

ANTARCTIC



The Journal of the New Zealand Antarctic Society Vol 17. No. 1, 1998-99

TOOTHFISH PATROL IN THE ROSS SEA



■ Britain's
Halley Station

■ Tales of
Adventure

■ Riddle of the
Peninsula

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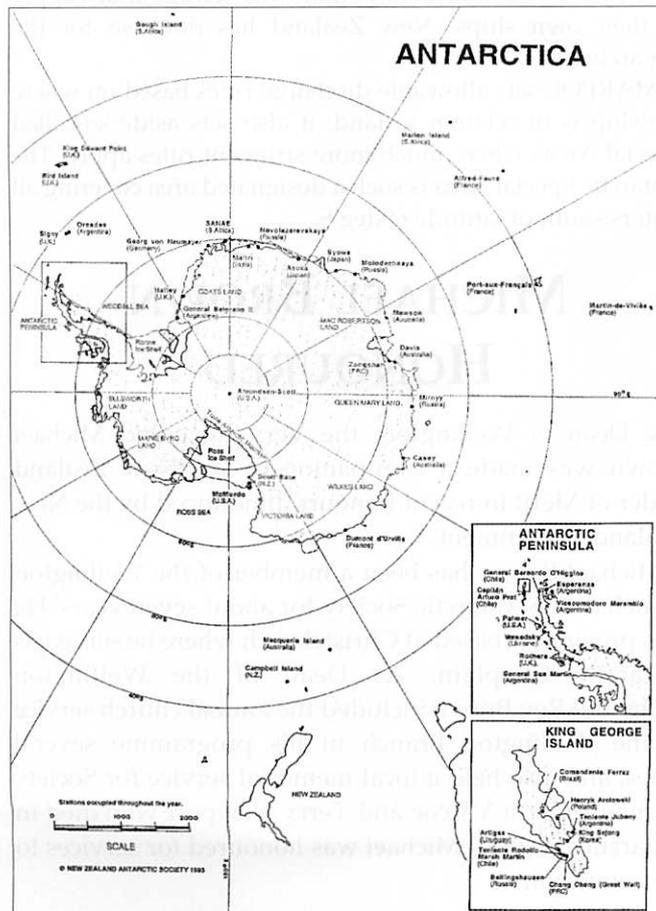


The Frigate 'Te Kaha' on patrol in the Ross Sea
- photo courtesy of the Royal New Zealand Navy.

Volume 17, No. 1, 1999-2000

Issue No. 167

ANTARCTIC is published quarterly by the New Zealand Antarctic Society Inc., ISSN 0003-5327.
Please address all editorial enquiries and contributions to Warren Head, Publisher, 'Antarctic', P O Box 2369, Christchurch or telephone 03 365 0344, facsimile 03 365 4255, e-mail headcon@chch.planet.org.nz.
Printed by Adams Print, Annex Road, Christchurch



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NEW ZEALAND SIGNS TO MARPOL CONVENTION

New Zealand is now party to an international convention (treaty) called MARPOL 73/78 – the International Convention for the Prevention of Pollution to Ships.



New Zealand is now a signatory to rules governing ship waste.

This convention is a series of prescriptive rules and requirements covering what a ship can and cannot discharge into the sea, and as well what sort of design and equipment they must have.

Enforcement is via implementation of rules and regulations by the country whose flag the ship flies (flag State Control) based on where they are registered, backed up by inspections by the authorities of all other countries at which those ships call (port State control).

Classification societies (eg Lloyds Register of Shipping) play a very important role in flag state control, as they inspect and survey the ships on behalf of the flag State and issue certificates which confirm that the ship complies with the relevant MARPOL provisions. Port State inspections look to make sure that the ship carries all relevant documentation and that those on board are familiar with

essential pollution prevention procedures. If a ship poses an unreasonable threat to the marine environment, it may be detained and prevented from sailing until the necessary remedial action has been taken.

MARPOL addresses six areas of potential marine pollution, via a series of specific annexes as follows:

Annex I: Oil

Annex II: Noxious liquid substances carried in bulk

Annex III: Harmful substances carried in package form

Annex IV: Sewage

Annex V: Garbage

Annex VI: Air Pollution

A number of countries have yet to accede to the sewage and air pollution annexes so they are not in force internationally. Some countries have made the sewage annex apply to their own ships. New Zealand has done so for the Antarctic.

MARPOL sets allowable discharge rules based on where the ship is in relation to land; it also sets aside so-called Special Areas where much more stringent rules apply. The Antarctic Special Area is such a designated area covering all waters south of latitude 60deg S.

NEW HISTORIC SITE IN WESTERN MOUNTAINS

In November last year, during one of the rare days off for the Cape Roberts drilling project team, drilling manager Pat Cooper attempted to find a previously unvisited historic campsite. Following remarks from the book "With Scott — The Silver Lining" by geologist Griffith Taylor, he believed the site would be on a large area of rock known as "The Flat Iron" adjacent to the Mackay Glacier in the Western Mountains. After an exhaustive search he not only found the site but a stone filled metal case containing a note, says *Heritage Hearsay*, newsletter of the NZ Antarctic Heritage Trust (AHT).

Pat, and the small party he had been searching with, were in a remote area with little chance of returning so he elected to photograph and document the site and recover the note which was already well weathered and at risk of complete loss. Approval to return it to New Zealand within the provisions of the Environmental Protocol was gained and the note has now been handed to the AHT.

Historian David Harrowfield has studied the note and he believes it to be in the hand writing of Frank Browning RN.

The short note written on a piece of card appears to read "?? Party are return from ? On W? On Jan . . ."

The writing in blue pencil, is faded with part of the text obscured by marks where it had been in contact with the stones. The note will be assessed and conserved.

MICHAEL BROWN HONOURED

The Dean of Wellington, the Very Reverend Michael Brown was made a Companion of the New Zealand Order of Merit in recent honours announced by the New Zealand government.

Michael Brown has been a member of the Wellington branch of the Antarctic Society for about seven years. He was previously based at Christchurch where he served as Antarctic Chaplain. As Dean of the Wellington Cathedral Rev Brown included the annual church service of the Wellington Branch in his programme several times, and also held a local memorial service for Society members Garth Varcoe and Terry Newport who died in Antarctica in 1991. Michael was honoured for services to the community.

MODERN DAY EXPLORERS AT SCOTT'S HUT

Two modern day veterans of Antarctic exploration met outside Scott's Hut at Cape Evans in February during the visit of Quark Expeditions.

On the left is David "Duke" Harrowfield a prolific New Zealand writer of polar history and an authority on the Heroic Era in the Ross Sea region. On the right is geologist Dr Barrie McKelvey. In the background passengers from the *Kapitan Khlebnikov* can be seen walking along a flagged route across the fast ice of North Bay towards the famous hut. This visit is one of the highlights of polar tourism.

David was working on artifacts in the historic huts, with material conservators and a research student, for the Antarctic Heritage Trust as part of the New Zealand Antarctic Programme. He spent three hours talking to passengers from the expedition showing them features in the hut and adding to the feeling of the place. Passengers very much enjoyed his interpretation and his personality.

Barrie first went to Antarctica as a geology student from Victoria University during the 1957/58 summer. Together with fellow student Peter Webb and also Dick Barwick and Colin Bull, the group played an important role in that first year of modern scientific research and exploration of the Dry Valley region. This year Barrie was a lecturer on the Russian icebreaker *Kapitan Khlebnikov* that is under charter to Quark for polar tourism expeditions.

One of the Quark passengers was John Hooke who was the son of the *Aurora's* radio operator. During a severe



David Harrowfield and Barrie McKelvey at Cape Evans with Kapitan Khlebnikov.

blizzard in the winter of 1915 the *Aurora's* hawsers snapped and the ship was blown off North Beach and trapped in an ice floe. It spent the next 10 months tightly wedged in the drifting pack ice with the crew expecting the worst before they were able to break out of the ice west of the Balleny Islands.

John's Hooke's visit added to the historic atmosphere when he examined one of the anchors the *Aurora* left behind and an old sou'wester cap thought to belong to his father.

Picture and story by Harry Keys, Department of Conservation, Turangi, who was on the February Quark Expedition.

ICE ART ON EXHIBITION

Christchurch residents recently had the opportunity to view two interpretations of the frozen continent on exhibition at present. Paintings by Wellington artist Margaret Elliot were exhibited at the CoCA Gallery and Auckland artist Nigel Brown's works were on display at the Canterbury Museum.

Both artists have been to the ice as participants in the Artists to Antarctica scheme generously supported by Antarctica New Zealand and Creative New Zealand. Nigel Brown and poets Chris Orsman and Bill Manhire travelled to the ice in 1997, the inaugural year of the scheme, while Margaret Elliot and author Margaret Mahy went in 1998.

Brown's work explores the personal narratives unfolding on the ice from the heroic age to Edmund Hillary and continuing to his own experiences, while in Elliot's work the ice itself becomes the central character in the drama creeping inexorably over the land and presenting both smooth and cutting edges to the viewer.



Nigel Brown's work

"As the scheme continues, it will provide the public with a diversity of interpretations continuing to challenge views of the frozen continent and adding another dimension to arts practice in New Zealand," says Antarctica New Zealand chief executive Gillian Wratt.

SERCO SELECTED

SERCO (NZ) Ltd has been selected by Antarctica New Zealand to provide staffing, engineering, field support and domestic services at Scott Base from next year.

The planning and control functions for field operations, capital development and cargo/passenger movements to and from Antarctica will remain with the state owned enterprise. Staff from Antarctica New Zealand will continue to be at Scott Base to oversee the operation of the base and field programme, and to represent the New Zealand government on the ice.

"We are now working with SERCO to reach agreement on the detail of what this will provide," says Antarctica New Zealand. "Subject to negotiation of a contract acceptable to both parties, SERCO will provide Scott Base services beginning October 2000."

YOUNG RESEARCHERS ICE BOUND

Four young scientists with research interests in mosses, penguin parasites, geology and sea ice physics have been awarded this year's post graduate Antarctic Scholarships, administered by Antarctica New Zealand.

The masters and doctorate students, from Waikato, Lincoln and Otago Universities, will travel to Scott Base this summer for research work. Sponsors also provide funding of \$10,000 each to the students, whose proposals were judged outstanding among the 10 applications for the annual awards.

Jonathan Banks of Lincoln University will use a Kelly Tarlton's scholarship to assist the study of penguin lice. Since the lice are totally dependant on their hosts for their survival the relationship between parasites from different penguin species may reveal much about the birds' evolutionary history.

Otago University geologist Sally Beckett will use a New Zealand Post Scholarship to investigate the Frio Shear Zone, a major tectonic boundary in south Victoria Land. The work will allow a re-examination of the current concepts about

the geological nature of the region and its links to New Zealand.

Telecom Payphone scholar, Sarah Hunger of Waikato University, will continue her work investigating the evolution of Antarctic mosses through population genetics.

The Sir Robin Irvine scholarship — funded by Antarctica New Zealand in memory of its first board chairman — was awarded to physicist Inga Smith of Otago

University, where Sir Robin was a Vice-Chancellor. Inga will investigate the mechanisms of platelet ice formation in sea ice.

Antarctica New Zealand chief executive Gillian Wratt said the scholarship scheme was a positive example of how business and science could work together to enhance knowledge, appreciation and conservation of the Antarctic environment.



Students visiting Antarctica on the Certificate in Antarctic Studies course last season.

GATEWAY ANTARCTICA OPENED AT CANTERBURY

The University of Canterbury has established a Centre for Antarctic Studies called "Gateway Antarctica".

The centre will contribute to the increased understanding and more effective management of the Antarctic and Southern Ocean by being a focal point and a catalyst for Antarctic scholarship and attracting national and international participation in collaborative research, analysts, learning and networking.

The centre will also operate a commercial or consultancy arm pursuing contract work of national and international clients.

Included under the Gateway Antarctica centre are:

- The Antarctica New Zealand library now housed in



the university library.

- The International Centre for Antarctica Information and Research (ICAIR).
- The certificate in Antarctic Studies.
- The Stage 1 Antarctic Studies paper.

The board of directors of the new centre is: Associate Professor Steve Weaver (chair)(Geological Sciences); Prof Bob Kirk (pro-vice chancellor, research); Dr Wendy Lawson (Geography); Dr Jane Shearer (research officer); Gillian Wratt (CEO, Antarctica New Zealand); Professor Peter Barrett (director, Antarctic Research Centre, Victor University); Garry Moore (Mayor of Christchurch) and Richard Westlake (South Island manager, Westpac-Trust).

CAPE ROBERTS PROJECT IS 'GO' FOR THIRD SEASON

The third season of the ambitious international Cape Roberts deep-sea drilling project is under way after all participating nations were advised that sufficient depth of ice has built up to allow a return.

Earlier a massive storm had made the drilling location dangerous and project planners delayed their decision on a third season until August.

The storm had caused considerable ice break-out for 20km along the edge of the ice shelf leaving the previous drilling site a tenuous 5km from safety.

