate men had also been sent back to base. The others arrived exhausted at the South Pole after man-hauling their sledges only to find they had been beaten by five weeks by the Norwegian explorer Roald Amundsen.

The weather on the expedition's return journey was exceptionally poor and the party was affected by scurvy, frostbite and depression. Scott was accompanied by four men but on the final leg Edgar Evans died on the Beardmore Glacier from blood poisoning after a hand cut on sledge runners became gangrenous.

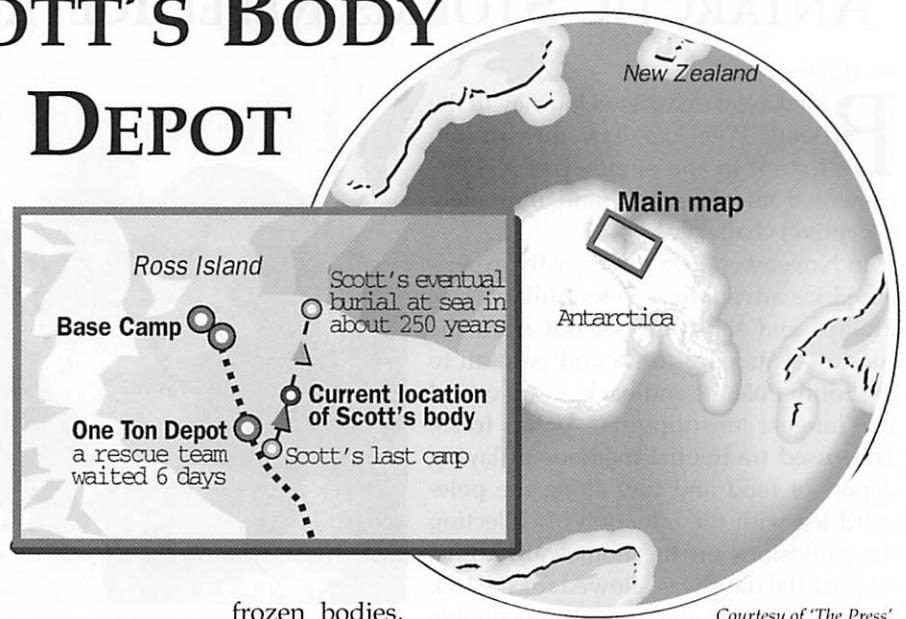
In a famous incident, Captain Lawrence Oates, at the end of his tether with severely frost-bitten feet, committed suicide by walking out into a blizzard.

By March 21 the remaining three men had been halted again by impenetrable weather. The blizzard now destroyed the exhausted men's chances of finding the major depot, One Ton Depot, built earlier on the Ross Ice Shelf.

On March 29, 1912, Scott wrote his final diary entry: "Every day we have been ready to start for our depot 11 miles away, but outside the door of the tent it remains a scene of whirling drift. I do not think we can hope for any better things now. We shall stick it out to the end, but we are getting weaker of course, and the end cannot be far. It seems a pity, but I do not think I can write more."

A dog team had waited for them at the depot for six days, but the blizzards kept the weakened men in their tent until their death.

On November 12, 1912, searchers found the tent, the



Courtesy of 'The Press'

frozen bodies, Scott's records and diaries, and geological specimens. The men had died on 31 March 1912, just 17km from rescue.

A cairn was erected over the bodies, but over the years it sank through the snow into ice.

Their bodies have now been carried about 60km from the spot where they were buried. And it is now thought Captain Scott has passed the site of One Ton Depot.

Based on interpretations of ice sheet drifts glacial dynamics expert Dr Ian Whillans, of the Byrd Polar Research Centre, Ohio, has plotted Scott's last journey.

The Ross Sea ice sheet flows north, in response to the weight of snow falling, and is known to flow faster in certain areas.

According to Dr Whillan's calculations, the bodies of Scott and his two companions now lie about 30m below the surface, covered by about 30cm of new ice each year. Their bodies have been moving at just under one kilometre a year, and Dr Whillans believes that will accelerate at the edge of faster ice flow.

He considers that in about 250 years the frozen grave will break into icebergs, and the bodies will eventually sink to the bed of the Ross Sea.

New Zealand glaciologist Dr Harry Keys agrees with Dr Whillans's calculations. Dr Keys believes the bodies moving north-north-easterly, will emerge about 120km west of Ross Island in a little over 250 years if the ice shelves calve about that time. The bodies would be perfectly preserved but dehydrated, he says. It would be difficult, but possible to find them with radio echo-sounding gear.

In more recent years the bodies of members of the ill-fated 1840s Arctic expedition of Sir John Franklin were found well preserved in the permafrost, enabling scientists to find out why members of the expedition had died.

"We know why Scott died," Dr Keys says. "It would be better to leave them in peace."

ANTARCTIC STORMS REPEL ICETREK'S RETURN PLAN

By Warren Head

Billed as an unassisted journey to the South Pole and back the Iridium Ictrek in the summer of 1998-99 presented an ambitious (and ultimately deceptive) challenge.

In November 1998 three vastly experienced ice adventurers Peter Hillary, Eric Phillips and Jon Muir set out from the coast of Antarctica to ski and parasail to the South Pole . . . and back . . . on one of the longest unsupported polar treks. They used traditional methods of laying depots of food and fuel along the poleward leg with the intention of collecting the provisions on the homeward route. At least 100 days was allowed for the trek across some of the most inhospitable terrain on Earth.

Publicists for Iridium saw the Ictrek as completing Robert Falcon Scott's ill-fated 1911 mission — to manhaul an expedition to the South Pole and back. They would be the first 'antipodeans' to do so and the first expedition to communicate via telephone from the Antarctic plateau (using the Iridium satellite-relayed mobile). It was, they said, the "last great polar journey", "a culmination of 50 years' combined adventuring success "for the trio including their ascents of Mt Everest and Mt Vinson and ski crossings of Greenland and Canada's Ellesmere Island.

The team would each tow 150kgs sleds 28kms daily helped wherever possible by traction kites called quadrifoils, steerable kites ranging from 3 to 7 sq metres.

Media expectation was generated with press statements describing the trek in three stages:

- The team would begin by crossing 780kms of the infamous Ross Ice Shelf, a floating ice table attached to the continent, laying five depots along a 782kms route, each marked with a snow cairn and the position GPS recorded. "This section of the journey is predominantly



The Iridium Ictrek team in November.

at sea level, availing the team of moderate temperatures."

- They would be the first to traverse a new route through the little-known Shackleton Glacier, a 140km long river of ice cutting through the Transantarctic Mountains, adding pure exploration to the adventure.
- Having climbed the glacier, skiing at an altitude close to 3000m the team would continue south crossing 480kms of the plateau to the South Pole, laying three more depots, their arrival scheduled for Christmas Day.

Once there they would not accept food, equipment or accommodation from the American Scott-Amundsen Base at the Pole. "A single cup of tea would render the expedition a 'supported' journey," said Iridium.

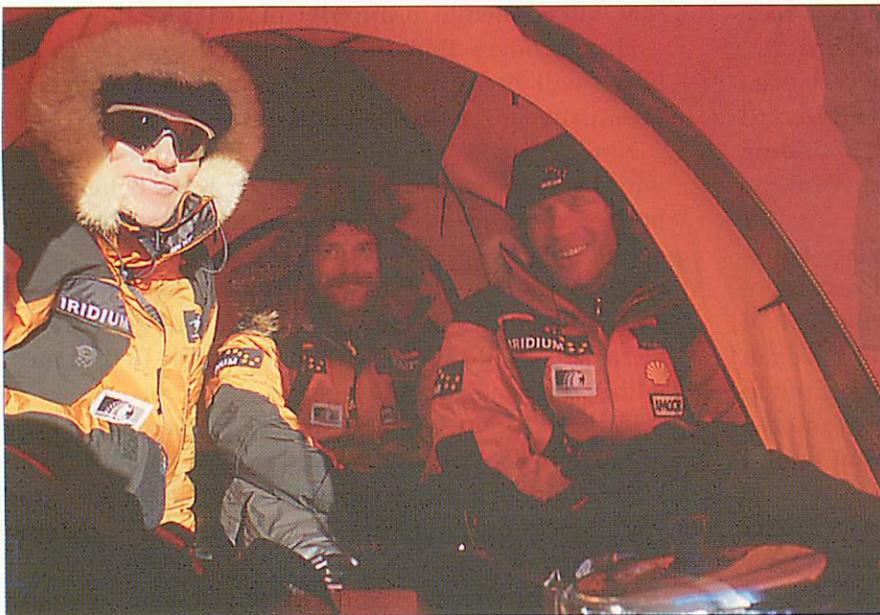
"Most South Pole expeditions are flown home from this point — their pinnacle achieved. Iridium Ictrek however, must turn around and retrace the 1400kms back to the coast . . . fortunately Antarctic winds flow from the Pole to the coast, allowing the expeditioners to race homeward aided by their powerful quadrifoils."

The target was to arrive at Scott Base in early February . . . 2804kms within 100 days.

The trek began well in very cold winds. "But after a week the air temperatures warmed up incredibly," Peter Hillary told 'Antarctic'. "We skied our way across the Ross Shelf, taking 38 days to get to Shackleton Glacier."

The glacier was deceptive with the true underlying nature of the surface uncertain, Hillary wary of crevasses he described as 'human fly-traps'. "Despite all sorts of dog legs we found a very good route and made good progress. It was very gradual except for the top section which had steeper terrain over 'blue ice' and many crevasses.