Satellite images of the area have been closely studied this winter and there were hopes that the conditions between June-August would become cold enough to allow sea ice to form up to the minimum operating thickness of 1.5m.

Project manager Jim Cowie of Antarctica New Zealand told Antarctic that a teleconference between representatives of the consortia (Britain, United States, Italy, Australia and New Zealand) discussed the conditions on 10 August and agreed to proceed via 'Winfly' in mid-August.

"Temperatures in July were about 3 to 4deg above average mean but there has been reasonable growth in the ice, with a new ice edge formed and there are hopes that it is thick enough in the



The Cape Roberts drilling site last season.

area chosen for the next drill site," he says. The ice shelf currently extends some 22km offshore.

The area south of the site is believed to be "a good deal thinner and younger".

On arrival an advance party will check the "ground truth" of the situation. The project has always been based on an assumption that weather patterns may force postponement at any time.

After a ground inspection, the party will prepare at Scott Base for the main contingents and in early September will start assembly of the drilling platform on a location 600-700m out on the ice from Cape Roberts. The new location is closer to land than the two previous sites at 14kms offshore and aims to pick up new layers.

The target is to achieve 700m of core sample (624m last year) in one season for Cowie says the water depth on the new site is much deeper at 320m and technically more difficult. He confirms that there is a strong tidal flow under the ice shelf, which in 220m water depth last year was faster than expected. "The water is not immobile but we hope the tidal movement will abate."

The project aims to study the record of earlier glacial movements as a way of understanding ancient climate changes and tectonic structures. It attracted huge international attention when the team found evidence of volcanic eruptions 25 million years ago that were as big as Krakatoa in Indonesia and which would have affected global climate.

SUMMER CRUISES TO SOUTHERN OCEAN

Christchurch-based Heritage Expeditions (NZ) Ltd, a leading Antarctic tourism operator, plans to offer several cruises South this summer. Two expeditions 'The Galapagos of Antarctica' (19 November-1 December 1999 to Campbell Is, Macquaries Is and Auckland Is) and 'Birding DownUnder' (5-22 December 1999 to the sub-Antarctic Is) are ideal for those interested in endemic and pelagic birds of the region.

Two Antarctic expeditions 'South to Antarctica' (4 January-4 February 2000 aboard the Akademik Shokalskiy) and 'In the Footsteps of Scott and Shackleton' (3-26 February-2000) celebrate 100 years of Antarctic expeditions and, says managing director Rodney Russ "in particular the very first expedition to overwinter, the Southern Cross Expedition of 1899-1900. Russ is also organising the 'Celebrating the new Millennium' cruise to Chatham Is and then south to the Bounty Is and Antipodes Is on the polar research vessel Akademik Shokalskiy.

ANTARCTIC TREATY MEETING IN LIMA

Unregulated and illegal fishing of toothfish was a significant topic on the agenda at the XXIII Antarctic Treaty Consultative Meeting held in Lima.

A strong message came from the meeting supporting CCAMLR work on catch certification.

Policy issues related to liability for environmental damage was discussed by a working party chaired by Don McKay of the New Zealand Ministry of Foreign Affairs.

This year was the second meeting of the Committee on Environmental Protection (CEP) which provides advice to the ATCM on the implementation of the Environmental

Protocol. The CEP adopted guidelines on environmental impact assessment, requested work from SCAR on an Antarctic state of the environment report and made progress on further development of the protected area system, says Antarctica New Zealand.

New Zealand tabled a paper outlining a proposal for a large protected area around Balleny Islands in the northern Ross Sea.

Gillian Wratt, CEO of Antarctica New Zealand was appointed vice chair of the CEP along with Jorge Beguno of Chile.

The committee is chaired by Norway's Olav Orheim.

NAVY IN DEFENCE OF THE TOOTHFISH

The Patagonian toothfish has many aliases. It is known to some scientists as *Dissostichus eleginoides*, to others it's *Dissostichus mawsoni*. The Americans call it Chilean sea bass and the Japanese, mero, but no matter what name it goes under this fish can grow to two metres in length and live to a ripe old age of 50 years if not caught for the lucrative markets of Europe, the United States and the Far East.

It commands a wholesale price of NZ\$10,000 per tonne, but you won't find its succulent delicate white flesh on the slabs of your local fish shop. The relatively small New Zealand catch, about 250 tonnes annually, of this big-eyed denizen of Antarctic waters, is all exported.

It is such a highly prized food fish that international pirate operations are now flourishing in many parts of the Southern Oceans and various intelligence sources suggest that it won't be long before they start to plunder areas to the south of New Zealand, especially the Ross Sea.

"The toothfish exploitation issue highlighted the potential weakness of the regime set in place to manage such fishing in the Southern Ocean by the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), says Stuart Prior, former director of the Antarctic Policy Unit at the Ministry of Foreign Affairs and Trade, "but more particularly for us, it highlighted certain vulnerabilities to our own Exclusive Economic Zone (EEZ) from the waters to the south.

"For the first years of managing our EEZ we were looking to the north. Threats to the EEZ would come from vessels from the north and the toothfish alerted us to the likelihood that pressure could come from the south.

"And that," he says, "immediately had a New Zealand Defence Force (NZDF) interest in strategic thinking because of the lack of involvement of the Defence Force, not just south of 60 deg south, but really south of New Zealand."

The toothfish saga took on a New Zealand flavour when New Zealand companies started to take an interest in the toothfish and invest in that fishery.

Mr Prior says, the reasons for New Zealand's interest became more pressing with the development of pirate fishing and the strong indication late last year that pirate vessels might, in fact, move into the Ross Sea.

"The known pirating activities were taking place in EEZs in the waters around sub-Antarctic Islands, and their metropolitan countries, South Africa, France and Australia were having to deal with that challenge just as we would if the EEZ was being breached around New Zealand. Both France and Australia have put considerable resources and effort in trying to find and dissuade the poachers," he says.

The French have two naval vessels patrolling the Kerguelen/Crozet area and Australia sent two task forces to Heard and McDonald Islands arresting three vessels.

RSA Review editor Bill Hopper reports on the search for the toothfish plunderers

Since then, they have set in place a surveillance programme to which some public reference has been made, but it is basically a secret surveillance.

The Australian Fisheries Management Authority's patrol ship *Cape Grafton* has also visited the remote French station on Kerguelen Island, which, together with Heard, are part of the Kerguelen Plateau in the South Indian Ocean on which Australia and France have adjoining EEZs and fishing interests.

Australia's Minister of Foreign Affairs, Alexander Downer says, "This action reflects the cooperative approach that both countries are taking to address the problem of illegal, unregulated and unreported fishing in the sub-Antarctic."

"These measures have obviously put some pressure on the pirate fleets," says Mr Prior.

Research undertaken by New Zealand, with information coming from various sources, including the fishing industry, had enabled a picture of the illicit fishing to be developed which showed where it was concentrated, but most importantly, who was doing it. "And, the "who" part



'Te Kaha' patrolled the Southern Ocean in search of pirate fishing vessels.

of the equation, shows that it was basically companies and nationals coming from countries which were signed up members of the CCAMLR," he says.

The bulk of the illicit fishing, although not condoned by the governments concerned, has been taking place from within the organisation which set itself up to provide stewardship of the area. "But that does not absolve those governments of responsibility," says Mr Prior.

CCAMLR is set in place to manage the Southern Ocean. Its regime to manage the fisheries is precautionary based so as not to damage the Antarctic environment. Those fishing in accordance with CCAMLR rules and conditions catch 12-15,000 tonnes of toothfish a year and at one point the illegal fishery was taking 10 to 12 times the legal catch. "Now it has probably fallen back to a factor of two to three times," says Mr Prior.

He says, not only are the pirate catches greatly in excess of the norms set by the CCAMLR convention, there are

companies and citizens of CCAMLR parties using all the tricks in the book to hide their origin. "It is very clearly the responsibility of those countries to take action on a national basis to honour their obligations to the Antarctic agreements they have signed because the Antarctic Treaty system is based on the idea that each country will exert effective authority over its own citizens."

Mr Prior says the illicit activity is carried out without any regard for the environment. "Where that has a particular impact is that toothfish fishing is long-lining, a method, which if not very carefully managed and properly controlled, results in very large mortality of sea birds."

"Looking at the problem from a whole Antarctic perspective you have a significant fishery in terms of numbers of vessels and major destruction of sea birds. If you look at it from a particular New Zealand perspective, you have a situation in which an uncontrolled fishery is affecting bird populations on our sub-Antarctic islands because the albatross and other birds can be snared on the long-lines well outside the Antarctic Treaty area."

Mr Prior says, the Antarctic Treaty system and CCAMLR are worth supporting. "They're key international agreements for managing Antarctica and protecting New Zealand's interests in the Ross Dependency. We have a very strong interest in what happens down there in making sure that the CCAMLR regime is upheld."

"The most effective way of approaching the problem is to bring the spotlight to bear on it — if there are pirate vessels, let's see them in all their glory!"

Mr Prior says, with our own work on toothfish, and analysis of what was happening, there seemed to be strong possibilities for tackling the problem head-on. "But that needed a bit of creative and realistic thinking, and that is where last year our discussions, which included the New Zealand Defence Force, evolved."

"We had credible information about groups of pirate vessels looking at heading into the Ross Sea and we also had information from fishing industry sources which suggested that people were already confident enough to be offering Ross Sea toothfish for sale and seeking buyers on the European market."

"We were extremely pleased by the way NZDF looked seriously at the issue."

And so Operation Mawsoni, a joint Air Force and Navy operation, was spawned.

"We sat down with Foreign Affairs and worked through what we wanted to achieve," says NZDF Director of Joint Operations and Plans, Captain Eric Good, RNZN.

"Normally in a fisheries operation we go in with an element of surprise to actually catch them. In this case the national strategy was to go down there, catch people in the act of conducting illegal fisheries and then, as a political

imperative, show photographs and evidence to the world media. The task was to project New Zealand's foreign policy out into the world through the media."

The operation initially involved No.5 Squadron RNZAF flying P3 Orion maritime surveillance aircraft south out of Dunedin.

Flight Lieutenant Rob Ovenden, aircraft captain for several of the sorties says from mid-January until early March the squadron flew 15 patrols, starting at about 60 deg south latitude and going down to 74 deg south.

"60 south is about the northern edge of where you'd find toothfish and we covered quite a wide area from south of Tasmania and across towards the east."

"Between 60 and 65 south we could normally get about five hours on station, at 70 south you are looking at about three hours and 74 about an hour."

Flt Lt Ovenden says they took extra survival equipment with them. Two-man survival packs that No.40 Squadron use when they fly down to the Ice and Antarctic cold weather clothing from the Antarctic Centre in Christchurch, "just in case of an eventuality that required us either to ditch in the sea, land on the Antarctic Continent or go down to McMurdo."

"McMurdo was only an extreme emergency alternative. We would only have gone there if there was no where else to go, it was the closest airfield if, for instance, the aircraft caught fire."

"I had to shut an engine down on one of the patrols right down at

70 south, but the problem was not sufficient to go to McMurdo. We were easily able to come back to Dunedin," he says

The transits were a bit tedious but the patrols themselves interesting, "plenty to look at as regards the icebergs, and the weather was most certainly interesting."

The patrols were conducted at between three and 12,000 feet depending on the weather and also on the density of icebergs. All the fishing contacts found in the patrol area were investigated. "They were few and far between. We found nothing that shouldn't be there," he says. "But we did say, "Giddy" to a New Zealand boat, *Janas*, that was licensed to fish in the Ross Sea".

The second stage of Operation Mawsoni was the deployment of *HMNZS Te Kaha* to the Ross Sea.

Commander Ross Smith, the frigate's CO, says their patrol area extended south from 60 deg. "We got to almost 64 South but very bad weather and the fact we were in moderate iceberg territory, together with high winds and big seas, kept us reasonably at bay."

The frigate spent five days in the patrol area experiencing some 36 hours of extreme weather. "We were operating in sea state 9, that is waves 14 metres and above with wind speeds of 50/60 knots (92/111kmh)," says Cdr Smith. "The highest recorded on the bridge was 75 knots (139kmh)."

Continued on page 24



Inspection of passing ship by P3 Orion aircraft of the Royal New Zealand Air Force.

PRIVATE FINANCE FOR NEW RESEARCH SHIP

The British Antarctic Survey (BAS) and its parent body the Natural Environment Research Council (NERC), have concluded what is believed to be the first ever Private Finance Initiative shipping contract.

The contract is with the Norwegian Rieber Shipping AS/Polar Holding ASA. The BAS will take delivery of the ice-strengthened ship *Polar Queen* in August for use in its annual re-supply of research stations as well as for scientific surveys. The stg30M ship, which replaces the 30 year old Royal Research Ship (RRS) *Bransfield*, will be renamed *Ernest Shackleton*.

The innovative contract with Rieber enables BAS to operate the ship for 15-20 years under a bare-boat charter using BAS crew during the Antarctic summer season (October - May). When not in Antarctic service the ship will be chartered back to Rieber for commercial work. This solution makes full utilisation of the ship and provides better value for both the UK taxpayer

and Rieber Shipping than through a conventional procurement.