"We turned left to the Zanefield Glacier which was pretty hard work, using crampons for 100-120kms. The sleds moved constantly on the ice and it was hard work on crampons.



The three men in their expedition tent.

"Once on the Polar Plateau we moved up to 3200m where we stayed. You could feel the altitude effects and temperatures were lower typically -30deg to -40deg. Then it fell to -50deg, with the wind chill factor even worse, just bitter. I cut little squares of foam and taped them on my cheeks for protection against frostbite."

"We encountered five storms on the Plateau and we could see time and supplies slipping away," said Hillary. With only 15 people ever crossing to the Pole there was limited knowledge of what to expect. "The weather could build up over a number of days, first forming balls of spindrift and haloes."

The coldness was so intense that breath condensation immediately froze on the inside of the tent fly and over four days becoming a centimetre thick, insulating the trekkers from the sound of the elements. "A number of times we thought the wind had died down only to find it was still raging outside."

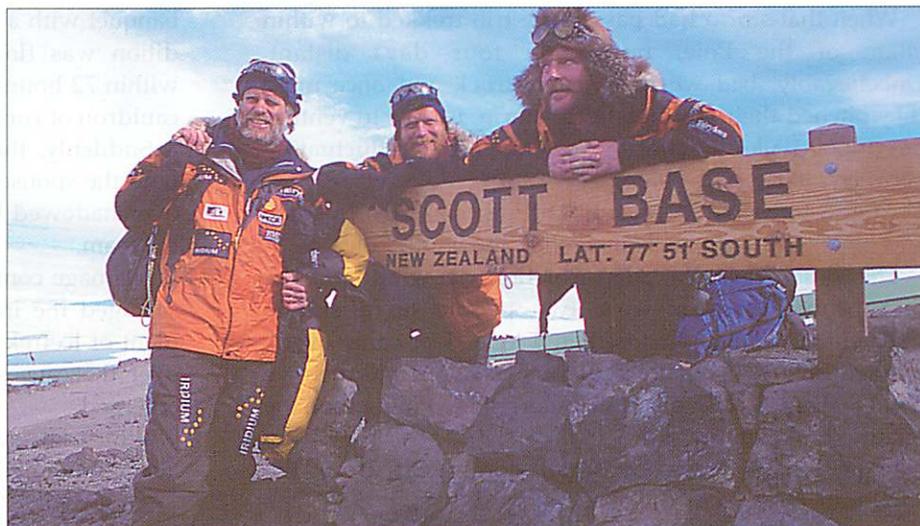
By Christmas the team was far short of the Pole and delayed three weeks behind schedule by poor weather and illness.

Tentbound in a blizzard near latitude 87deg the team contemplated their misfortune. With inadequate wind to inflate the quadrifoils they needed to sustain a daily average distance on foot but were thwarted by the weather. The dilemma of how to make up for long delays while still hampered by poor weather and dwindling supplies worsened.

"The time factor said 'you won't make it' at your current rate of progress," Hillary told 'Antarctic'. "There was the constraint of getting back by the 7th of February, the difficulty of standing by that arrangement, with all its ramifications if we didn't. We were not there as a private event but as an official New Zealand event, K390."

"There was the worry of putting pilots at risk making rescue landings 1000kms from anywhere if anything went wrong."

There was barely enough time to catch a routine USAP Hercules aircraft leaving mid-January from the South Pole to Scott Base. With intense regret, plans to attempt the return leg were abandoned. The goal now became the US Amundsen-Scott



Peter Hillary (left), Eric Phillips (middle) and Jon Muir at Scott Base before their return to New Zealand.

Station at South Pole.

Writing for "The Press", Christchurch writer Colin Monteath said "With heavier, bulkier, equipment Captain Scott's man-hauling party of five had already crossed the 87th parallel on New Year's Eve 1911, well ahead of Ictrek's position on that date." But Scott's ill-fated expedition had help from support parties as far south as 88deg on the Polar Plateau and dogs had been used to help lay depots across the Ross Ice Shelf.

The decision made to halt at the Pole, a USAP Twin Otter ski-aircraft piloted by Max Wenden landed beside the trio just south of 87deg South to offload vital supplies. Monteath added "Obliged to leave the Continent as they found it, Ictrek's depots . . . will be later be recovered by aircraft. Footing the bill, Ictrek will need little reminding that air operations of this nature are expensive and risky and can create an awkward precedent."

"It became clear that a resupply was necessary when food and fuel originally allocated for a depot on the Polar Plateau had to be consumed to maintain progress."

On 5 January 1999, Jon Muir confirmed by telephone interview with New Zealand media that supplies were sufficient to get them to the South Pole. "It's by no means a dangerous situation; we would just like it to be a bit more comfortable."

Within two weeks the team was hit by yet another "horrendous" ground blizzard. By telephone Eric Phillips reported "the wind blew up to about 50 knots, we had less than 10m visibility". At one point Hillary had fallen a short distance behind and the two forward trekkers saw only a "wall of rime (frost)" as the tracks leading back vanished. Fortunately, Hillary held a straight path by compass and emerged safely from the murk. For three more days the trekkers were tent-bound still 200km from the Pole.



The rigours of the trek show . . . back at Scott Base in January 1999.

When that storm had passed the trio trekked to within 98km of the Pole, now only four days distant. Unbelievably, bad weather again struck and once more they pitched their tent in a fierce storm, unable to venture out in 60-100kmh gales with temperatures fluctuating between -30deg and -50 deg.

After a tortuous 84 days of battling blizzards, frostbite and illness the Icetrek trio arrived at the South Pole.

The initial transition from isolation was gradual. "The first people we saw were two people on a skidoo researching ice dust clouds then a lone skier came over," recalled Phillips. "We crossed another valley and then we saw the flags. And five minutes short of the Pole station the binding broke on my ski!"

Peter Hillary says "a small contingent from the American base were there to meet us . . . then we found a quiet spot to reflect on our shared experience and put up our own ceremonial 'South Pole' a piece of driftwood Jon Muir brought all the way from the Victorian coastline in Australia."

"I didn't sleep that night." says Phillips, "We had clean sheets and were warm but it was so alien getting back into the real world and was uncomfortable."

Queen Elizabeth II New Zealand PM Jenny Shipley and Australia's Communications

Minister each wired their congratulations. Ed Hillary, who had ridden a modified Massey Ferguson tractor to the Pole in 1957, told his son "Congratulations Peter on this marvelous achievement of reaching the Pole."

Ed Hillary had shared updates constantly throughout the expedition with Peter's wife Yvonne Oomen who wrote in a wife's perspective of the trek published in *'The Press'* "Not long ago we heard that due to the relentless blizzards, the delays and the resulting logistical problems with rescue requirements, the team would have to call a halt at the South Pole."

Crossing to the Pole, she wrote, had been "such an arduous affair with hugely heavy sleds and endless monochromatic flatness. The vast emptiness affected the team deeply. It required great physical endurance and mental discipline. Peter's calls would bring me shockingly into the reality of a wild, lonely and vicious place, and I would fret about dwindling food, their state of mind and the vastness of their task. But still they marched on inexorably . . ."

"Ironically the return part of the journey was always going to be the easiest, with the katabatic winds blowing the right way for the team to use the huge quadrifoil kites they were carrying. But every expedition must work with Nature.

"Triumphs are achieved not through conquering Nature but by being graciously blessed by her opportunities."

From South Pole Station it was a very fast transition back from isolation. Ferried by Hercules aircraft to Scott Base, they found the "Ministerial-on-Ice" meeting under way and participated not in "a quiet barbecue but in a full

banquet with a need for impromptu speeches." The expedition was flown with ministers to Christchurch and within 72 hours of ending the trek found themselves in a cauldron of controversy.

Suddenly, the heroic achievement of the inwards trek (and the sponsor's new satellite-direct mobile phone) was overshadowed by media generated allegations of a rift in the team.

'Damage control' by Iridium's public relations advisers salvaged the inner integrity of the overarching achievement of Icetrek but internal disagreement by the trekkers over the causes of the decision to halt at the Pole now emerged.

Whilst all were frustrated that the return journey was abandoned, Phillips, his undoubted skills in using quadrifoils so superbly demonstrated on an earlier solo crossing of Greenland, publicly showed the intensity of his disappointment. "As with every expedition you plan and train but you never have enough time. Our quadrifoiling and kiting skills were not as good as they could be and the fact was we weren't fast enough — we went through a learning curve and started slowly."

Muir was deeply introspective and declared at a media conference in Christchurch's Rydges Hotel that going back was not a burning ambition

and he was now planning solo journeys across deserts and along remote coastlines.

A perplexed Hillary diplomatically played down the apparent dissension, thanking Antarctica New Zealand for its confidence in supporting "something less mainstream, a small group facing the elements in a place of great epics and dramas and communicating this back (to the public)."

For him the highlight of Icetrek was the journey through the Shackleton Glacier. "On the eastern side it reminded Jon and I of the Himalayan peaks, vast and stunning, while the western side was like the incredible terrain of the American Rockies. At the top of the Glacier in the camaraderie of the climb we all told each other Monty Python jokes."

"The Polar Plateau went on forever, an absolutely astonishing place, the harshest place I've ever visited, a surface etched by wind. We encountered not one but five storms and it was quite incredible putting up a tent in a 50 knots gale . . . knowing that if it blew away it might tumble for 1000kms."

"The actual snow does not pose a problem. At no stage is it deeper than six inches and not difficult on skis."