The *Polar Queen*, designed and built by Rieber Shipping in Norway in 1995, has a well proven capability for polar logistic and scientific work.

In recent years German, Scandinavian and Australian national Antarctic research programmes have chartered her for Antarctic work.

Professor Chris Rapley, Director of BAS, said "The new vessel will enable BAS to ensure that the UK's presence in Antarctic scientific research will be maintained at a high level and at an affordable cost in one of the most sensitive and fascinating regions of the world. RRS *Bransfield* can retire gracefully after a distinguished service in the often hostile conditions of the Antarctic".

The British Antarctic Survey has operated RRS *Bransfield* in Antarctica since 1971, the ship has covered around 800,000 nautical miles. The British Antarctic Survey (BAS) is responsible for almost all of the

British Government's scientific research in the Antarctic, South Georgia, and the South Sandwich Islands. Financial support comes through NERC from the Office of Science and Technology. All aspects of the research programme are organised from the BAS headquarters in Cambridge. Website: <http://www.nerc-bas.ac.uk>

The Natural Environment Research Council is the leading body in the UK for research, survey, monitoring and training in the environmental sciences. NERC funds research in universities and in its own Centres, Surveys and Units. NERC website: <http://www.nerc.ac.uk> Rieber Shipping AS/Polar Holding A/S was originally established 120 years ago, and has operated vessels since the 1930's. In 1956 the company undertook its first Antarctic expedition charter.

In 1973 the company ordered the first of a series of purpose-built, modern icebreaking ships for Antarctic and Arctic expeditions.

CELEBRATING ANTARCTICA'S HEROIC AGE

In the last 100 years Antarctica has grown in world importance from the last great unknown wilderness to the largest science laboratory in the world. Much of this impressive development can be traced back to the exploits of those heroic leaders of expeditions to the white wilderness.

With the centenary of the sailing of Captain Scott's first Antarctic expedition due in 2001 a group of organisations have decided to celebrate the links between then and now with a series of major national and international activities. In particular they wish to generate wider public interest in the achievements of these expeditions, one of which will shortly feature as a Hollywood epic on the remarkable exploits of Ernest Shackleton.

Starting in Dundee in 2001, with a range of special events organised around Scott's ship *Discovery*, and broadening to link arts and science, Britain and many other European countries, the celebrations will look at

the achievements of these men from the Heroic Age and what their contribution has been to our modern understanding and use of the Antarctic.

Planning is well advanced for events in 2002 commemorating the Scottish National Antarctic Expedition, led by William Bruce. Lectures, film shows, exhibitions, expeditions, books and even commemorative postage stamps will all provide reminders of our adventurous past.

The organisations collaborating in planning these activities have called the initiative ANTARCTICA 100 and include those concerned with geographical, scientific, artistic, heritage and educational fields.

The following organizations are the founding members of ANTARCTICA 100:

- British Antarctic Survey
- Cheltenham Art Gallery & Museum Dundee Heritage Trust
- Government of the British Antarctic Territory
- James Caird Society

- National Maritime Museum
- National Museum of Scotland
- Royal Geographical Society (with the Institute of British Geographers)
- Royal Scottish Geographical Society
- The Captain Scott Society
- The Oates Memorial Library
- Scott Polar Research Institute
- UK Antarctic Heritage Trust

KEY BRITISH EXPEDITIONS

1901-1904 British National Antarctic Expedition. Robert Falcon Scott (*Discovery*). The first extensive exploration on land in Antarctica.

1902-1904 Scottish National Antarctic Expedition. Dr William Bruce (*Scotia*). First oceanographic exploration of the Weddell Sea.

1907-1909 British Antarctic Expedition. Ernest Henry Shackleton's expedition (*Nimrod*). Wintered at Cape Royds on

Continued on page 18

'AN EXTRAORDINARY RANGE OF WORK'

An extraordinary range of work is being undertaken in Antarctica by the British Antarctic Survey, says BAS director Professor Chris Rapley.

The current programme in its third year operates under the following headings:

- Iced cover and climate
- Energy flow and dissipation in geo space.
- Geological history of Antarctica
- Structure and dynamics of the Southern Ocean ecosystem.
- Dynamics of Antarctic terrestrial and freshwater ecosystems.

Work is also carried out on geographic information and mapping and in studying humans in isolated polar communities.

Rapley says such a broad research agenda is unique for a single organization in the UK and unusual worldwide. "It offers the possibility of powerful interdisciplinary interaction and synthesis, a potential which is exploited effectively in a number of projects presently but which will be emphasised more in the future.

Special highlights include:

- The discovery from a 40-year time series of radio sounding data over the Argentine Islands that the ionosphere has dropped 8km, consistent with the upper atmospheric cooling anticipated as a consequence of increased atmospheric carbon dioxide concentrations.
- Indications from maritime and lake cores that in spite of widespread evidence that climate variability has been unusually low globally over the last 10,000 years, this has not been the case in the region of the Antarctic Peninsula. Some 2500-4000 years ago the region was significantly warmer and wetter than it is now.
- Evidence from shallow ice cores that the 2.5°C temperature rise which has occurred over the last 50 years — the most rapid and intense regional warming signal on Earth — is pervasive and is associated with a significant increase in regional snow accumulation rates and changes in regional atmospheric circulation.
- The stability of Antarctic ice shelves. The application of this to explaining the recent disintegration

RESOLVING PRESSING ISSUES FOR EARTH

The study of Antarctica — despite its remoteness — is integral to the Earth System and to resolving some of the most pressing issues in Earth System science, the director of the British Antarctic Survey, Professor Chris Rapley says in his annual report on 1997-98.

"The southern continent's ice and sediment cores provide crucial insights into the potential behaviour of the world's climate system as it responds to the range of human pressures known collectively as Global Change. Antarctic bottom water permeates vast areas of the global ocean, with a poorly understood influence on the thermohaline circulation of the ocean and the associated poleward transport of heat.

"Studies of the dynamics and mass balance of the Antarctica ice sheet are fundamental to the prediction of future global mean sea level and its impact on the half of humanity who live in the coastal zone.

"Despite the gradually reducing concentrations of ozone-destroying, synthetic compounds in the lower atmosphere, Antarctic springtime

ozone depletion remains as severe as ever, with ongoing impacts on Antarctic terrestrial and marine ecosystems.

"Research and monitoring, being carried out to underpin the commitments made through the Antarctic Treaty system, to the protection and preservation of Antarctica's pristine environment and to sustaining its living resources, form the cutting edge of approaches to "environmental protection" and "sustainable development."

Rapley adds that Antarctica lies at the heart of investigations into the mechanisms of continental break-up, since its surrounding oceans include prime examples of some of the most important phenomena of plate tectonics and lithosphere-mantle interactions.

He says the location of the continent above the South Magnetic Pole makes it an ideal platform for investigating the behaviour of ionised plasma in geo-space and studying solar-terrestrial interactions.

"It is apparent that Antarctica is emphatically a continent for science."

of Larsen "A" Ice Shelf and assessing the future stability of other major ice shelves under potential threat.

- The acquisition through the first Ocean Drilling Programme campaign in Antarctica of a 10 million year record of Antarctic glacial history and the vindication of the use of the continental shelf and rise sediments to reveal such information.
- The daring and innovative deployment, as part of an international collaboration, of the Cape Roberts drill rig on sea, in spite of being forced ultimately to withdraw by poor weather and ice conditions.
- The commissioning, testing, and first 9000 year core extraction of the European project for Ice Coring in Antarctica at Dome C.
- Following up the detection of significant losses of albatross as a result of long-line fishing activities, the demonstration of measures, which significantly reduce seabird mortality, with small impact on fishing costs and catch.

BAS IN TOP ECHELON

A benchmarking exercise has indicated that the British Antarctic Survey lies within the top four of the world's Antarctic operators in terms of cost effectiveness and delivering science.

BAS director Chris Rapley says the success of a research programme so broad in scientific range and so extensive in geographic coverage, executed at 'the other end of the Earth' in one of the most challenging environments on the planet, requires a very special degree of skill, organization and commitment on the part of operational and logistical teams.

"The BAS operation is not only lean and mean but innovative and forward thinking," he says, citing as an example the commissioning of containerised laboratories and purpose-built equipment to permit a research cruise by HMS *Endurance* to occur.

HALLEY STATION

Halley Station is one of the most important science outposts on the Antarctic continent. It is also one of the most frequently rebuilt. Such is the extreme nature of the Brunt Ice Shelf environment that blizzards and snow drifts eventually bury everything.

Buildings disappear beneath the snow, requiring, says the British Antarctic Survey, ever-lengthening vertical shafts to provide access to the outside world.

"Because of burial by snow and the movement of the ice shelf, it was necessary to replace and resite the first Halley Station in 1967 and subsequent stations in 1973, 1983 and 1992, all being abandoned before being crushed by the weight of overlying snow."

A new briefing document by BAS explains why the British rebuilt Halley. Studies conducted there are crucial, says BAS, for "a global perspective on ozone depletion, atmospheric pollution, sea level rise and climate change."

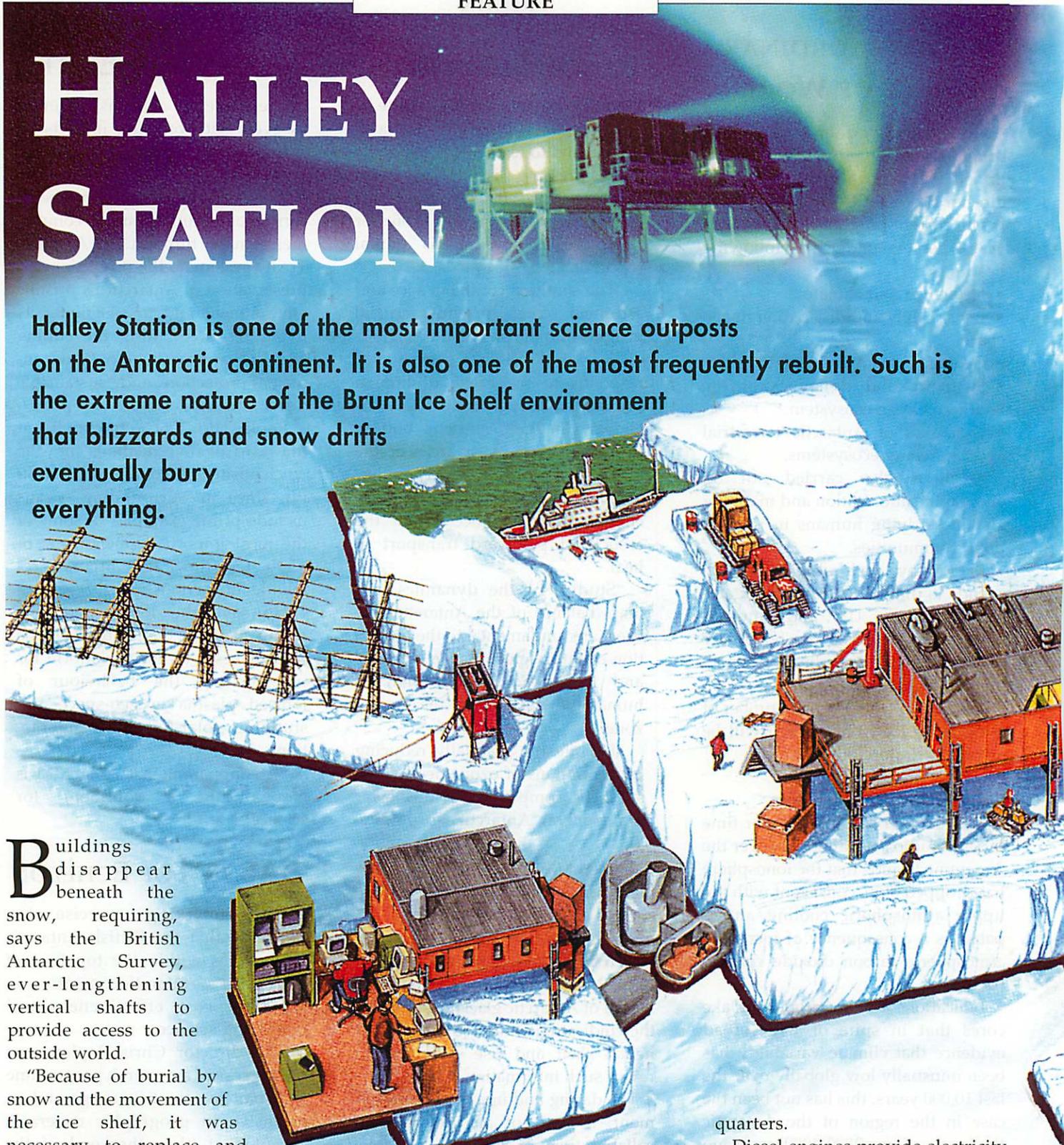
Halley 5 took six years to make from drawing board to commissioning in February 1992. Its three main buildings sit 4m above the snow on independent jackable steel platforms. The largest, the Laws Building, 59m long, 14.6m wide and 3m high, is used for accommodation with three sections (services/technical, living area, sleeping

quarters.

Diesel engines provide electricity and waste heat warms the buildings and melts snow to provide water. The living area includes a darkroom lounge, library, dining room, kitchen, computer room, base commander's office, communications room, recreation room, storage areas, washrooms, hospital and surgery. There are 20 individual bedrooms for a winter base complement of 18 with eight scientists, one doctor and nine support staff.

Summer visitors are housed in the Drewery Building, a self-contained structure on skis that is towed to a fresh site each year to avoid burial and also serves as an emergency refuge.

The smaller Simpson Building (meteorology and ozone studies) and Piggott Building (upper atmospheric sciences)

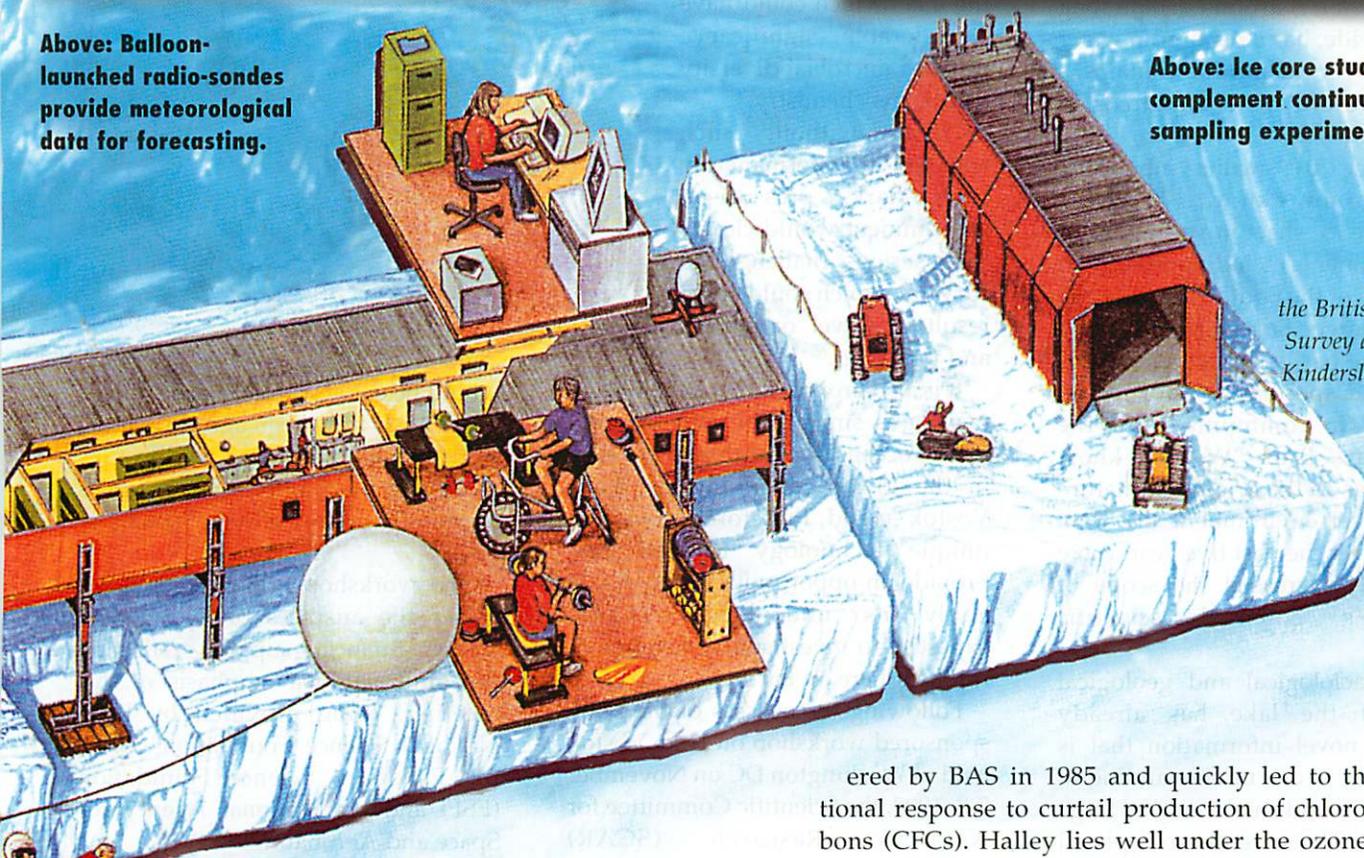




Above: Balloon-launched radio-sondes provide meteorological data for forecasting.



Above: Ice core studies complement continuous air sampling experiments



Courtesy of the British Antarctic Survey and Dorling Kindersley (graphic)

house specialist laboratories.

The height of the platforms affects the local wind turbulence and the build-up of drifting snow. Each summer they are raised about one metre to compensate for the accumulated snow; the supporting legs can be altered to realign to the flow of the ice shelf.

BAS meteorologists take advantage of the flatness of the ice shelf to study the dynamics of the atmosphere close to the ground. This research is improving the representation of high latitude processes in global circulation models used for climate modelling.

Meteorological data has been collected daily at Halley since 1956 and is sent by geostationary satellite (Meteosat) to weather forecasting centres in the Northern Hemisphere. Halley and a dozen other stations in east Antarctica provide a climate database for an area larger than Europe.

This data supplements a programme on atmospheric chemistry supporting the work of glaciologists who use ice cores to study past climate.

Ozone has also been monitored at Halley since 1956. A spring-time depletion in stratospheric ozone was discov-

ered by BAS in 1985 and quickly led to the international response to curtail production of chlorofluorocarbons (CFCs). Halley lies well under the ozone hole and houses instruments monitoring key chemical constituents of the stratosphere.

Lying at the edge of the southern auroral zone, Halley is ideally situated for geo-space research, the Southern Hemisphere Auroral Radar Experiment providing an unparalleled spatial picture of geo-space interactions in the upper atmosphere (above 100km altitude) over an area of around 3 million sq km of geo-space over the South Pole.

Halley Station provides state of the art computing and digital communications facilities for BAS participation in the NASA Global Geo-space Science mission involving many spacecraft. BAS is one of only four ground-based teams worldwide contributing to the mission. Halley is also the focus for a network of four unmanned automated geophysical weather stations.

Once a year Halley Station is resupplied by ship. Cargo is normally offloaded onto sledges on the sea ice and towed by tracked vehicles up ramps of drifted snow onto the ice shelf and 15kms inland to the station.

In 1998 RRS *Bransfield* and the summer team arrived on 21 December, relieving Halley from Mobster Creek, 20km north of the station in seven days, returning 11-14 February.

HUGE FRESHWATER LAKE BELOW VOSTOK STATION

One of the largest (10,000km²) freshwater bodies in the world has been identified beneath the 4km thick ice sheet of Eastern Antarctica in the vicinity of the Russian Vostok Station.

Lake Vostok is around 230km long by 50km wide, has a maximum water depth of over 500m and contains a sediment record up to hundreds of metres thick.

A further 70+ smaller sub-glacial lakes are now known to occur beneath the ice sheet in various parts of the continent, including several in the vicinity of the South Pole, says the British Antarctic Survey (BAS).

"The lake has generated enormous interest and speculation both within the scientific community and the media," says BAS. "We still know very little as to the origin and nature of this novel environment but data collected over the past five years have significantly increased the scope of the lake's potential scientific relevance.

"The glaciological and geological setting of the lake has already generated novel information that is contributing to our understanding of the structure and movement of large ice sheets. The recently completed multi-national ice coring project at Vostok Station has provided further information on the nature of the ice cover overlying the lake and demonstrated the presence of ancient viable micro-organisms in the ice core that could feasibly be a source of propagules to the underlying water body."

Recent Russian research has raised the possibility that Lake Vostok may have a rift valley setting similar to Lake Baikal. Establishing an origin from extensional tectonics would clearly have considerable relevance to the debate on the geological evolution of Antarctica. A rift valley origin would also raise the possibility of elevated heat flow and even hydrothermal vents.

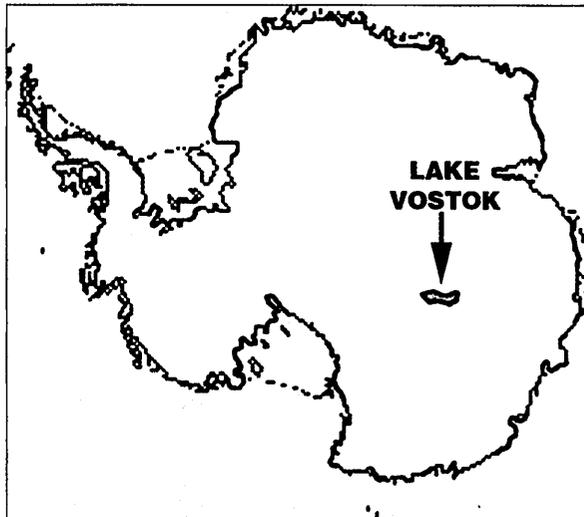
Both of these features could have profound consequences for biodiversity in the lake and the broader evolution of life debate, which has already been stimulated by findings

from the marine abyssal environment, says BAS. "The presence of gas, hydrates in the overlying ice sheet suggests that clathrates may exist within the lake, which could have considerable significance for both microbial diversity and biogeochemistry.

"Even without such features, the permanently cold, dark, pressurised environment would clearly offer serious challenges to survival, which could again result in novel organisms and processes."

It is also proposed that Lake Vostok may have similarities with the sub-glacial oceans that are thought to exist in the Jovian moon Europa. Lake Vostok could therefore provide a unique technology test-bed and provide an opportunity for NASA to apply its undoubted technical expertise to investigate a novel environment here on Earth.

Following the success of the NSF-sponsored workshop on Lake Vostok held in Washington DC on November 7-8, 1998, the Scientific Committee for Antarctic Research (SCAR)



announced that a further workshop would be convened in Europe during 1999. It has now been agreed that the British Antarctic Survey will host his workshop in Cambridge, 50 miles north of London, between September 25-28.

The workshop is being convened under the auspices of SCAR with further financial support, reflecting the multi-national emphasis of this meeting, being provided by BAS, National Science Foundation (NSF), the European Science Foundation (ESF) and the National Agency for Space and Aeronautics (NASA).

AUSTRALIA

AUSTRALIA – BUDGET FOR 1999-2000

The Australian Government has allocated \$95.3m to the Commonwealth's Antarctic programme for the 99/2000 year.

The money is expected to fund ongoing research and conservation efforts as well as new transport arrangements.

A scoping study looking at air transport options between Australia and Antarctica was due to be completed at the end of July.

Continuing high quality marine research was vital if Australia was to maintain its efforts to secure international agreement on conservation measures and to ensure harvesting of the regions resources occurs in a

sustainable manner, Environment Minister Senator Robert Hill said.

"Better knowledge of the Southern Ocean area, including the sea ice zone, is also required to develop our understanding of the important role Antarctica plays in the global climate and weather systems."

Senator Hill said further funding will be set aside in 2000-01 to enable the Australian Antarctic Division to put in place new shipping arrangements when the current charter of the icebreaker, *Aurora Australis*, expires next year.

The shipping tender process will examine multi-ship options, in keeping with the Government's

election commitment to examine more flexible and efficient operational support for the Antarctic Program.

Senator Hill also said the Government would continue its vigilance and efforts to protect the Australian fishing zone around Heard Island from illegal fishing.

SUMMER TEAM TO MAWSON'S HUTS

Planning is well advanced for the second AAP Mawson's Huts Foundation conservation expedition, reports the Antarctic Heritage Trust.

The 10-strong team is scheduled to leave Hobart late in October to take advantage of this usually calmer period at the "Home of the Blizzard".

The expedition's work will follow the Conservation Management Plan now almost completed by Sydney heritage architects, Godden Mackay Logan.

Planning has also been assisted by temperature and relative humidity data from monitoring equipment set up in Mawson's Main Hut last January, says the Trust.

Transport to and from Cape Denison became a difficulty when plans to use the supply ship *Aurora Australis* had to be scrapped after changes to scientific and logistic priorities following a series of mishaps last season.

Negotiations have been under way for the party to be dropped by the *Kapitan Khlebnikov* when it resupplies Australia's Casey Station in November and for a pick up by the French ship *L'Astrolabe* on its return from Dumont d'Urville in early January.

MID-WINTER MERCY FLIGHT BY STARLIFTER



The crew of the Starlifter, Sgt Paul Zukoski (left); Capt. Keith Lowman; Lt-Col Chris Solos and Major Greg Pike.

Essential drugs and medical equipment were air-dropped at Amundsen-Scott station last month in a risky flight to help a woman with suspected breast cancer.

After consulting several medical experts in the United States, officials of the National Science Foundation (NSF) determined that an air drop of medical supplies was the best option immediately available to treat a woman "wintering over" at Amundsen-Scott South Pole station. The researcher recently discovered a lump in her breast and is unable to leave base until October.