But the kites proved difficult to deploy to best advantage. The quadrifoils were in various sizes, operated like a parachute or flown higher to generate greater speed and lift. Hillary says that as a qualified pilot he was aware of how air works "but nothing beats specific training." Or, of course, wind from the right direction. There were few northerly winds en route to the Pole and Hillary says there is little existing evidence of wind coming from the North



Eric Phillips towing a sledge.

except on the higher slopes of the Continent on the South African side.

In a day of 24 hours sunlight, Hillary thought it vital to have a very regimented 'workday' of 8 hours. "We had four two hour sessions and over time the regimen protects you overdoing it."

"There needs to be a definite start and stop to the day," Hillary says. "When you are man-hauling for 8 hours, travelling 6km every 2 hour session, to do more risks being shattered the next day and putting the whole schedule out. When you can sail on the kites up to 80km a day it makes it worthwhile going on."

"It was a huge journey and one of the most ambitious since Scott," said Phillips. "Over the inwards half of the journey we couldn't use wind assistance. We used the quadrifoils less than 10% of the way so we had to do it on foot all the way there."

"If we could have done it in 60-65 days and kited home we'd have been dragged along and not expending the same energy on skiing. There was nothing wrong with the objective and it is achievable but this was a 'cutting edge' adventure and this time we didn't make it."

"There are certain trips I'd do with certain people," he said, explaining to media that he was a 'flatlander'. "If Peter chose people to come with him to Mt Everest I wouldn't expect to be there. Both Peter and Jon are high altitude climbers. If the expedition was to Patagonia, well, Peter is not a kayaker."

"If you're going to do a technical rock climb you'd choose partners for that. An expedition is complex and it's important to be compatible and have the right set of skills."

Phillips' pragmatism did not diminish his opinion of the others. "I think we had an amazing strength. We didn't fail. We'd all agree that slogging it for 84 days was a fantastic privilege. I'd rather spend 84 days (getting there) and call it quits than pull out of the return leg after 10 days."

Hillary said that at times his nose was almost touching the snow under the "unbelievable strain" of the heavy sledges and Phillips challenged the media to "think of a place 30kms away and then imagine dragging a 170kgs sled, the combined weight of three people, that far in a day and again tomorrow . . ."

Hillary spoke of feeling closer to Scott. "In the last 20 years there has been some criticism of Scott and it's absurd. Sure, he made mistakes but we've come away with a renewed admiration for his expedition...they nearly made it back. If we had an emergency we could at least ring up and arrange something."

Jon Muir says the trio passed near where Scott's party stopped and perished. "We were just east of their position."

Icetek has broadened the public's awareness of Antarctica at a time when perceptions of the Continent had become cosy. "The useful scientific work involves things the taxpayers don't understand and aren't that interested in," says Hillary.

"The trek had the flavour of old expeditions, three people taking a new route to the Pole and through Iridium able to share the experience with the public...enormous coverage raised the profile of Antarctica to the forefront and reminded the public of the substantial involvement we have in one of our closest neighbours."

"It is not sufficient that keen interest in Antarctica should only be scientific interest."

Antarctica New Zealand's Chief Executive Gillian Wratt says the Icetek showed the New Zealand public that Antarctica is still a challenge and a difficult, hostile, place.

"But an interested and informed public is essential if we are to manage Antarctica and the expedition achieved a new awareness of the nature and importance of Antarctica."

Perhaps if the Icetek had not been profiled as an attempt at a return journey the magnitude of what was actually achieved might have remained unclouded. The blazing of a new route to the Pole via the Shackleton Glacier and the back-breaking uphill haul of sledges to the Pole certainly rates Icetek as an historic achievement.

The decision to stop at the Pole became itself inevitable when the trek was so delayed by raging storms a return journey might not have been completed in time for the party to make the final flight to New Zealand of the late summer.

As an exercise in risk analysis, the decision to abort the homeward leg was finally determined not by fitness but by logistics.

Hillary is adamant that on a team expedition "each person needs to think about the issues, contribute to the decision-making and then go with the flow."

Muir says "Sure the second leg would have been the icing on the cake but the cake wasn't bad!"

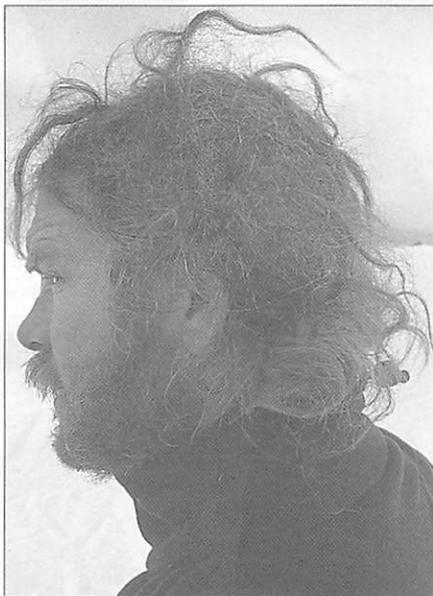
Yvonne Oomen wrote "It is hard for me to read about other people saying they've failed when all I can see is what they have achieved, taking one of the hardest, longest, most difficult routes to the South Pole. Being the first over the Shackleton Glacier."

"Supporting each other through illness and frostbite."

"It must have been desperately hard to maintain healthy relationships within a team when it constituted three men who sought refuge every day for nearly 100 days in a one-man team."

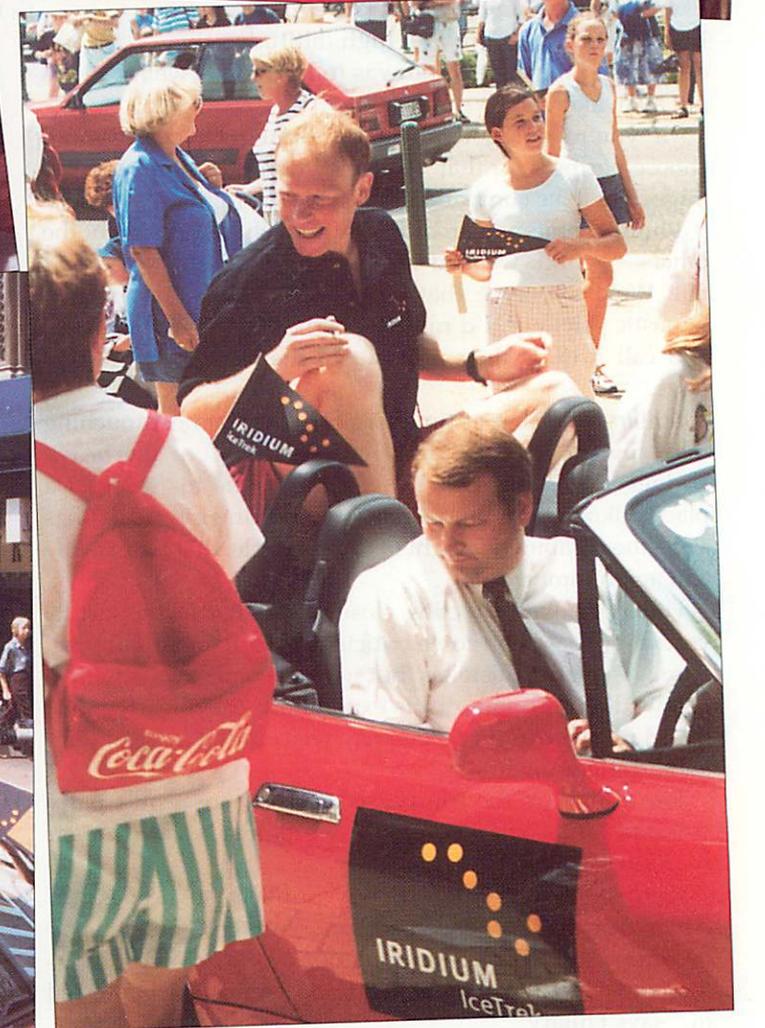
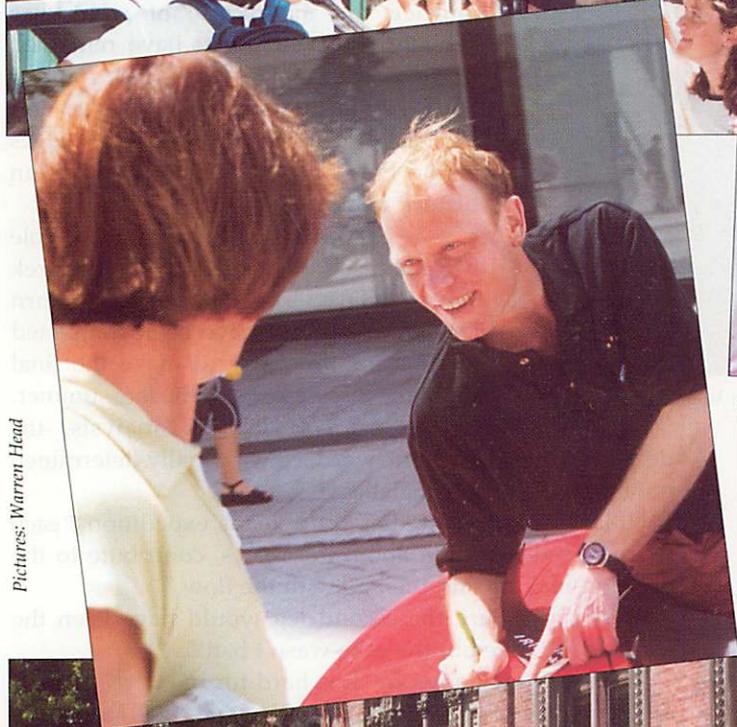
Cooking, eating, sleeping talking to loved ones, trying to get comfortable, even toileting, within centimetres of each other. But the team respected each other in the face of all this. They are still good friends . . .