Six bundles were air-dropped by a C-141 StarLifter which left from Christchurch on July 11. The trip took over 14 hours and the drop was carried out in total darkness in temperatures averaging minus 67deg. The bundles contained essential medicines and two full sets of medical diagnostic equipment including ultra-sound scanners. Unfortunately the ultra-sound equipment was damaged beyond repair on impact, but other medicines and new video conferencing gear which will help doctors communicate with medical experts were intact.

The package also contained fresh fruit and vegetables and mail for other staff.

Staff on the ground had between five and seven minutes to pick up the bundles before they froze. The bundles were marked with strobe and chemical lights.

The StarLifter carried 25 personnel on the journey, including a double air crew for the long flight and a doctor to treat any hypothermia suffered by aircrew when the doors were opened. The StarLifter skimmed the frozen continent just 300m above surface.

The air-crew told reporters on their

return that it was the most satisfying mission they had flown.

The 47 year old woman, is a US citizen employed by Antarctic Support Associates (ASA) in Englewood, Colorado. Medical experts were contacted immediately and were provided information about the patient through a satellite communications link, so they could assess the threat to her health. After a thorough review of the information, the patient and her physicians decided on a course of drug treatment that they considered appropriate to maintain her health and safety. The National Science Foundation in consultation with the US Airforce, decided that it would be possible to fly an aircraft to the South Pole station to deliver the necessary medical supplies.

The extreme conditions at the Pole during the austral winter — with low temperatures averaging 80 degrees below zero Fahrenheit, and almost absolute darkness — made this a challenging flight for both the aircrew and the aircraft. The NSF says it is grateful to the Air Force for supporting and undertaking this difficult, but necessary, humanitarian mission, as well as for the support received from ASA, the National Cancer Institute, NASA and several physician advisors in the private sector.

NSF through the US Antarctic Program (USAP), operates three scientific stations on the Antarctic continent; Amundsen-Scott, McMurdo, on the Ross Sea; and Palmer, on the Antarctic Peninsula. ASA provides logistical support to the scientific mission of the USAP. Personnel who are selected to spend the winter months at the South Pole are screened for medical conditions that might require treatment beyond that which the station clinic is capable of providing.

80TH BIRTHDAY FOR SIR 'ED' HILLARY

New Zealand's living icon, the "Conqueror of Everest" and Trans-Antarctic explorer Sir Edmund Hillary has been cutting cake rather than ice steps during recent weeks.

Sir Edmund turned 80 years of age in July and celebrations have been held for the great New Zealander in several places.

At a glittering party held in the ballroom at Government House, Wellington, the celebrated guest of honour was surrounded by friends, family and dignitaries as well as a hefty media contingent when Governor-General Sir Michael Hardie-Boys hosted a national birthday party.

A message of congratulations sent by Her Majesty Queen Elizabeth and Prince Philip came in recognition of the special place held by Sir 'Ed' in the hearts of the Royal Family. . . it was at the time of the Coronation in 1953 that Hillary ascended the summit of Mt Everest.

At the birthday function, Sir Edmund's legendary self-deprecation — the attitude that produced the now-famous "We knocked the bugger off" quote as he descended Everest and met George Lowe — was still evident as he told guests he felt he "epitomised the average New Zealander".

"I have average abilities which I combine with a great deal of determination and I quite like to succeed."

Sir Edmund said his life had been very busy since he was a teenager and it continued to be so. "I had a grandfather who felt he had lived a full life at 60 years of age. He retired and went to bed for the next 37 years."

Visiting Christchurch in August as the guest of the Royal New Zealand Foundation for the Blind, Sir Edmund spoke to a packed audience at the Christchurch Casino of his life-long work in the Himalayas. It provided some unique insights into the man's great depth of humanity.

During this event, a charity auction, coupled with seat sales, raised a combined \$19,000 for the Foundation. The items auctioned included an original sketch by Sir Edmund of Mt Everest and an autographed copy of his latest book: "A View from the Summit."

Donated by Antarctica New Zealand were Margaret Elliott's oil on board painting of "A Day at the Beach", Nigel Brown's oil on paper painting "A Conversation between Hillary and Shackleton 1999" (featured recently on the cover of "Antarctic"), Colin Monteath posters of Adelie Penguins and a limited edition facsimile copy with original Nigel Brown cover book of poetry by Chris Orsman, Bill Manhire



Sir Edmund (centre) with a cheque for the Royal New Zealand Foundation for the Blind.



Sir Edmund Hillary with the Hägglund that bears his name.

and Nigel Brown.

A champagne flight on Pionair's DC 3 and two framed commemorative covers of the 1957-58 Transantarctic crossing were also auctioned.

HILLARY LENDS NAME TO RIDE 1

Ice explorer Sir Edmund Hillary has provided his name for the new Hägglund all-terrain vehicle Ride 1 at the Visitor Centre at the International Antarctic Centre in Christchurch.

"We certainly didn't have anything like this when I was crossing Antarctica on a Ferguson tractor," Sir Edmund joked with a party of visiting school children.

The Antarctic Hägglund Ride will be formally opened on 18 September 1999 adding another exciting dimension to the Visitor Centre. The vehicle ride will be the only one of its type in the world around a working Antarctic Campus and will follow in the footsteps of modern day ice adventurers.

The Hägglund is the Swedish tracked vehicle used in Antarctica by the US Antarctic Programme and New Zealand Antarctic Programme and it is in genuine Antarctic condition apart from the installation of video monitors and minor modifications to permit better comfort and viewing.

The Hägglund can carry up to 16 passengers. It will depart from the front of the Antarctic Centre on the hour during the day every hour, 7 days a week. The passengers will be first driven to the American Clothing Warehouse where they will see how people are kitted out with survival gear for their visit to the ice. Up to four layers of clothing!

Passengers will then view inside the Antarctic Departure Terminal where scientists and support staff travelling to Antarctica are checked in and attend crew briefings. The tour will then proceed to the Hägglund Adventure Course, laid out to put the all-terrain Hägglund through its paces.

TALES OF ADVENTURE

The exploration of Earth's last great wilderness, the Antarctic, has resulted in many tales of extraordinary adventure recounted by the brave souls who have embarked on Polar exploration and survived to tell the tale. In the last *Antarctic* journal, Colin Monteath reviewed "Alone across Antarctica". In this issue he talks about other favourite tales of ice travel, some treacherous and others not quite so daring!

From the first half of the century it is hard to go past Roald Amundsen's "The South Pole" — John Murray, London 1912. This was the first expedition to reach the Geographic South Pole and the straightforward evocative writing (a translation) just oozes professionalism. It tells a story of ruthless planning, which, combined with an experienced team made the trip a relatively straight-forward affair.

Almost on a par with Cherry-Garrard's "The Worst Journey in the World" is Raymond Priestly's "Antarctic Adventure" — Fisher Unwin, London, 1914. Though not a private expedition Priestly's book describes one of the ultimate Antarctic adventures — an epic winter in a snowcave in north Victoria Land. Also of importance is Frank Worsely's "Endurance" — Phillip Allan, London, 1931, an astounding act of navigation to reach South Georgia under near impossible conditions — a book which is so much better than Shackleton's official account "South" which like his "The Heart of the Antarctic", was ghost written by a New Zealand journalist.

Other notables include Lincoln Ellsworth's biography "Beyond Horizons" — Doubleday, New York, 1938 the story of the first flight across Antarctica. John Rymill's classic "Southern Lights" Chatto and Windus, London 1938 where a superb use of light aircraft and dog sledging skills produced worthwhile exploration maps and scientific research. And of course Vivian Fuchs/Edmund Hillary's ever popular "The Crossing of Antarctica" — Cassell, London 1958. Though Government backed this expedition was privately inspired and, as the first surface crossing of the continent, it broke major psychological barriers — in the same way as John Hunt's classic "The Ascent of Everest".

Perhaps I shouldn't forget Richard Byrd's quirky, though in parts, eloquent, book "Alone" — Putnam, New York, 1938,



Ran Fiennes (right) pictured with his wife, ventured to both poles.

again a partly government backed, though definitely privately driven expedition involving an attempt at a solo winter. Clearly it was a bold undertaking. However, with nearby support to effect a rescue when mishap occurred, it was hardly a true solo. The first solo winter expeditions took place concurrently, in 1990, when French yachting Hugues Delignieres and Brazilian Amyr Klink (not a colonel!) wintered on their snug, steel vessels *Oviri'* and *Paratii* frozen in near Pleneau and Wiencke islands respectively. Of the two only Klink published a book of his experiences "Between two Poles" — Bloomsbury, London, 1995.

Skating to the expeditions of the past three decades,

David Lewis's attempt at a solo circumnavigation voyage and his book "Icebird" — Collins, London, 1971 leaps out at me. If you ever forget what it feels like to be wet, cold and on the edge of despair read "Icebird". While you're at it dip into Gerry Clark's "The Totorore Voyage" — Century Hutchinson, Auckland 1988.

For sheer tenacity and boldness the British Transglobe Expedition 1979-82 will forever rank highly, in part due to dealing with the outright pigheadedness of various governments which tried hard to block the expedition, but mostly because it was attempted in the days when private expeditions had to procure a ship, support their own aircraft then winter on the continent so as to be in a position to undertake their traverse.

By completing the second crossing of Antarctica, and with Fiennes and Burton going on to be the first to make surface traverses to both geographic poles, Ran Fiennes' "To the Ends of Earth" — Hodder and Stoughton, London 1983 will always impress as a stirring 'boys own' adventure story of massive proportions.

Shortly after the Mear/Swan/Wood manhauling epic ran its course from Ross Island in 1984/86 complete with sunken ship ("In the Footsteps of Scott" — Jonathan Cape, 1987), Norwegian glaciologist Monica Kristesen's 86/87 attempt with dogs to re-



Monica Kristensen, the Norwegian glaciologist.

enact Amundsen's journey to the Pole via the Axel Heiberg glacier was an impressive piece of planning (employing her own ship *Aurora* and Twin Otter/helicopter support) particularly considering it was timed to be completed during the brief summer months. As the expedition turned back short of the pole to meet the ship and thus avoid winter it was seen, typically by some media, as a failure. Consequently, Monica's book "Mot 90deg Syd" — Grondahl, Oslo 1987 never made it into English.

Since 1985, the advent of a single commercial aircraft company Adventure Network International (ANI) operating each year in Antarctica, with its proven ability to support expeditions anywhere on the continent, at both ends of a traverse or in the event of an emergency, all subsequent traverse parties have planned trips timed to coincide with ANI's summer only operation. These icecapades could perhaps, unashamedly, best be defined as 'recreational' expeditions, though sponsors and the media persist in the use of such words as exploration and conquest.

While ANI's remarkable 13 year history has yet to be written, most of the recent books recording traverses to the Pole or of the whole continent, seem to purposely downplay and gloss over the significance of ANI's role in their expedition. For all that, while some of the books are superb, others leave much to be desired. In this department I include Reinhold Messner's needlessly bitter account of the third well executed manhaul/skiparachute traverse of the continent in 1989/90 — "Antarctica — Both Heaven and Hell" — The Mountaineers, Seattle, 1991. The book is mired in trivial complaints against Messner's German partner Arved Fuchs. Perhaps jealously simply reared its ugly head as Fuch's had just skied to both Geographic poles within 12 months!

Today of course there are many who have made it at least to the South Pole, starting from ANI's drop off point near Berkner Island on the fringe of the Weddell Sea and then being flown back to ANI's Patriot Hills Base at 80deg south. Some take part in guided trips, one involved a client who had never been on skis before (Mountain Travel/Martyn Williams 1988/89), another tour was made on motorbike (Kazama 91/92).

There is a story of an American all woman team (Ann Bancroft plus three, 1992/93), a solo woman, Norwegian, Liv Arneson 1994 and another Norwegian tour "unarmed" in 1994 involving Cato Pederson who only has half an arm.

In 1992/93 Erling Kagge became the first to ski solo to the South Pole. In 1990 he had skied to the North Pole with Borge Ousland) then as a non-mountaineer, he was guided up the Third Pole (Everest) by Rob Hall. Kagge's

"Pole to Pole and Beyond" — Damme and Son, Norway, 1994, documents this unique Scandinavian Grand Slam.

The fourth traverse of Antarctica (1989/90) was completed only a month after the Messner/Fuchs crossing when Jean-Louis Etienne and Will Steiger's six man International Trans-Antarctic Expedition reached Mirny after fully 7000 km of dog sledging in a punishing seven months. Pre-laid depots by ANI with Soviet Government support, helped pull off one of the great dreams of Antarctic travel. "Crossing Antarctica" by Will Steiger

and Jon Bowermaster remains a striking testament to planning, stamina and dog-power, as well as massive multi-national sponsorship. A spin-off from this expedition was the construction of the multi-million dollar yacht *Antarctica* which Etienne subsequently used in the making of educational films for French schools.

In 1993 he took *Antarctica* into the heart of the Ross Sea, further south than any other sail powered vessel since 1842, to climb Erebus.

His colourful book "Antarctica — une aventure dans les mers australes" Gallimard, France 1992 is done in the same profusely

illustrated style as Australian Lincoln Hall's "The Loneliest Mountain" (first ascent of Mt Minto) — Simon and Shuster, Sydney 1989. Before dismissing yachting expeditions, "Going to Extremes" — Doubleday, Sydney, 1986 by Jonathan Chester about Project Blizzard voyages and restoration surveys to Mawson's "Home of the Blizzard" base must rate as one of the best researched and designed private expedition accounts of the past 20 years.

At long last, Antarctica has its first real mountaineering books. In 1993/94 Ivar Erik Tollefsen and his Norwegian team of 13 climbers reached Dronning Maud Land using Russian Government ships for transport and pulled off the first big-wall route in Antarctica. Tollefsen's "Queen Maud Land — Antarctica," — 1994 documents this truly bold expedition. The large format book is a magnificent publication combining great photography and moody paintings.

There are breathtaking images of ski tours among the rock spires of the Sør Rondane Mountains, spectacular parapente descents from summits and gob-smacking views from the 11 day hard-living, big wall route on Ulvetanna and the previously unclimbed Jokulkyrkja, Norway's highest peak. In 1997 he released a second book "Antarctica — the Ronde Spire" which chronicles an even tougher big-wall route again in Dronning Maud Land.

Tollefsen's beautifully designed books help to highlight just how much private Antarctic expeditions have changed in recent years.



The rigours of Antarctic exploration. Above: Robert Swan.

WORSLEY – DREAMER AND HERO

Significant gaps in the literature surrounding the 'heroic era' of Antarctic exploration have included a definitive account of Shackleton's 'Aurora' support party for his ill-fated 1914-16 Imperial Trans-Antarctic Expedition.

Also missing are a biography of Shackleton's (also Scott's and Mawson's) most able 'lieutenant' Frank Wild and a biography of Shackleton's 'captain', Frank Worsley.

Now, thanks to Wellington writer John Thomson, we have the remarkable story of the New Zealander Worsley from his early days at Akaroa in the 1870s to forays as a treasure hunter (like Shackleton, Worsley became a dreamer and schemer, chasing rainbow's gold on several occasions) and, as a 70 year old (he lied about his age to the Admiralty) naval commander in WWII.

Despite winning the DSO as a Royal Navy commander of an anti-submarine vessel in WWI and another DSO fighting Bolsheviks on the Russian Front (two interesting chapters in the book), it is in the annals of Antarctic exploration and open-boat voyages that Worsley's name will always come to the fore.

Navigational and small boat handling skills learned as a young seaman, on New Zealand Shipping Company clippers in the Pacific and on rounding the Horn to England, later became crucial to the safety of the beleaguered *Endurance* crew as Shackleton's men battled their way across the Weddell Sea pack ice to Elephant Island.

This much-documented tale and the subsequent story of the open-boat voyage to South Georgia has, in the past, been told from Shackleton's perspective, or visually through the eyes of Frank Hurley and his wonderful images (surely the most closely-guarded photographic plates of all time, many used again to good effect in this book).

Now we have a much better appreciation of just how miraculous their survival was under Worsley's command of *Endurance* and subsequently as 'master' of the tiny lifeboat

*SHACKLETON'S CAPTAIN —
a biography of Frank Worsley
by John Thomson, Hazard Press, Christchurch, 208
pages, softbound, 96 black and white photographs,
maps and paintings, NZ\$49.95.*

James Caird on its 800 nautical mile odyssey across the Southern Ocean.

Staying alive on *James Caird* was a grim, precarious business and Thomson's piecing together of the story is well done, to be enjoyed even by those already familiar with other highly detailed accounts of the expedition such as in Roland Huntford's biography "Shackleton" (1985).

The *James Caird*, with Shackleton, Worsley and four others on board simply had to strike the coast of South Georgia or the 22 men remaining on Elephant Island (under Wild's leadership) were doomed. Against all odds Worsley hit the gale-swept island on the nose.

No-one has ever had their skills with a sextant so direly tested — the book's cover painting of Worsley making one of his four desperate sightings is a beauty.

Until the release of "Shackleton's Captain", Worsley's true role in this survival epic, and the significance of a Worsley/Shackleton partnership which led the way over the spine of South Georgia to initiate rescue, has been largely unsung.

Given the amount of factual information the author has had to deal with, throughout Worsley's whole life, let alone on his most famous polar expedition, Thomson's tight journalistic style is almost entirely appropriate. There are occasions though, such as during the first landfall on South Georgia when the *James Caird* rudder is lost and, given the desperate situation the party faced, I looked for more passion and detail in the writing.

Unbelievably, given the violent nature of the vast King Haakon Bay and the crew's tenuous position on its edge at Cave Cove, the rudder floated back to them days later enabling the *James Caird* to push on to where they could start the fabled crossing of the island. This situation could have been fleshed out to create the powerful

drama it undoubtedly was.

Thomson has raked through many family collections and libraries in England (Worsley lived much of his life there) to greatly enhance his book with quotations from family associates and importantly, by gathering a superb collection of photographic plates which illustrate the book.

Our own Alexander Turnbull Library and The Hocken Library have been crucial in this area too, both in terms of gaining access to the Hurley plates and providing information on Orde-Lees and McNeish, two key players in the *Endurance* story who spent their final days in Wellington.

The sketch maps in the book are important to following the main Antarctic story and it is poignant that they are from Worsley's own hand.

Weaving pertinent quotes into his narrative, the author has made deft use of Worsley's own (long out of print) books "Under Sail in the Frozen North" (1926), "Endurance" (1931), "First Voyage in the Square Rigged Ship" (1938) and "Shackleton's Boat Journey" (1940).

Among others, Frank Wild's scarce book "Shackleton's Last Voyage" (1923) is also well used to document the 1921 Antarctic expedition when Worsley rejoined his old partner Shackleton to command the *Quest*. It proved to be a fateful coming together for Wild and Worsley as Shackleton died of a heart attack with the *Quest* at anchor off South Georgia.

"Shackleton's Captain" has four interesting appendices but none more so than 'Edward Saunders', the Shy Ghost Writer' documenting for the first time the crucial part the New Zealand journalist played in the writing of Shackleton's two classics "The Heart of the Antarctic" (1909) and, with bearing to Worsley's own story, "South" (1919) the official account of the 'Endurance' expedition.

Reviewed by Colin Monteth who was for many years field manager with the New Zealand Antarctic Programme before establishing his own photographic and publishing agency, Hedgehog House.

'BETTER FOR SCIENCE TO PREVAIL OVER POLITICS'

This is the second volume of Dr Ralston's biography of Dr Phillip Law A.C., C.B.E., P.M., founding director of the Australian Antarctic Division.

The first volume ("A Man for Antarctica", Hyland House Publishing P.L., South Melbourne, Vic. 3205 1993) covers Law's early life, his years as a lecturer and researcher in the Physics Department of the University of Melbourne, the commencement of the Australian National Antarctic Research Expeditions (ANARE) in 1947 with stations on sub-Antarctic Heard and Macquarie Islands, and the first venture onto the Antarctic continent for the establishment of Mawson station.

This second volume covers the years of Law's greatest achievements. Under his leadership Mawson and Macquarie Island were developed into major scientific research stations, Davis station was established and Wilkes was taken over from the USA's operations. The Australian Antarctic Territory (AAT) was explored and mapped.

The operations of ANARE during these years are described in very readable detail. Each summer Law sailed south on one of the Lauritzen Company's "Dan" ships, on charter to the Australian Government. The stations were relieved and resupplied. Then Law led exploration voyages along the coast of the Australian Antarctic Territory (AAT). Landings were made on rock outcrops and islands, by motor boat and later by helicopter. Astro fixes, geophysical measurements, geology and biology surveys were made. At the same time, an aircraft carried on the ship made photo mapping flights over the area. This so-called "hit-and-run" exploration was clearly very dependent on weather and ice conditions; it could be very frustrating and at times highly dangerous. Nevertheless by the time that Phil Law left the Antarctic Division, the whole of the coastline of the AAT had been mapped.

Dr Ralston describes these activities and adventures with enough detail to satisfy the most demanding of armchair

Phillip Law — the Antarctic Exploration Years 1954-66 Kathleen Ralston

(AusInfo - Department of Finance and Administration, Canberra) ISBN 0 644 38318 6-1998. Price \$39.95

Available from Government Info shops and agents in major cities. Mail order sales - AusInfo, GPO Box 84, Canberra ACT 2601.

Fax (06) 295-4888.

(Reviewed by Malcolm Kirton [editor of 'Aurora' - Australia's Antarctic Journal] President ANARE Club

explorers, with information taken from Law's voyage logs and from interviews with many of his co-explorers. However, to this reviewer, the most entertaining parts of the book concern the relationship between Phillip Law as director of a small branch of the Australian Commonwealth Public Service and his political and bureaucratic masters in Canberra; the Antarctic Division was then in the Department of External Affairs. Members of ANARE in those days were aware that Law experienced frequent diffi-

culties in his dealings with Canberra. Now all is revealed. Dr Ralston has obtained under the Freedom of Information legislation all files and correspondence relating to the Antarctic Division during these years. She quotes enough of this material to show that Phil Law suffered almost constant indifference, obstructiveness and often downright hostility from his bureaucratic masters as he tried to do an important job in very unusual circumstances and conditions.

This was partly due to the fact that, at the time, the official view of ANARE's function was that it was to back up Australia's claim to its Antarctic territory. A few men living in a scattering of small stations and showing the flag were considered adequate for this. Law's philosophy was that Australia would only gain international recognition by doing something useful in Antarctica, which then as now meant scientific research. This required larger stations, more infrastructure and career paths for polar scientists. Law had a constant battle with his political masters, who knew nothing about science and cared even less, to secure an adequate budget for his expeditions and public service positions for his scientists. It is only in the last decade that we have the situation of science driving politics instead of the reverse, as a result of widespread concern over global climate changes.

Dr Ralston has written another important book, again meticulously researched, with the order of thirty references to each chapter.

CELEBRATING ANTARCTICA'S HEROIC AGE

Continued from page 8

Ross Island, climbed Mount Erebus (3799m) on 10 March 1908, and party of four sledged to farthest south of latitude 88.38 degrees south, only 180 km from the South Pole.

1910-1913 British Antarctic Expedition. Robert Falcon Scott. (*Terra Nova*) Wintered at Cape Evans on Ross Island.

Five men (Scott, Bowers, Evans, Oates and Wilson) reached the South Pole on 17 January 1912 by man hauling and perished on the return journey. Extensive exploration and

scientific investigations conducted.

1914-1916 Imperial Trans-Antarctic Expedition (Weddell Sea Party). Sir Ernest Shackleton. (*Endurance*) *Endurance* was beset in ice, drifted ten months, and was crushed in pack ice of the Weddell Sea. The company escaped in boats to Elephant Island. South Shetland Islands, from where Shackleton and five others sailed 1450 km to South Georgia in a modified whale boat, the *James Caird*.

1914-1916 Imperial Trans-Antarctic Expedition (**Ross Sea Party**). Aeneas

Mackintosh 1914-1915, Joseph Stenhouse 1915-1916

(*Aurora*). Organised by Shackleton to meet *Endurance* party intending to sledge from the Weddell Sea. *Aurora* was beset and drifted for ten months in Ross Sea pack, freeing on March 14 1916.

For further information contact: Dr John Heap KMG, Chairman of the UK Antarctic Heritage Trust, The Old House, High Street, Harston, Cambridge, CB2 5PX Telephone: 01223 870288 Fax: 01223 870288 (if faxing please phone first).

JAPANESE STUDY ADELIE

Adelie penguins usually forage in open sea where prey availability is unpredictable.

At Syowa region where fast sea ice remains throughout the breeding season, however, they forage in small open waters along tide cracks or icebergs, a Japanese scientific team reported at the VII SCAR International Biology Symposium.

"Available foraging sites were limited and stable, and were influenced by the seasonal change in the sea ice condition," they reported. "We found the seasonal change in foraging site and diving patterning in Adelie penguins in this area."

Eight to seven parents' brooding chicks were fitted with VHF radio

transmitters to monitor for foraging sites and the data loggers to monitor diving behaviour at Hukuro Cove colony near Syowa Station in each three day period of early and mid brooding stage and early creche stage in 1995/96.

In 1996/97, foraging sites and diving behaviour of eight parents were monitored with the same methods.

The team comprised Akiko Kako (National Institute of Polar Research, Japan), Yutaka Watanuki, Hideo Ichikawa (Hokkaido University, Japan), Yoshinori Miyamoto (Tokyo University of Fisheries, Japan) and Yasuhiko Naito (National Institute of Polar Research, Japan)

COLD CHALLENGE AT McMURDO

The cold water temperature in McMurdo Sound (-1.8°C throughout the year) provides a challenging environment for Antarctic fish.

At these temperatures biochemical reactions are inhibited, but Antarctic fish have adapted to this environment and their enzymes maintain normal activity, Rachel Fleming, Stuart McInnes and Craig Marshall of the Department of Biochemistry, University of Otago reported to the VII SCAR International Biology Symposium.