"For me, this expedition would have been a failure if the men had endangered themselves . . . or gone beyond their means. Peter's talent has always been to know when to stop. That is why he is alive today."



Jon Muir.

Pictured on the following page: (top left), Peter Hillary; Eric Philips, (mid and lower page) and Muir (top right), are welcomed by Christchurch in a city victory parade.



Pictures: Warren Head

NORWEGIAN'S SOLO SKI JOURNEY ACROSS ANTARCTICA

ALONE ACROSS ANTARCTICA — BORGE OUSLAND. ISBN # 82-994379-1-1. Published privately in Norway — English edition 1997. Large format, 160 pages, 195 colour photographs plus aerial photo/ maps. Available by mail order — www.ousland.com (profit to cancer research) Reviewed by Colin Monteath.

Mid way through next century when polar historians compile overviews of significant private Antarctic expeditions of the 20th Century, particularly those involving major traverses, a notable few will stand head and shoulders above the rest. Even now, reflecting on the past 100 years of polar travel, each of us will have our own list of favourite Antarctic expeditions which have somehow captured the imagination. As a bonus, some of the many expedition books to appear have turned out to be well-written, dramatic accounts of remarkable achievements. As such, they will stand the test of time. Others, though no great shakes as literature, contain a pleasing blend of word and photographic image, thereby succeeding in graphically illustrating the style in which these 'milestone' expeditions were executed. While it may not quite be an ice-shattering piece of writing (remember, I've only read a translation) Borge Ousland's lavishly-illustrated book "*Alone Across Antarctica*" of his solo ski journey across the continent must remain firmly near the top of anyone's list.

Ousland (ex marine commando and deep sea diver) had skied to the North Pole in 1990 (with Kagge, - no depots/air pick-up), then again to the North Pole (from Siberia) in 1994, this time alone (52 days - no depots). In 1995/96 Ousland took on Antarctica - to attempt a complete solo crossing (no depots) from the Weddell Sea - but pulled out just past the South Pole (severe abrasions/cold damage to his groin) as he commenced the long descent to the Ross Sea. Tasting defeat was not easy, but even failing in its main objective, this expedition still made him the first person to ski solo to both geographic poles. Determined to return and complete the job, Ousland refined his thinking, his equipment and trained harder. From the outset he had been inspired by the fifth crossing of Antarctica in 1991/92 when Norwegians Simen and Sjur Mordre drove dogs to the South Pole, flew the dogs out, then skied on (with a photographer) to Ross Island. Expert Nordic skiers, they made very effective use of parawing chutes to help pull their pulka sledges on the final leg down from the Pole and across the Ross Ice Shelf.

(The Mordre brothers enjoyed skiing down the Axel Heiberg glacier so much during their 105 day crossing



Norwegian explorer Borge Ousland with skis decorated by his children.

that they went back up and did it again).

As the 1996/97 season approached Ousland learned that Ran Fiennes was also planning to return to Antarctica, this time to make his bid in the quest for the first solo crossing. Sensing the emergence (in the media) of yet another Norwegian/British 'race', Ousland perhaps took some comfort by studying the methodology of the 1992/93 crossing attempt by Fiennes and 'Footsteps of Scott' veteran Mike Stroud. Emaciated, the two Britons were finally evacuated by ANI from the southern extremity of the Ross Ice Shelf, suffering from frostbite and starvation after a 2500 km trek. Their books "*Mind over Matter*" (Fiennes) - Sinclair-Stevenson, London, 1993, and *Shadows on the Wasteland* (Stroud) - Jonathan Cape, London, 1993, highlighted just what pitfalls to avoid - surprisingly, they had used stiff plastic mountain boots/mountain skis on a flat continent (and wondered why their feet couldn't take the punishment), took no

crampons for the hard bare ice of the Beardmore (and so fell repeatedly, further injuring themselves), had no experience using parawing chutes and used equipment which ultimately proved too heavy.

In late October 1996, Borge Ousland had returned (with ANI) to Berkner Island to commence the 2800km slog to Ross Island. Others were out there too, dodging crevasses and hauling crippling weights across the Plateau's sastrugi - Fiennes (England - solo - though evacuated early in the piece with a kidney stone problem), Marek Kominski (Poland - solo) and Young He Heo (Korea - six persons) - each bent on going all the way. Ousland



Borge Ousland completes his solo crossing of Antarctica in 1996.

completed his impressive crossing in only 64 days. He then flew back from Scott Base (as a VIP guest of the US/NZ programme along with Ed Hillary) to South Pole Station (Ousland hadn't camped there on his traverse so as not to break his concentration and rigid routines) in time to meet the incoming Koreans. On the point of giving up their crossing, the Koreans were dumbfounded at Ousland's speed. Kominski had flown back to Patriot Hills from the Pole also without attempting the rest of his crossing. But before you think it was all plain sailing for any of them out there on the Polar Plateau, even with the spasmodic extra grunt provided by parawings, read Ousland's version of Kominski's near-fatal drag across the ice when he fell and was

knocked unconscious near the start of his trek - scary in the extreme. Clearly, by managing a record personal best of 226 kms in one stint, Ousland had perfected his judgement of when and how to use his two different-sized parawings.

Ousland's tale is remarkable. I find it inspirational that with the clever use of modern equipment an individual can live and travel safely through the cruelest wilderness for 64 days, hauling less than 200 kgs of gear. Ousland's text combines his own thoughts and fears with passages from his support person on radio watch at Patriots as well as from Amundsen's writing. For me, the great strength of the book is in its photographic coverage (many of the recent books such as Messner's and Fiennes' are very poorly illus-

trated). This is all the more powerful when you look at the variety of self-portraits and icescapes he has achieved (in all weathers) by cunning use of a self-timer or a camera clamped to a ski. One of Ousland's secret weapons was his skis, richly adorned with his son's artwork, so that he could constantly be reminded of his family's love and strength. The inner tent is similarly decorated and one of the best wide-angle images in the book shows Ousland, tired at the end of a day's march, looking at a print of his wife and son, with his boy's sketch splashed across the tent fabric. Ousland did his 'homework'. Remember, ruthless planning equals good planning. Antarctica demands no less.

RESEARCHER REVIVES BYRD'S NORTH POLE SAGA

"To the Pole" — The Diary and Notebook of Richard E. Byrd 1925-1927 — Edited by E. Goerler (Ohio State University)

Reviewed by Robert (Bob) Thomson

Most of us with interests in the Antarctic over the years soon became aware of the name "Admiral Byrd" and read much of the history of his early expeditions to Antarctica and his leadership in "Operation High Jump" and "Deep Freeze 1".

Few New Zealanders sought information on Byrd's early life for the North Pole was simply too far away! For many, Byrd's family life, his early naval career and his exploits in the far north remained little known.

I was more fortunate than some in becoming a close friend of the late Eddie Goodale and Larry Gould who were very active members of the early Byrd Antarctic expeditions. In our many discussions we concentrated on Antarctica where our then activities were taking place.

In March 1996 I visited the Byrd Polar Research Centre at Ohio State to attend the Byrd

Polar Colloquy commemorating the anniversary of Operation High Jump and the 70th anniversary of Admiral Byrd's historic flight to the North Pole and to select material suitable for a Richard E. Byrd exhibition to be held later that year at the Shirase Antarctic Museum in Konoura, Japan.

Raimund E. Goerler provided fullest assistance in my quest to select Byrd material. This was no easy task for the amount of material was enormous, with hundreds of large boxes containing tens of thousands of photographs, reports, letters, personal records, paintings, films etc. During this time I was also able to learn a great deal about Richard Byrd's early life and his outstanding accomplishments in advancing the development of aviation.

The book *"To The Pole — The Diary and Notebook of Richard E. Byrd 1925-27"*, edited by Raimund E. Goerler, provides a very concise and accurate account of those early years in Byrd's life. The reader does not have to wade through hundreds of boxes of archives to seek such information as Raimund had to do. While there remains

some controversy such as whether Byrd did in fact fly over the North Pole in 1926, the editor has, as far as possible, deciphered Byrd's handwriting and also provided the opinions of others. Readers may, therefore, come to their own conclusion.

This book is most timely for as we approach a new millennium many of the outstanding feats of this century, unless accurately and fully recorded, will become forgotten and lost in competition with future events. Thanks to Raimund Goerler, the full life of Richard E. Byrd has now been written and available for future generations.

I thoroughly recommend "To the Pole — The Diary and Notebook of Richard E. Byrd" edited by Raimund E. Goerler, to all interested in reading about highly successful lives or adding important information to their existing Byrd or Polar collection.

Bob Thomson, O.B.E., was, for many years, the Director of the New Zealand Antarctic Division and now lives in the United States in his retirement.

FIRST SUMMER COURSE RAISES FRESH PERSPECTIVES

By Margaret Bradshaw

Seventeen students participated in the University of Canterbury's inaugural summer course in Antarctic studies, 10 of them women.

They came from a broad spectrum of professions, with ages ranging from 21 to 56 years. Professions included journalism, architecture, law, orthodontics, weaving, clinical medicine education and information services, with the balance from recent graduates in zoology, business studies, geology, chemistry, electrical engineering and environmental science.

The course had been initiated as a Graduate Certificate (see *Antarctic* 16/3) but after a remarkably fast-tracked conception and implementation, it met unexpected delays obtaining approval from the University Qualifications Board, and in January was forced to go ahead only as a Certificate of Continuing Education.

The course was led by Professor John Hay of Auckland University and Dr Brian Stewart of Otago University. At the official launch of the intensive 12 week study period on 11 January, the Deputy Vice Chancellor of Canterbury University, Professor Bob Park, outlined the proposal for a Centre for Antarctic research and study at the University, stimulated by the transfer of Antarctica New Zealand's Antarctic library and ICAIR to the campus.

The course began with a concentrated series of lectures and activities that covered all aspects of Antarctic geography, science, history, politics, tourism and current issues of concern. A total of 26 lecturers contributed at various times with live video links with Bill Manhire, Kim Stanley-Robinson, David Walton, Anne Kershaw, and Klaus Dodds. Visits were made to Canterbury Museum's Antarctic displays, the International Antarctic Visitor Centre, and to Antarctica New Zealand where the group had a chance to question representatives from the New Zealand, American and Italian Antarctic Programmes. A conference call was also made to Scott Base.

Two afternoons were kept free for local fieldwork as training for the Antarctic visit, one sampling the water in the Avon estuary for faecal coliforms and the other to study the volcanic rocks on the Port Hills.

Four syndicate groups began to research specific topics: Human artefacts in Antarctica treasure to be conserved or junk to be removed? Emerging fisheries - threat or opportunity? Tourism - where to?, Antarctica - a strategic asset?

These were presented at the end of the formal part of the course, before the students returned home to each undertake their final investigative report on an approved topic.

The highlight of the course for both students, co-ordinators and two extra tutors (Gary Steel, Lecturer, Lincoln University and Margaret Bradshaw, Research Associate, University of Canterbury) was the visit to Scott Base on 5 February. The 10 day visit was prolonged to 13 days when mechanical problems with starlifters delayed the party's return.

There was no doubt that the influx of such a large group at the end of the season put considerable strain on Scott Base staff and resources, especially when it came so soon after the Ministerial visit, but the course slotted in extremely well.

Quite a few of the students had their first real taste of cold and snow when they spent two days and a night out on survival training away from base. The resident survival team of Kevin Nicholas and Sam Bosshard was swelled by the voluntary help of Scott Base chippy Grant Shadbolt and Field Support Officer Logan Akers. After learning basic ice and snow techniques and roping up as four groups to thread their way in and out of the ice cliffs, the group then had to make three giant snow mounds as communal "dormitories", and to cook a meal in the open for each mound's-worth of people. The next day, in whiteout conditions and falling snow, the group learned the rudiments of polar tent erection, then returned to base to prepare for a proper "Fieldtrip" where they would experience what it was really like living in the field. This was seen as an

important part of the Antarctic "experience", to offset the easily acquired impression of Antarctica based on the considerable comfort of Scott Base, where even the squeaky floored Q-Hut had been transformed into smart four or eight bunk rooms, with carpets, wardrobes, desks and doorways that could be closed with a proper door.

With Peter Cleary (Operations Manager) leading a safety team of Kevin, Sam and Logan, 25 individuals travelled to Black Island in two haggulds piled high with supplies, gear and bodies. A young lone

moulting Emperor penguin beside by the flagged route to Pegasus Runway was the student's first chance to see a penguin "in the flesh" and for a while the silence was broken only by a multitude of clicking shutters. Shortly afterwards the convoy left the runway "road" to follow the flagged route northward round Black Island. But the weather was closing in and a cap of high wind cloud was sitting snugly over the top of Mt Discovery. With some worried looks at the weather, and conscious of leading a large and inexperienced party, Peter Cleary recommended returning to a more sheltered site on the southern side of the island.

Fourteen polar tents were offloaded and erected with varying degrees of eptitude and confidence. A communal "loo" was established behind a massive wall of iceblocks (all waste was removed), a meal was cooked, and the camp settled down for the "night", and what some later said was the "real" Antarctic experience.

The next day the group moved en masse up onto the slopes of Black island, studying the volcanic rocks, lichens, desert pavements and patterned ground as they went. The disadvantages of such a large and varied party became immediately obvious, and credit must go to Peter, Kevin, Sam and Logan who made it safe for people who would otherwise never have felt inclined to venture onto ice and snow and unstable scree. By the time a mummified seal was inspected and some attempt made to do metre-square analysis of the ground to assess the affects of large surface stones on lichen populations, the cold, persistent wind and the descending cloud base cut the day short and the party returned for its second night in camp.

Camp was struck remarkably quickly the following morning and a sweep by 25 people across the site produced only a few



Studying lichens on Black Island.

threads, down feathers and a couple of tiny pieces of plastic tape. The party was satisfied that nothing had been left behind apart from some rough snow and a myriad of footsteps.

On the return journey to Scott Base, after another stop to see the same penguin in the same place, a detour was made in perfect conditions to see the Volcanic explosion vent that comprises Castle Rock. For many, the dramatic and silent view of the Ross Island coastline and the distant Transantarctic Mountains which was suddenly revealed from the top of the ridge was the highlight of the whole trip and to many represented what Antarctica was really about.

Back at Scott Base, and as part of another science project, the students selectively sampled the water intake over a 24 hour period for testing, and the following day had a further 24 hour schedule counting the prepared and incubated samples for faecal coliforms. Despite quite high levels of these in the intake water, additional tests showed that the Scott Base Reverse Osmosis system produced only the purest of water. In another project, each student had to perform a taped interview with randomly selected workers at McMurdo Station about Antarctic humour. A real but quickly controlled fire in the Scott Base bar early one morning and the rapid response of base staff and the McMurdo fire team, was another instructive experience for the group, and the extra pairs of hands for the clean-up were very welcome.

The Antarctic visit produced a remarkable variety of responses from the students. Nearly all of them became passionately concerned about the human impact on the Antarctic environment. While most were very impressed with the tour of the new Creay Science Lab at McMurdo, few of them liked McMurdo itself which they thought untidy and ugly, and they were appalled over the marks left by bulldozers scraping gravel from the lower slopes. I felt this view was pretty harsh, having seen the awful untidiness and poor practices of the mid 1970's which have gradually changed over the years into today's very ordered arrangement. I was impressed with the neat lines of tracked vehicles, the clearly labelled bins for separating materials which stood outside every building, the carefully stacked supplies that showed up tidily from the top of Observation Hill. McMurdo may still look like a dusty mining town, but at least its a tidy one without smouldering rubbish fires on the edge of Winter Quarters Bay as in the past.

Nor was Scott Base exempt from having the finger pointed at it. The students were highly critical of the siting of the new windowless ablutions block, which was being rapidly erected by the army team whilst they were there. In the students opinion, it totally destroyed the view from the bar and science lab corridors, and would have been better built at the back of the base. But the use of polystyrene as the insulating material sandwiched between the walls, and the way this littered the ground when panels were cut and erected, really got their ire. Many wondered how such a building could have got the environmental impact consent necessary for it to go ahead when everyone knew that polystyrene was frowned upon in Antarctica and that it would be released as soon as the panels were cut. The panels could have been cut and pre-erected in New Zealand, then sealed to minimise release of fragments before transport to Antarctica and "kit-set" erection on site. It might have been best to wait an extra year and do it this way rather than litter the ground with material that would never decompose and could travel far on the wind? The Army constructors were embarrassed by the mess and made every attempt to minimise the damage. But they had a very tight

deadline to work towards, and the base staff were to complete the interior of the building over the winter.

Maybe Scott Base could have managed with the perfectly good ablutions facilities for just one more year?

Such were the thoughts that circulated round the students and tutors as they spent a total of four hours picking up the polystyrene fragments around the construction site, even resorting to vacuuming up the finer pieces as best they could. The students were flown home, however, before the polystyrene had finished falling.

Since the group's return, it has become known that urethane-foamed panels had originally been planned by the designer, but could not be sourced from the manufacturer as they had closed down. A new composite urethane/styrene panel that was being developed was twice the cost of a styrene only panel, and the cheaper option preailed.

Some students came back from the ice keen to pursue further Antarctic work and research. others felt they had had a life-changing experience and were reviewing their future directions. New enriching behaviours emerged - a need to write and express, the production of poetry, the desire to draw, the start of the first



Kate Downer, a student on the Antarctic studies course, adding to Scott Base's first Antarctic weaving.

weaving to be made at Scott Base, an Antarctic scene using materials found only around the base - tent fabric, paper serviettes, pillow stuffing, unravelled nylon cord and discarded socks. Quite a few of the group contributed, but time ran out and it was left, half finished, for the winter-overers to complete.

As an Antarctic scientist, this was a new insight into people and the Antarctic. Were these students perhaps more honest than scientists about their feelings for Antarctica and why they wanted to be there? Did they express their concerns better and more bluntly, not being worried about lessened future support from the resource givers? Did they, after the intensive and varied lecture programme, acquire an overview of Antarctic knowledge more rapidly than scientists who often took years to accumulate this knowledge because it was always secondary to their immediate speciality? Are these courses with their very limited scientific content, just as important on a broader scale as some of the deeper scientific projects?

Its all a question of balance. I think we need both, and despite a few details of planning that will need to be addressed, including the effect of such a large group being in any one place at any one time, I think carefully packaged and academically controlled educational courses such as this are helpful for the future well-being of Antarctica and should be continued.

FEARS FOR FUTURE OF ANTARCTIC MATERIAL

By Colin Monteath

I write in defence of a small, 40 year old library of unique Antarctic material which, by the time I return to Christchurch in November, will be all-but dismembered and dispersed.

I am referring to the old DSIR Antarctic Division library from which, in 1984/85, I was banned by the then Director for daring to write in defence of the validity of retaining the Scott Base huskies. I wrote as a freelance journalist starting to specialise in polar matters but having just finished long-term employment with the Division.