These enzymes are structurally adapted to low temperatures but little study of these adaptations has been made.

Notothenioid fish are found around Antarctica as well as having temperate relatives in coastal waters around New Zealand and South America.

Comparing enzymes from Antarctic and temperate Notothenioid fish at a structural level will improve our understanding of how enzymes from Antarctic fish function at cold temperatures.

Lactate dehydrogenase (LDH)

catalyses the interconversion of pyruvate and lactate in the glycolytic pathway. LDH has been extensively studied and the mechanism of action well understood. LDH is relatively abundant, easily purified and is ideal for comparative studies.

LDH from white muscle has been purified and characterised from three Antarctic and one temperate Notothenioid fish as well as from *Squalus acanthias* (dogfish).

Kinetic data and thermal denaturation curves have been collected as well as pH optima and isoelectric point of the individual LDH enzymes.

The team are interested in correlating the differences in LDH function with alterations in the 3-dimensional structure. "The information obtained from the 3-dimensional structure of the different LDH enzymes is important for determining what structural differences are associated with cold-adaptation," they reported.

"X-ray crystallography using crystals of LDH, will allow the 3-dimensional structures to be solved."

SCIENCE RESTRUCTURE WITHIN BAS

A restructuring of the science divisions of The British Antarctic Survey has occurred in mid-1999.

The Biological Sciences Division was formed in April as an amalgamation of two life sciences divisions, the Marine Life Sciences Division and the Terrestrial and Freshwater Life Sciences Division.

The Environmental and Information Division was formed to contain the Antarctic Environmental Data Centre and the Mapping and Geographic Information Centre.

The Geoscience Division was unaffected by the reorganisation.

The BAS Medical Unit and Plymouth Hospitals NHS trust continues as before.

The Physical Sciences Division was formed in April as an amalgamation of the Ice and Climate Division and the Upper Atmospheric Sciences Division.

GERMAN RESEARCHERS LAND ON FLOES

German polar researchers have landed on ice floes in the Antarctic by helicopter for the first time in order to identify them using satellite transmitters.

These devices will enable the researchers to track the ice floes for a year to gain more information about marine currents and iceberg drift, report 'Deutschland'.

The scientists were set down on the 40m high, soccer-field-sized "table icebergs" in the Antarctic by the helicopter based on the *Polarstern* research ship.

The transmitters, carefully packaged in waterproof material, were buried in the snow. The project is part of an international research programme, which involves participation by 43 scientists from four countries.

IMPACT OF TOURISTS ON GENTOO PENGUINS

It appears that penguins, or specifically the Gentoo penguins on the Antarctic Peninsula, don't mind the odd thousand or two well behaved visitors arriving at their Antarctic home.

Scientist's fears that tourism has been adversely affecting the Gentoo penguin population at Port Lockroy have been quelled after a study showed that their breeding habits have remained the same as other penguin colonies untouched by tourists.

Port Lockroy, located on the Antarctic Peninsula, is one of the most popular destinations for tourists visiting Antarctica by cruise ships and yachts.

The site is a natural harbour with spectacular mountain scenery and abundant wildlife.

Tourists have been visiting Port Lockroy regularly since the 1980's, although only since 1996 have they been able to visit the restored old British base (Base A) on Gaudier Island.

Norman D Copley, John R Shears and Rod R Downie reported at the 1998 VII SCAR International Biology Symposium in Christchurch that the British Antarctic Survey (BAS) were concerned that the large number of tourists visiting Port Lockroy might be

having adverse affects on the wildlife, particularly the Gentoo penguin (*pygoscelis papua*), and began an environmental monitoring programme in 1996 to determine human impact.

In order to investigate the effects of visitors on Gentoo penguin population trends and reproductive performance, a team used a combination of long-term (40 years) count data obtained from Alice Creek and Damoy as well as two years of intensive studies of breeding performance at Gaudier Island. At the Alice Creek and Damoy Point colonies, which are 700m apart and of a similar size, the number of breeding pairs has increased between 1958 and 1998 and there is a strong positive correlation between the sizes of the two colonies.

However the two colonies have received markedly different numbers of visitors since 1989, Alice Creek has been visited by about 2,500 people annually, but Damoy Point by only 120 people annually. The Alice Creek colony is split into two groups by an isthmus. Jougla Point occupies the low ground and is near to the main landing area used by visitors, while at Lecuyer Point, the colony occupies higher ground and is further away from the visitor landing beaches.

Most tourists remain at the colonies around the landing areas. Monitoring has shown that in both areas the colonies have increased at similar rates.

On Gaudier Island, Gentoo penguins colonised the island in 1985 and their population has been expanding. The breeding performance in 1996/97 was compared in treatment colonies, where visitors were free to approach the colonies following Antarctic Treaty guidelines, (minimum approach 5m) and at control colonies where visitors were excluded.

There were no differences in key breeding performance parameters (pairs laying' clutch size, brood size, breeding experience, chick mass and survival to 20 days old) that could be related to visitor disturbance says the BAS team.

In the 1996/97 and 1997/98 seasons over 3000 visitors came to Gaudier Island, but the breeding population of Gentoo penguins and their overall breeding success (chicks fledged per pair) was high and comparable to an (undisturbed) Antarctic peninsula Gentoo penguin colony.

The BAS team concluded that whilst Gentoo penguin populations have changed at Port Lockroy since the 1950s there is no evidence that current tourist numbers have adversely affected the population.

GLOBAL WARMING EFFECTS

United States scientists are predicting that global warming could hinder the world's oceans from absorbing carbon dioxide causing the earth to get even hotter.

Evidence from a study which took place on a month-long expedition by American researchers during the Antarctic summer indicates that some conditions scientists think will occur with global warming may promote the growth of algae in the Southern Ocean that do not absorb carbon dioxide as well as others. Kevin Arrigo, a biologist at NASA-Goddard Space Flight Centre in Maryland, who led the study, told Reuters news agency that because the waters around the Antarctic make up 10% of the world's oceans they play a significant role in soaking up carbon dioxide.

PUZZLE OF ANTARCTIC GIANTS SOLVED

Scientists have the first proof that Antarctic crustaceans are giants because of increased oxygen availability rather than their low temperature environment as previously thought.

Reporting in the publication "Nature", authors Gauthier Chapelle of the Institut Royal des Sciences Naturelles de Bruxelles and Professor Lloyd Peck of British Antarctic Survey explain how cold-blooded animals in polar regions are true giants. Professor Peck says, "the largest Antarctic amphipod is, at 90mm and five times as long as its tropical cousin, indeed a true giant. For the last hundred years or so scientists believed that the phenomenon of giant species found in polar seas was related to the low temperatures and the reduced metabolic rates of the cold-blooded animals living there. "However, we found that freshwater

amphipods from Lake Baikal, Russia, were twice as large as those in the sea at the same temperature, leading us to conclude that their size could not be controlled by low temperature alone. We ran a series of analyses and found that the increased oxygen in the cold oceans and freshwater lakes meant bigger species could be produced.

"One implication of our work is in understanding the fossils of giant insects from the Carboniferous period. At that time the amount of oxygen in the atmosphere was 33% compared with the 20% we have today. Giant amphipods, and probably most polar giant species, are at the limit of their possible size. If global change reduces the available oxygen in the environment, or increases their requirement for oxygen we would predict that cold-blooded giant low-temperature species would be among the first to become extinct."

THE RIDDLE OF THE ANTARCTIC PENINSULA

by David E. Yelverton FRGS. *The Story of the French Antarctic Expedition 1903-5: Part I*

Dr. Jean-Baptiste Charcot returned from a summer voyage to Jan Mayen Island in 1902, planning to mount an expedition to Novya Zemlya.

Failing to attract financial support for the sort of ship he needed, he had committed his personal fortune to the building of the *Français*. Barely 105ft long at the waterline, topsail schooner-rigged, she had two boilers serving a midships engine of no more than 125hp, which was the most that he could afford.

With the ship's keel laid on 15 January 1903 and plans scarcely formed, news of Nordenskjöld's first discoveries had fired his conviction that France should have been part of the great European campaign being waged in the Antarctic.

News of Scott's achievements then arrived to reinforce the enthusiasm of the prestigious committee drawn from the Institut Français, that was considering Charcot's Antarctic plan, to go south in the Weddell Sea, in the hope of extending Larsen's original discoveries. Barely a month later, news of the disappearance of the *Antarctic* and preparation of the Swedish relief expedition burst into the headlines.

Charcot was the first to propose the *Français* should join in the search for Nordenskjöld's ship, in conjunction with the *Fridthjof*, which had been chartered by the Swedish government.

The *Français* was launched on 27 June, commissioned by the end of July, and sailed from Le Havre on 15 August 1903 to the cheers of enthusiastic crowds, only to be struck by immediate tragedy as the towline broke loose, killing a seaman on the forecastle. Leaving again a few days later to pick up instruments and final supplies at Brest, Charcot finally sailed from there on the 31st, scarcely yet assured of the total finances he needed, despite the handsome support of the national daily "Le Matin".

Charcot had almost despaired at the end of May, with only 20,000 Francs assured, plus the promise of instruments, dynamite and 100 tonnes of coal, firmly assured. A chance encounter with the Editor of "Le Matin" resulted in the launch of an appeal for 150,000frs. When that brought in only 90,000frs, the editor had personally given the remainder.

Even when the Chamber of Deputies voted a further 90,000frs at the urging of President Loubet, the total had amounted to less than half the Scottish Expedition's final cost by the time the *Français* entered Buenos Aires in the last week of November, there to learn of the rescue of the Scandinavians. (1)

The way was open again for his own exploration to go ahead, but by now Charcot had lost the only man aboard with Antarctic experience. He had sought and received the support of De Gerlache from the start, and, after he had



Charcot aboard the *Français*.

changed his objective to the Antarctic, De Gerlache had agreed to serve on the expedition. However, after crossing the Atlantic, De Gerlache pulled out at Pernambuco, following a difference of opinion over Charcot's plans. With him went two naturalists he had recruited for the expedition. (2)

Advice from Nordenskjöld, Larsen and Bruce, all in Buenos Aires, helped fill the gap. After inviting them aboard the *Français*, he soon built up a new plan based on their discoveries, he promised to co-ordinate observations with Bruce's Laurie Island base, which was to be manned by Argentinians, tutored by Robert Mossman for the first year.

Charcot published the new plan on 4 December 1903. The main objectives for the first season were exploration of the west coast of the islands bordering De Gerlache's strait, and establishing a winter station as far south as possible, by mid-March 1904 at the latest. If conditions allowed, they would leave news of its whereabouts on Wiencke Island, or on Biscoe's Pitt Island, which De Gerlache thought he had seen

in 65°57S opposite the 'vaste baie ou détroit' he and Lecoite had taken for Dallmann's Bismarck Strait.

As to the 1904-5 season, doubtless encouraged by the early timing of Nordenskjöld's Gustav Channel journey, the goal for the spring depended on how far south their winter quarters would be.

If no further south than the 66th parallel, Charcot would sledge eastward across the Peninsula to the coast Nordenskjöld had discovered. If his party got into trouble after reaching the Weddell Sea coast, they would leave a message cairn at Mt. Christensen, and make for Nordenskjöld's depot on Seymour Island.

If the winter station was further south, then, more ambitiously still, he would explore the west coast by land as far as Alexander I Land!

All that was to be attempted while the ship was still frozen in. Given De Gerlache's pictures of the forbidding nature of the coast in the Lemaire Channel, there was, understandably, no mention of a specific date for the return of the sledge party.

When the ship was freed from the ice they would continue exploration of the coast as far as Alexander I Land, avoiding the fate of the *Belgica* at all costs, and returning to South America no later than 1 April 1905. In case they discovered a navigable channel through to the Weddell Sea, their course was left unspecified.

The *Français* had arrived in Buenos Aires under tow after a fractured propeller shaft key had stranded her at Montevideo. The Argentine Government promised every help with the repair. A government transport would carry their collapsible shore hut to Ushuaia, and refill their bunkers there free of charge. The navy would lend him the dogs Nordenskjöld had given the captain of the Uruguay, and the Argentine ship would be sent to look for the cairn the following summer.