During those years of planning New Zealand's Antarctic expeditions I spent a considerable amount of time in that library using its maps, aerial photos, irreplaceable black and white photographs dating back to TAE and, most importantly, the many books and obscure periodicals gathered from all over the polar world, principally SCAR and Treaty countries.

When researching new geographical areas of endeavour for New Zealand's science field parties I often didn't precisely know what I was looking for when I entered the library that was an integral part of our office. When dealing with the alien world of Antarctica which is still governed by an unusual set of rules, this resource immediately took on vital importance during search and rescue operations for accidents to remote field parties, for downed aircraft and for stricken vessels.

In a way that only librarians can, I was quickly and skilfully directed to potentially relevant material tucked away in dusty corners of that shabby little office in Oxford Terrace.

Many individuals and organisations come to mind - such as Les Quartermain, NZ Antarctic Society, Arnold Heine, Jim Caffin and Bob Thomson to name a few - who helped pull this library together or who donated/loaned books, pamphlets, news cuttings and private expedition memorabilia.

Now elements of this library are to be amalgamated with the University

of Canterbury library and I cannot imagine a university ordering system ever having the same 'feel' or ability to add the sort of material I believe we need to be accumulating for future generations.

I considered that the Antarctic Division library complimented the Skellerup collection of purely historic books on 'permanent' loan to Canterbury Museum as well as the collections of readily-available polar science text books at New Zealand universities involved in our Antarctic science initiative. When considering the tragedy of potential fire damage I felt it was an advantage to have collections housed under different roofs.

I always viewed the library, underfunded and young in stature though it was, as a national resource in the same way I thought of the impressive libraries at British Antarctic Survey and Australia's Antarctic Division when I toured their offices. For all its faults I still considered our library as a place of wonder and excitement for the annual crop of new-comers who, just as I did, joined NZARP as a youngster about to venture to Scott Base for the first time.

Even if individuals just wandered through the place for a few minutes and barely touched a book, I felt they gained some sense of history, past personalities and NZARP traditions and, if they dug deeper, a knowledge of field techniques, geography and the importance of international co-operation in Antarctica.

Today, the all-too prevalent, tightly cost-effective approach to many aspects of government work results in a contentment to downplay the importance of tradition. Therein I feel government errs, indeed errs greatly, by discarding some of the greatest assets we hold as a small-tight-knit nation.

The concept of moving Antarctic Division's office from Oxford Terrace to the Christchurch airport was overdue. It was a costly move with expensive rented library space. The gain though was the great benefit of

improving the logistic operation and social interaction between New Zealand and the other nations, principally USA and now Germany and Italy, that use Christchurch as their gateway to the Ross Sea. It seemed fitting to have the host nation's library properly displayed and easily accessible to all in the luxury of a large, peaceful setting in a building touted as an International Antarctic Centre.

And now, as I write in 1999, with the long-serving librarians ditched on the scrap heap of redundancy and much of the library deposited on the seventh floor of the University of Canterbury's library, I ponder the future. While we are told "The change does not significantly affect the accessibility of the collection to the Antarctic community" I wonder who will actually make the effort to use an integrated Antarctic collection when it becomes functional - students and university staff one hopes, but who of the public and who of Antarctica New Zealand's staff or employees let alone transitory foreign scientists, writers or researchers will give this new remote library little more than perfunctory credence?

Trying to view recent events in a positive way I must remember that in England in the 1920s one of Scott's scientists, Frank Debenham, created what is now the prestigious Scott Polar Research Institute as a branch of the geography school at The University of Cambridge. I can but hope that someone with passion and vision emerges from our ranks to create something of lasting value.

Already, many hundreds of books and journals from the old Antarctic Division library have been dumped on the second hand book market here in Christchurch. Many of them are presumably doubles already held in the university collection - specialist polar texts in glaciology, geology, remote sensing, microbiology etc as well as sets of journals such as the *Journal of Glaciology*.

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ANTARCTIC COLLECTION AT NEW UNIVERSITY HOME

The Antarctic Collection is the result of a partnership between Antarctica New Zealand and the University of Canterbury Library.

It was moved from the International Antarctic Centre to the university library in September 1998.

The collection will be managed by the University Library on indefinite loan and will continue to be developed as a focal point for Antarctic researchers, says Rosalind Patrick, sciences librarian at the university.

In a communication to staff and students, she backgrounded the history, use, content and location of the collection:

History of the collection

The Antarctic Division of the DSIR and its library were established in 1959. "The initial emphasis was on

building up a comprehensive collection of historical publications covering New Zealand's Antarctic interests and that of other countries in the Ross Dependency." This later changed to establishing "a comprehensive scientific and technical collection of Antarctic literature".

When the DSIR was disestablished the New Zealand Antarctic Institute Act 1996 created Antarctica New Zealand which took over the library.

The library served the International Antarctic Centre (including Antarctica New Zealand, the International Centre for Antarctic Information and Research, the Visitor Centre, members of the United States and Italian Antarctic programmes while in Christchurch, and Scott Base).

It was also open to researchers and members of the public interested in Antarctica. As part of Antarctica New Zealand, the library saw its mission as "the prime source of information on New Zealand's activities in Antarctica".

Use of the collection

Now based at the university, the collection will continue to be used by staff of the International Antarctic Centre and the wider research community who are interested in Antarctica.

It will also support teaching and research within the university, at all levels and from all faculties. The interdisciplinary course on Antarctic Studies (INCO 103) which is taught by staff from ten departments is an indication of the widespread interest at the university, an interest which continues at higher teaching levels and in research.

The new Certificate in Antarctic Studies, offered for the first time in 1999, is another example of the partnership of the university and Antarctica New Zealand.

Content of the collection

The subject coverage of the collection is wide-ranging, but has particular emphasis on New Zealand activities in Antarctica (records of

scientific work, logistic support, environmental concerns and Antarctic Treaty matters), Antarctica in general and Antarctic science.

Some material is received under the Antarctic Treaty requirement of "free exchange of information". A special strength is the full text of microfiche of the items listed in the Antarctic Bibliography, which is on loan from the National Science Foundation. The Antarctic Bibliography is included among the Arctic & Antarctic Regions group of databases which can be searched online. A small collection of valuable "heroic era" books is housed in the library's Special Collections Room.

Materials in the collection include not only books and journals, but also maps, aerial photographs and videos. Links to information on the Internet are available through the library's web pages under both <InternetSubjectResources> and <ElectronicJournals>.

Some materials are still held at Antarctica New Zealand. These include photographs, slides and the Field Event reports and Field Event Diaries of the Antarctic Research Programme. They may not be borrowed, but may be consulted by appointment with Natalie Cadenhead, information services specialist. (phone 35802000 or email: n.cadenhead@antarcticanz.govt.nz).

Location of the collection

The books and journals can be found in the north-west corner on level 7 of the central library. The videos, maps and aerial photographs of the Antarctic Collection have been incorporated into the library's Audiovisual Collection which is housed on the south side of level 7. The Antarctic Collection is a focal point for those interested in the continent, but other material on Antarctica continues to be available in all branches of the library.

The collection is being recatalogued so that it integrates better with the university's collections.

FUTURE OF ANTARCTIC MATERIAL

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On the surface, even though many are long out-of-print or limited run texts, this may seem as no great loss. Others though, are unusual books that are personally inscribed to NZARP, Vanda Station or Scott Base libraries by visiting scientists including Tetsuya Torii, Haroun Tazieff and George Denton, to name a few.

Donating such books on their life work was one way of expressing the joy and pride of their past association with NZARP. One of these books, an inscribed book on Antarctic meteorites by a Japanese scientist who was active with NZARP in the Dry Valleys in the 1970s, has already been sold and is on its way to a collection in USA.

Ironically, the Italian government recently bought large numbers of books from this library, transporting them by ship from Christchurch to their national antarctic institute at the end of this past season.

I fear much has been cast adrift and I am left with a feeling of sadness.

UNIVERSITY 'VALUES' THE ANTARCTIC COLLECTION

The University of Canterbury values the Antarctic collection and will integrate it as a discreet unit within the context of its broad collection - but as a specialist collection, the vice-chancellor Professor Daryl Le Grew writes to 'Antarctic'.

"The library will also be placed in the context of the university's "Gateway Antarctica" Centre, a research centre that will provide a national focus for Antarctic Studies and intends to draw together Antarctic scholars, ICAIR and other Antarctic resources.

"The university will, therefore, treasure the Antarctic library collection and see that it is curated, enhanced and developed and well used by new generations of Antarctic students and scholars.

"Whilst I appreciate Dr Monteath's feelings on the matter, I can assure you that the transfer and curatorial care of the collection is in excellent hands." The university's librarian Gail Pattie advised the vice-chancellor, by way of response to Colin Monteath's letter to 'Antarctic' that the University of Canterbury Library "is honoured and very pleased to have been the recipient of the Antarctica New Zealand library collection last year when Antarctica New Zealand sought a new home for its collection."

While the University Library (pictured) is not a "special" library with the special and individual services that that term implies, it is a major research library physically close to the Antarctic Centre, and sits within an institution which is building on its already impressive range of Antarctic research activities, she says. "The University Library believes the collection has come to the best home it could have outside Antarctica New Zealand".

"It is important to note that not all of the collection has come to the university as Antarctica New Zealand has retained those materials



that are of day-to-day significance to their research activities. There is inherent flexibility also in that materials can be released from the university on long-term loan as required. Many of the maps and slides have also been retained by Antarctica New Zealand as working resources.

"The University Library has endeavoured to be flexible about who has access to the collection and to make it as easy as possible to use the collection. It is expected that those who would normally have used the collection at the centre will be fully informed of and referred to the University Library for access.

"The materials held are also listed on the New Zealand national biblio-

graphic database which can be searched by any library in New Zealand and from overseas.

"A benefit for those who do come to use the Antarctic Collection is that they will also be able to use the rest of the university library's collection.

"It should be noted too that the Antarctic Collection will be kept together as a specialist collection within the library.

"Decisions as to what was kept and what was not kept in the collection were carefully made, and were the results of protracted negotiations with Antarctica New Zealand.

"The University librarian would be very happy to have Mr Monteath visit and examine the future plans for the collection."

SCIENCE NOTES

FOUR NEW FISH DISCOVERED BY ACCIDENT

An Ohio University researcher who discovered four previously unknown species of fish during a recent Antarctic research cruise says the discoveries confirm his hypothesis that the continent's frigid seas represent a world-class evolutionary laboratory.

"Antarctica is under-appreciated as an evolutionary site," says Joseph Eastman, an anatomist who made his discoveries aboard *Nathaniel B Palmer*, an icebreaker of the NSF's polar research fleet.

Eastman's discoveries - which include the first identification of a new species in the genus *Artedidraco* in 80 years - occurred almost by chance. Eastman studies the anatomy of buoyancy and how it evolved in Antarctic fishes. "It wasn't my intention to look for new species," he said.

Based on his 20 years of research and his new discoveries, Eastman says "as far as bottom habitats are concerned, sponge beds in Antarctica are the equivalent of coral reefs in the tropics; sites of high fish diversity.

Polly Penhale, who oversees medical and biological research for the US Antarctic Program, said that Eastman's findings indicate that "future research is likely to lead to a greater appreciation of biodiversity in the polar regions."

THE PONDS OF THE MCMURDO ICE SHELF

Life in continental Antarctica is dependent on the availability of liquid water. Probably the commonest type of wet habitat are the small pools which accumulate meltwater in summer, and freeze solid during winter. Such ponds are typically colonised by a range of aquatic biota, with benthic mats of algae and cyanobacteria particularly common.

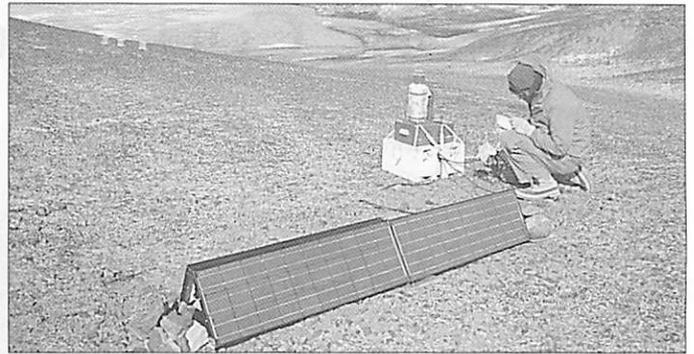
"During summer, these ponds provide a benign habitat, with temperatures above zero and abundant light for photosynthesis," says Clive Howard Williams, Rob Smith, Ian Hawes and Ann-Maree Schwartz of NIWA, in Christchurch

"It is only during the period of freezing that this habitat becomes stressful." In order to better understand the nature of these stresses, and how organisms respond, the physical environment in ponds of the McMurdo Ice Shelf, close to Bratina Island, was monitored over a 12 month period between January 1997 and January 1998 using a network of automated sensors.

Based on these environmental data, a series of experiments investigated how the dominant cyanobacterial communities adapted to tolerate conditions outside the traditional summer sampling.

Air temperature at the study site was above zero for a very short period during the summer of 1998. Mean daily incident irradiance showed the expected gradual decline to darkness with the onset of winter and the period of near total darkness lasted from 20 April to 1 September, a period of 130 days.

Ice formed on the ponds in February 1997, and gradually increased in thickness until most of each pond was frozen by early April. Lowest temperatures recorded in the ponds were -35°C . As more water froze, salt concentration in the remaining water increased.



Setting up a solar panel to power remote sampling instruments at a pond on the McMurdo Ice Shelf's Bratina Island.

This led to a two-fold increase in conductivity of pond bottom water, but affected shallow water only marginally. The characteristic conditions under which the majority of the benthic mat material froze were; temperature slightly below zero, conductivity slightly elevated from open water conditions, light levels low but not yet dark.

Manipulative experiments have shown that increasing salt concentration, to the levels observed prior to freezing, had no effect on rates of photosynthesis in benthic mat communities. Photosynthesis and respiration both continued at temperatures of -2°C , and behavioural adaptations of the benthic photosynthetic community, involving vertical migration of active cells, allowed them to remain photosynthetically active up to the moment they froze.

These data confirm that the active period of benthic communities in Antarctic ponds is likely to extend well beyond the summer open-water period.

Ongoing research is designed to investigate the effects of prolonged freezing to temperatures below -35°C on mat survival.

WAVELENGTHS PENETRATE TO SIGNIFICANT DEPTHS

There is overwhelming scientific evidence that UVB (280-320) wavelengths are damaging to marine organisms and penetrate to biologically significant depths in the marine environment.

Column ozone concentrations over Antarctica presently fall to less than 50%, and may fall below 30% of pre-ozone hole concentrations annually, an Australian research team reported at the VII SCAR International Biology Symposium.

Significant depletion of ozone also persists into January and February the team says. The consequent increase in short wavelength UVB coincides with the proliferation of phytoplankton in the sea ice and marginal ice zone (MIZ).

There is great interspecific variation in tolerance to UVB exposure; the susceptibility being dependent on the effectiveness of the UV tolerance mechanisms they possess. *Phaeocystis antarctica* is one of the most abundant components of the phytoplankton in the ice and MIZ. The unique physiology and vast biomass of its blooms make *P. antarctica*

a pivotal component and determinant of the Antarctic microbial community.

The bloom-forming colonial stage of *P. antarctica* possesses high concentration of UV-absorbing compounds which enhance the survival, production and growth of colonial cells when exposed to UVB radiation.

"Our results show that production of UV-absorbing compounds by *P. antarctica* is responsive to UVB exposure, increasing linearly with increased UVB dose," the team says.

"While many marine organisms are incapable of detecting and/or responding to UVB radiation, *P. antarctica* alters its level of UV-protection in response to UVB wavelengths.

"Changing the duration of dark incubation following exposure to UVB radiation did not alter the UV-absorbing pigment concentration at a given flux, irrespective of the flux rate.

"Thus, the metabolic expense of protection against UVB was minimised by producing and maintaining a concentration of UV-absorbing compounds that was determined solely by the UVB exposure."

NAVY FLIES LAST ANTARCTIC MISSION

A 44-year long era in aviation came to an end in February this year when the US Navy made its final flight in support of the National Science Foundation's (NSF) U S Antarctic Program.

Logistical support for the US Antarctic Program is now carried out by the New York Air National Guard's 109th Airlift Wing, based in Schenectady, New York.

The Navy squadron played a vital role in shuttling personnel and cargo to Antarctica and to research locations throughout the continent.

The last ski-equipped LC-130 cargo aircraft flight by VXE-6, the Antarctic Development Squadron, was made in February 1999 from McMurdo Station in Antarctica to Christchurch, New Zealand, where it was met by a large crowd of well-wishers.

Aviators and support personnel of VXE-6 were honoured by the people of Christchurch who turned out to farewell the squadron at Christchurch International Airport, on February 20.

"This is a proud but sombre day for the men and women of VXE 6 and the US Navy," said Commander



VXE-6 squadron commanding officer Commander Dave Jackson is congratulated after the squadron's last ice flight in February 1999.

Dave Jackson, the unit's last commanding officer. "For more than 44 years, the US Navy has committed itself to leading the way in the support of science in Antarctica. Today, I am proud to say that our mission is done."

The Schenectady-based 109th is now the world's only ski-equipped LC130 unit.

THE WORKHORSE OF OPERATION DEEP FREEZE

VXE-6 had its roots in "Operation High Jump", the fourth Antarctic expedition conducted by Rear Admiral (USN) Richard Byrd.

In December 1946, this expedition, involving sea-based Martin PBMs and land-based Douglas R4Ds, set out to conduct an extensive aerial survey of Antarctica.

Based in the Ross Sea ice pack, they eventually mapped about 1.5 million square miles of the interior and 5,500 miles of coastline.

Established as Air Development Squadron XIX (VX-6) at Naval Air Station (NAS), Patuxent River, Maryland on 17 January 1955, the squadron's mission was to conduct operations in support of U.S. Department of Defence responsibilities in connection with the United States Antarctic Programme.

VX-6 made its first deployment, Deep Freeze 1, in November 1955, as part of "Task Force 43". That first season, VX-6 completed nine long range exploratory flights, and transported people and materials

necessary for the construction of Little America base camp, the Naval air operations facility on Hut Point (McMurdo Station) and South Pole Station, and assisted in the location of four other base sites on the continent.

Following its return from Deep Freeze 1 in February, 1956, VX-6 was relocated to NAS Quonset Point, Rhode Island (this was also the home of Naval Construction Battalion 200, which had been formed to do the construction of facilities in the Antarctic).

In January 1969, VX-6 was re-designated as Antarctic Development Squadron Six (VXE-6). Since its establishment, VXE-6 logged more than 200,000 flight hours in direct support of United States' interests in the Antarctic. The squadron transported more than 195,000 passengers, delivered over 240 million pounds of dry cargo and nearly 10 million gallons of fuel to numerous sites throughout the continent.