With news of the French deputies' vote and contributions pouring in from the local French community, every problem seemed resolved as the *Français* cast off and steamed out into the roads on 23 December 1903. (3)

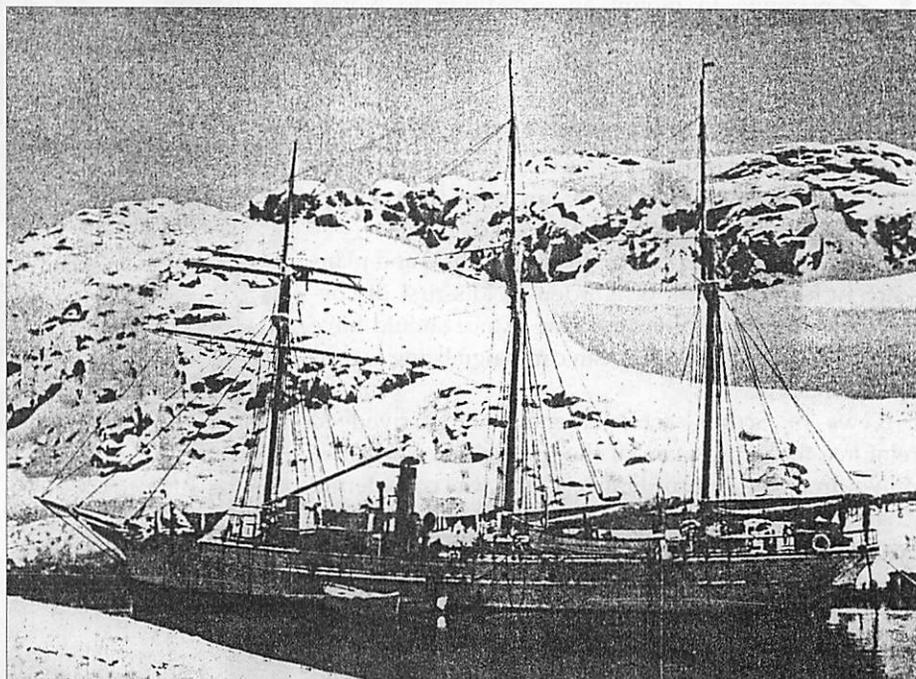
Reaching the Argentine magnetic observatory on Ano Nuono, off Ano Nuono, off the North coast of Staten Island, on 7th January 1904 they

picked up the five best Greenland dogs from the nine left there by Irizar, and steamed through the Beagle Channel to anchor at Ushuaia three days later. (4)

With every inch of bunker space crammed with coal, the *Français* was back in the relative shelter of Nassau Bay on evening of the 26th. With the ship watered and swung for compass adjustment all was ready to cast off

obviously so much worse, Charcot must have realised that his chances of finding a base much further south were slim indeed. Returning north to establish a message cairn on Wiencke Island had become essential, costly as it might be in yet more days lost from the few he now had left.

Sailing north on 19 February, the passage anti-clockwise round the island in search of a suitable site for the



The Français in Français Cove on Booth Island, 1904.

from civilisation by the following evening. Charcot and his nineteen companions headed south in the smallest ship of all in the great assault on the unknown south.

Turning west from the entrance to De Gerlache's strait six days later, they had barely begun their running survey of the seaward coasts of the islands discovered by the Belgians when a tube burst in the port boiler. All other tubes were found to be blocked by scale. Harassed by fog off the north coast of Anvers Island, and limited to one boiler, Charcot nevertheless accomplished most of his first objective by the time his ship heaved to at the head of Flanders Bay on 7 February, just as Bruce completed his last preparations at Port Stanley for his return to Laurie Island.

Sheltered in an inlet from the stream of icebergs circulating round the main bay, Goudier, the chief engineer, took 11 days to have the boilers repaired and cleaned. De Gerlache had found the bay completely free of ice six years before. With conditions now

cairn had brought them almost full-circle when, on the second day, an inlet near the south-west corner proved to be a channel separating the land west of De Gerlache's Cape Errera from the bulk of the island.

Following the coast eastward into its wide entrance, they came to a perfect little anchorage a mile in from the Roosen Channel, which Charcot later named Port Lockroy. There was even an ideal site for the cairn on a little island in the main channel just outside the bay, visible from any ship that entered it from either direction. (5)

From that moment, three days after Scott's *Discovery* was freed from the frozen harbour at Hut Point, Charcot knew that he had a safe base if he failed to find one nearer the goal beyond Cape Tuxen that dominated his hopes. (See map on page 152 in Vol.14, No.4, December 1996)

The prize that might be his was tantalisingly near. The other side of Flanders Bay lay De Gerlache's Lemaire Channel. That led, after a mere 17 miles, to the towering Cape

Tuxen, and the vast bay or strait that De Gerlache (and Nordenskjöld on hearing the Belgian's account) had believed was the real Bismarck Strait to the Weddell Sea, albeit probably not navigable. He, Charcot, could prove it one way or the other.

His hopes of reaching it were soon dashed. The channel was blocked by a jostling mass of pack far too heavy for their ship's puny engine to force them through. As *Matha*, the First Lieutenant, took the ship round west of the first two islands, De Gerlache's Wandel and Hovgaard Islands, Charcot realised they were really the Booth and Krogmann Islands in Dallmann's Kaiser Wilhelm I group.

Soon thwarted by numberless bergs and pack caught up in the maze of small islands outside the main chain, there was little alternative but retreat to shelter on the north side of Booth Island, where they had been lucky enough to spot a likely looking cove. Successfully inching the ship into it, astern of *Matha*, who was sounding from the dinghy, Charcot had at least found a winter harbour a little further south, should all else fail in the coming three weeks.

Another attempt to get through the channel next day proved hopeless after only four miles. *Français Cove*, as he later named it, came to their rescue sooner than expected. After watering ship with melted ice and snow on 23 February, another tube burst as they raised steam the following morning, this time in the starboard boiler. Yet another precious day was lost.

In calm and magnificently clear conditions on the 25th, they were soon among floes so packed that it was impossible to stream the log as they struggled through the cordon of islands and rocks. Breaking out on a south-westerly course, the ice had already forced them too far west to allow them to see the coast beyond Cape Tuzen.

Far away on the horizon lay an isolated island which Charcot took for the most northerly of the Biscoes. (6)

Setting course to pass south of it, larger islands appeared to the south, though the view everywhere was fragmented by a patchy mist. Enough could be seen, however, to show there was no hope of passing inside those islands, and Charcot headed for the open sea.

Still favoured by calm weather, the mist lifted enough the next day to reveal a series of islands, backed by distant snowy peaks on what could only be the mainland. A promising looking bay on the largest island (Renaud Is.) proved to be full of dangerous rocks and icebergs, offering no hope of a landing or harbour.

Beyond the island another attempt to push towards the land on 27 February soon had them in ever-increasing danger of being trapped by the ice. Further progress was impossible when they had reached 65°58S 66°22W. (7) The coast, visible beyond the islands, was forbiddingly hostile, and obviously bereft of any safe haven for their small ship. It was time to settle for the cove on Booth Island. Markham had surely been right when he dubbed it "a route of little chance" in considering plans for the British expedition.

As though to emphasise its hostility, the wind rose to a stormy NE gale, engulfing them in fog and snow showers, with little respite as they fought their way northward with rapidly ailing boilers, only to find their cove full of ice and growlers on the night of 3 March 1904.

Much to Charcot's relief, *Matha's* sortie in the dinghy next morning revealed that they could get safely into the cove, which was too shallow at its entrance to let the bergs threaten them. It meant they could avoid the retreat to the harbour at Wiencke Island.

That very day the Scots had reaped their reward as the coast of Coats Land appeared. For the French there had been only repulse by the coast that had defied De Gerlache's approach six years before, and Evensen's four years before that. Now for the third time it had hidden its secrets in a swathe of mists behind a barrage of ice.

(To be continued)

NOTES

(1) The final total before leaving Buenos Aires amounted to 450,000frs, which, by the labour and supplies they provided, the Argentinians augmented to an extent that virtually eliminated the threat of insolvency.

(2) Charcot gives this explanation in the expedition journal published after the expedition, but his biographer, Mlle Marthe Emmanuel, wrote that De Gerlache was unhappy to be separated from his fiancé, and hinted at an unwillingness to play second string to Charcot. The reality may lie in the likelihood that involvement in the search for Nordenskjöld's ship would so limit the scope of the expedition, despite the funds voted by the Deputies, as to forfeit the Belgian's interest, which had until then outweighed his personal feelings. Charcot, who would not have a word said against De Gerlache, would certainly not have revealed the personal side of his companion's motives for pulling out, when preparing a document for general publication.

(3) In the dark, they passed the *Scotia*, stranded on a shoal, on her way back to collect Bruce, without realising the mishap that had befallen her.

(4) In *Le Français au Pole Sud* (pp 85-9) Charcot describes only three (Sogen, Nerven & the bitch Fia) as pure-bred, the other two being Storm and another bitch Peridota. Storm was not used on the only sledge journey they were employed on.

(5) Casabianca Island.

(6) The "island" on the horizon was almost certainly the group in 65°15S 65°05W Charcot named after the Argentinian Admiral Betbeder, according to the course plotted on Lecoigne's chart. These are the same as De Gerlache's "Iles Cruis", towards which the *Belgica* was forced away north-west on 13 February 1898, when near the reef today known as Grim Rock, and too far out to see the coast in the 'vast bay or strait'. Today, islands further north bear the name Iles Cruis.

(7) Given in the expedition *Meteo Report* pp 264-8 as the 27 February 1904 position. That was a remarkably accurate fix, compared to the disproportionate size and position assigned to the islands on Lecoigne's chart, which was yet another instance of the difficulty of running surveys in misty conditions.

NAVY IN DEFENCE OF THE TOOTHFISH

Continued from page 7

"One afternoon we were hit by a set of freak waves estimated at 20m. The ship came through with only minor damage to upper deck fittings from water sweeping across the fo'c'sle. The ship's complement were well and truly prepared for the elements, new immersion suits in case it became necessary to abandon ship and special gear for those operating boats and for the boarding parties."

On the way south from Dunedin *Te Kaha* conducted a couple of boardings in the EEZ to do some real time training. "We boarded another dozen as we came north again, says Cdr Smith. "By the time we were getting into the EEZ boardings towards the end of the period we had two boarding parties going, leapfrogging from ship to ship, Russian mainly, with some from Taiwan and China."

Cdr Smith says the whole crew were pretty happy they were taking part in an operation that had a lot of public interest.

"Even though we didn't get into any toothfish boardings down there, or see any illegal or unregulated activity, it was successful on two counts. Firstly the deterrent nature of the task sent a clear message that New Zealand would uphold the Antarctic Treaty system and the CCAMLR regime by having aircraft and ships down there, and secondly, it proved the ANZAC class capability of being able to operate in that harsh environment of the Southern Ocean," says Cdr Smith.

"As a joint exercise with the Air Force, we were talking to each other, it was a good operation to enhance that joint capability".

Captain Good says, it was a good national strategy that got some people excited. "The Australians said how can you go and catch them, but I explained that we weren't actually capable of arresting people there, it's outside our EEZ."

By law, the Navy could do nothing, says Captain Good, they had to take a reverse tack which was to be overt. "We had to let the world know we were going to do this — and then do it."

He says they knew there was a lot of pirate fishing round the Kerguelen Islands, "And as these other countries legislate to push them out, the vessels will naturally migrate, and we know that there are toothfish there [in the Ross Sea]."

Te Kaha was authorised under CCAMLR to board CCAMLR flagged vessels, but there is no basis in law to board non-CCAMLR ships operating in the area and outside the EEZ. In these cases photographic evidence is collected and circulated.

Captain Good says, had he located an illegal operation he would have had photographs back within minutes of being taken and video transmitted from the ship by satellite back to New Zealand for immediate international media distribution.

"We know that news of our strategy has got out to some of the commercial vessels that have the potential to go to the Ross Sea," says Captain Good. "We are quite certain that the messages are out among the long-lining fleet. The fact that they did not get there this year is a combination of that, and the ice being extremely thick for a lot longer than normal."



Huge seas crashing over the bow of the Te Kaha.

POLICY

JAPAN AND ANTARCTIC

The Japanese stance towards Antarctica was the topic of a recent paper submitted to 'Polar Record' by Shirley Scott, School of Political Science, The University of New South Wales.

She notes by Article 2(e) of the 1951 Treaty of Peace, Japan renounced 'all claim to any right or title to or interest in connection with any part of the Antarctic area'. The paper traces the process by which Australian diplomacy ensured the inclusion of such a provision in the Treaty and assesses the contemporary significance of the article.

"While in the unlikely event of the breakdown of the Antarctic Treaty System, Japan would be legally entitled to make a territorial claim on the basis of activities undertaken between the conclusion of the Peace Treaty and the coming into force of the Antarctic Treaty, such a claim would likely be weak", she says. "It is more probable that the Japanese government would assert that, just as Japan had had no rights to renounce in Antarctica, neither had any of the Antarctic claimants complied adequately with the provisions in international law for territorial acquisition."

Scott concludes that it is unlikely that Japan could ever make a strong claim to Antarctic territory in terms of the rules of Antarctic territorial acquisition as accepted, for example, by the United Kingdom.

In this regard, she adds, the reticence of UK and US officials to incorporate a renunciation of Japanese Antarctic territorial rights in the Treaty of Peace with Japan appears to have been valid in that repeated references to the provision can easily lend credence to what is in effect a 'non-issue'.

"But it must be remembered that there is not even general agreement that effective occupation is a valid basis for territorial acquisition in Antarctica.

"There is, indeed, a difference of opinion, even amongst claimant states, regarding the means by which Antarctic territory can be acquired," she adds.

Significantly the United States has refused to recognise territorial claims to Antarctica on the assumption that the degree of settlement needed to meet the requirements of effective occupation is impossible in the harsh conditions of Antarctica.

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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