In support of Operation Deep

Freeze, the squadron operated a variety of aircraft, including the P2V-2 Neptune, UC-1 Otter, R4D & C-47 Dakotas, R5D and C-54 Sky Masters, R7D Super Constellation, and LH-34 and HUS-1A helicopters. Deep Freeze '61 marked the arrival of the ski-equipped LC-130 Hercules, then dubbed the "work horse of the future", due to its long range and heavy load capability.

During Deep Freeze '72, the UH-1N Huey was introduced to the continent, with VXE-6 being the first Navy recipient of this now world famous twin-engine helicopter. Providing an additional means of direct scientific support, the Huey had the capability of rapidly transporting field teams and cargo to otherwise inaccessible locations within a 150-mile radius of McMurdo Station.

VX-6 has had many aviation firsts. On 20 December 1955, two P2V-2 Neptunes and two R5D Sky Masters forged the first air link with the continent of Antarctica with a flight from Christchurch, New

Zealand to McMurdo Sound. During Deep Freeze II "Que Sera Sera", an R4D Dakota (BUNO 12418) became the first plane to land at the South Geographic Pole on 31 October 1956. Also in Deep Freeze II, R4D (BUNO 17274) delivered the first group of 11 Seabees and 11 dog sledges, together with tents and other equipment to the South Pole, to begin construction of the first South Pole station.

By January 1958, a VX-6 Otter made the first wheels-on-dirt landing in Antarctica at Marble Point. On 9 April 1961, the first midwinter fly-in was accomplished to rescue a seriously ill Russian scientist from Byrd Station.

In February 1963, VX-6 completed the first delivery of bulk fuel (3000 pounds) by an LC-130 aircraft. In 1964, VX-6 conducted the first-ever flight, from Capetown, South Africa to McMurdo Station, Antarctica, first-ever flight of US aircraft to the Russian-operated Antarctic station Vostok, and the first successful demonstration of Trimetrogon photography, used extensively to map the Antarctic continent.

OTHER SIGNIFICANT MILESTONES/EVENTS:

During Deep Freeze '78, VXE-6 evacuated five critically injured Soviets from the crash site of an IL-14 transport aircraft at Molodezhnaya, on the Prince Olav Coast, located 1,825 miles (about 24 flight hours, round trip) from McMurdo Station. This arduous and hazardous life-saving flight earned the squadron the Navy Unit Commendation.

The squadron received the 1982 Chief of Naval Operations Safety Award in recognition of its accident free flight operations for that year and for its outstanding safety programme.

Deep Freeze '88 was a particularly challenging season. A medical evacuation to the South African station of Sanae broke the record for time and distance in a single Antarctic flight. Another highlight of the season was the recovery of an LC-130 (BUNO 148321) that had been buried in ice and snow since its crash in 1971 near Dumont D'Urville. That aircraft, designated as "XD-03", has been fully restored and still operates with VXE-6 to this day.

Deep Freeze '90 was a highly successful season. With the combined efforts of HH-1N and LC-130 aircraft, VXE-6 moved almost 8,000 passengers and over six million pounds of cargo which included five re-supply flights to the Russian-operated Vostok Station. Additionally, VXE-6 completed the first wheeled landing of an LC-130 aircraft on a "blue ice" surface near the Beardmore Glacier. Capping this successful season, VXE-6 was awarded the COMNAVAIRPAC Aircraft Squadron Battle Efficiency Award.

Deep Freeze '92 marked the first year in which aircraft (UH-1N Hueys) were operated during the period between WINFLY and the start of normal operations in October. All helicopter missions were completed despite being grounded for over a month because of a suspected drive-shaft problem. Another historic milestone occurred on 25 October 1991 when an all-female crew took an LC-130 to

"open-up" South Pole Station. Topping off the season, VXE-6 was again awarded the Chief of Naval Operations Safety Award.

Deep Freeze '93 saw VXE-6 break many records, the most amazing being the total cargo flown in a single season: nearly 9.4 million pounds of cargo and fuel were transported on continent.

Deep Freeze '96 marked the squadron's 40th annual deployment to Antarctica. Together, the Hercs and the Hueys flew over 4700 hours to deliver more than eight thousand passengers and over 6.7 million pounds of cargo and fuel. On 3 February 1996, the squadron operated its last helicopter mission in Antarctica (the helicopter programme is now bid-contracted every five years).

The Navy's helo programme in Antarctica ended with the disestablishment of VXE-6's helo component in April 1996. At the conclusion of the 96/97 deployment, the



The Mayor of Christchurch, Garry Moore, farewells VXE-6 in 1999.

squadron held an Old Antarctic Explorers Reunion, commemorating the 40th anniversary of Antarctic research support. Approximately 200 past and present VXE-6 personnel were in attendance, including members of VX-6 Deep Freeze 1.

Deep Freeze '97 proved to be very successful in spite of a delay in "opening-up" South Pole Station until early November due to extremely low temperatures. Despite many delays and maintenance difficulties due to extreme weather conditions, VXE-6 and the Air National Guard's 109 Airlift Wing completed all planned missions.

Plagued by the "worst weather for 24 years", Deep Freeze '98 ended successfully with the completion of an extremely busy air lift schedule, including the delivery of a substantial amount of materials necessary to begin the erection of the new South Pole Station, slated for completion in 2005.

Deep Freeze '99 was VXE-6's last deployment in support of the United States Antarctic Programme. The season's LC-130 airlift schedule was the busiest on record, with nearly 500 missions are planned; 320 to the South Pole alone! Following the closure of South Pole Station's summer operations in mid-February, VXE-6 returned to Naval Air Station, Point Mugu, CA, to be disestablished.

MEMBERSHIP

The New Zealand Antarctic Society Inc., was formed in 1933. It comprises New Zealanders and overseas friends, many of whom have been to the Antarctic and all of whom are interested in some phase of Antarctic exploration, history, development or research.

Annual membership of the Society entitles members to: *Antarctic* which is published each March, June, September and December. It is unique in Antarctic literature as it is the only periodical which provides regular and up to date news of the activities of all nations at work in the Antarctic and Sub-antarctic. It has a world-wide circulation.

Members also receive a regular newsletter called *Polar Whispers*, an annual *Polar Log*, which records the decisions made by the Society's Council at its AGM, catalogues of the Society's mailorder bookshop 'The Polar Bookshop' and occasional brochures from the Society's 'Sales Stall'. Occasional meetings are held by the Auckland, Wellington, Canterbury and Otago branches.

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Cdr G. K. Ebbe, USN	02 Apr 55 to 15 Jun 55	Cdr W. A. Morgan, USN	31 May 78 to 11 May 79
Cdr E. M. Ward, USN	15 Jun 55 to 16 Jul 56	Cdr D. A. Srite, USN	11 May 79 to 30 May 80
Capt D. L. Cordiner, USN	16 Jul 56 to 10 May 57	Cdr V. L. Pesce, USN	30 May 80 to 22 May 81
Cdr V. J. Coley, USN	10 May 57 to 07 Jul 58	Cdr P. R. Dykeman, USN	22 May 81 to 28 May 82
Capt Slagie, USN	07 Jul 58 to 04 May 59	Cdr M. J. Harris, USN	28 May 82 to 27 May 83
Cdr J. M. Barlow, USN	04 May 59 to 21 Jul 59	Cdr M. J. Radigan, USN	27 May 83 to 25 May 84
Caot W. H. Munson, USN	21 Jul 59 to 01 Jun 61	Cdr D. D. Fisher, USN	25 May 84 to 24 May 85
Cdr M. D. Greenwell, USN	01 Jun 61 to 25 Apr 62	Cdr P. J. Derocher, USN	24 May 85 to 18 Apr 86
Cdr W. H. Everett, USN	25 Apr 62 to 29 Apr 63	Cdr J. D. Mazza, USN	18 Apr 86 to 22 May 87
Cdr G. R. Kelly, USN	29 Apr 63 to 06 May 64	Cdr J. B. Rector, USN	22 May 87 to 27 May 88
Cdr F. S. Gallup, USN	06 May 64 to 05 May 65	Cdr J. V. Smith, USN	27 May 88 to 26 May 89
Cdr M. E. Morris, USN	05 May 65 to 17 Jun 66	Cdr K. S. Armstrong, USN	26 May 89 to 25 May 90
Cdr D. Balish, USN	17 Jun 66 to 26 Apr 67	Cdr S. E. Sebastian, USN	25 May 90 to 22 May 91
Cdr A. F. Schneider, USN	26 Apr 67 to 14 Jun 68	Cdr W. R. Reeves, USN	22 May 91 to 15 May 92
Cdr E. W. VanReeth, USN	14 Jun 68 to 10 Jul 69	Cdr J. D. Keho, USN	15 May 92 to 07 May 93
Cdr J. R. Pilon, USN	10 Jul 69 to 24 Jun 70	Cdr M. J. Duvall, USN	07 May 93 to 19 May 94
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Cdr C. H. Nordhill, USN	01 Jul 71 to 30 Jun 72	Cdr J. P. Morin, USN	25 May 95 to 24 May 96
Cdr J. B. Dana, USN	30 Jun 72 to 27 Jun 73	Cdr W. B. Stedman, USN	24 May 96 to 06 Jun 97
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Cdr F. C. Holt, USN	18 Jul 74 to 11 Dec 76	Cdr D. W. Jackson, USN	22 May 98 to 31 Mar 99
Cdr D. A. Desko, USN	11 Dec 76 to 02 Jun 77		

