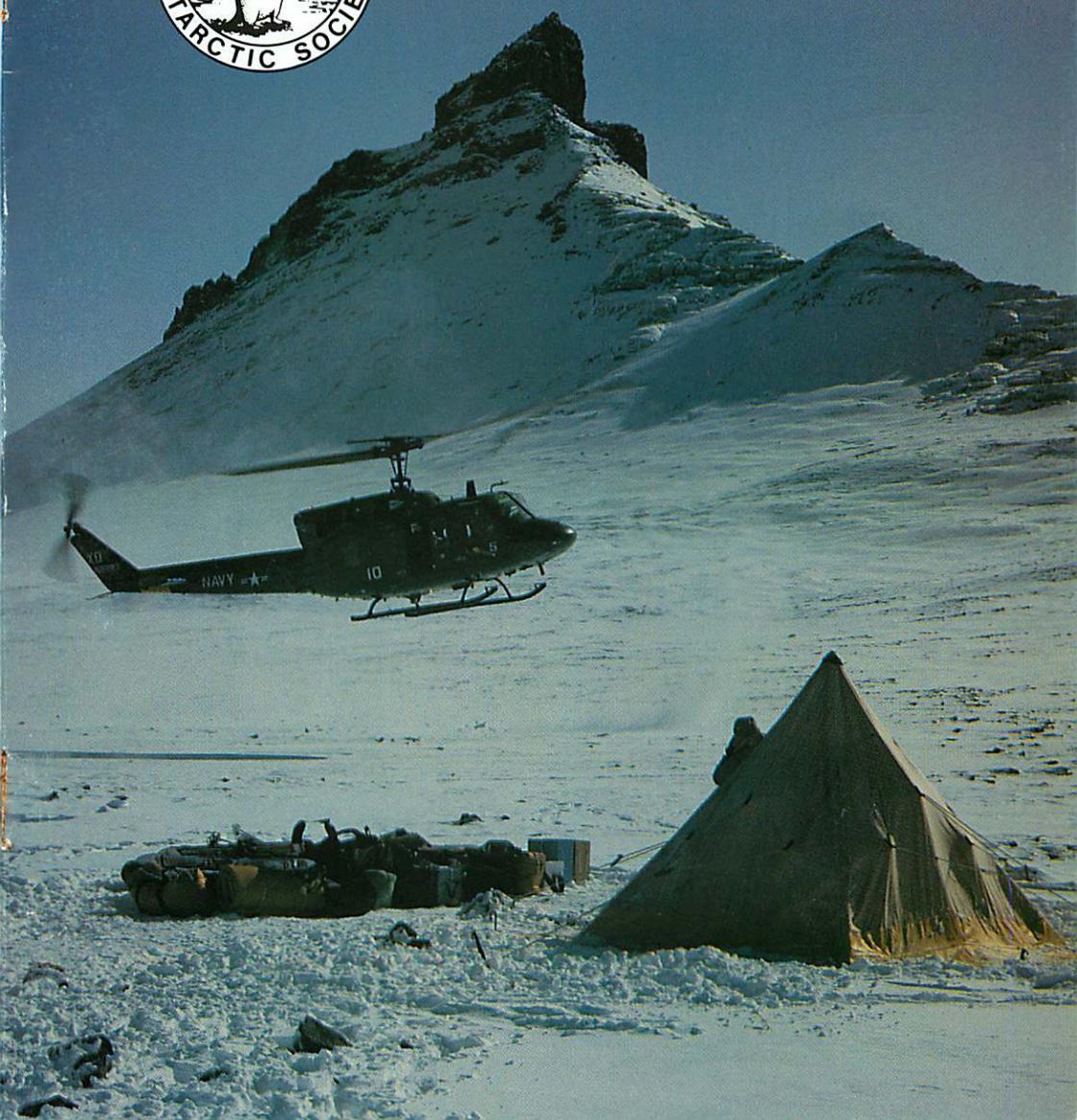


ANTARCTIC



Bulletin Vol. 13, No. 11, September 1995



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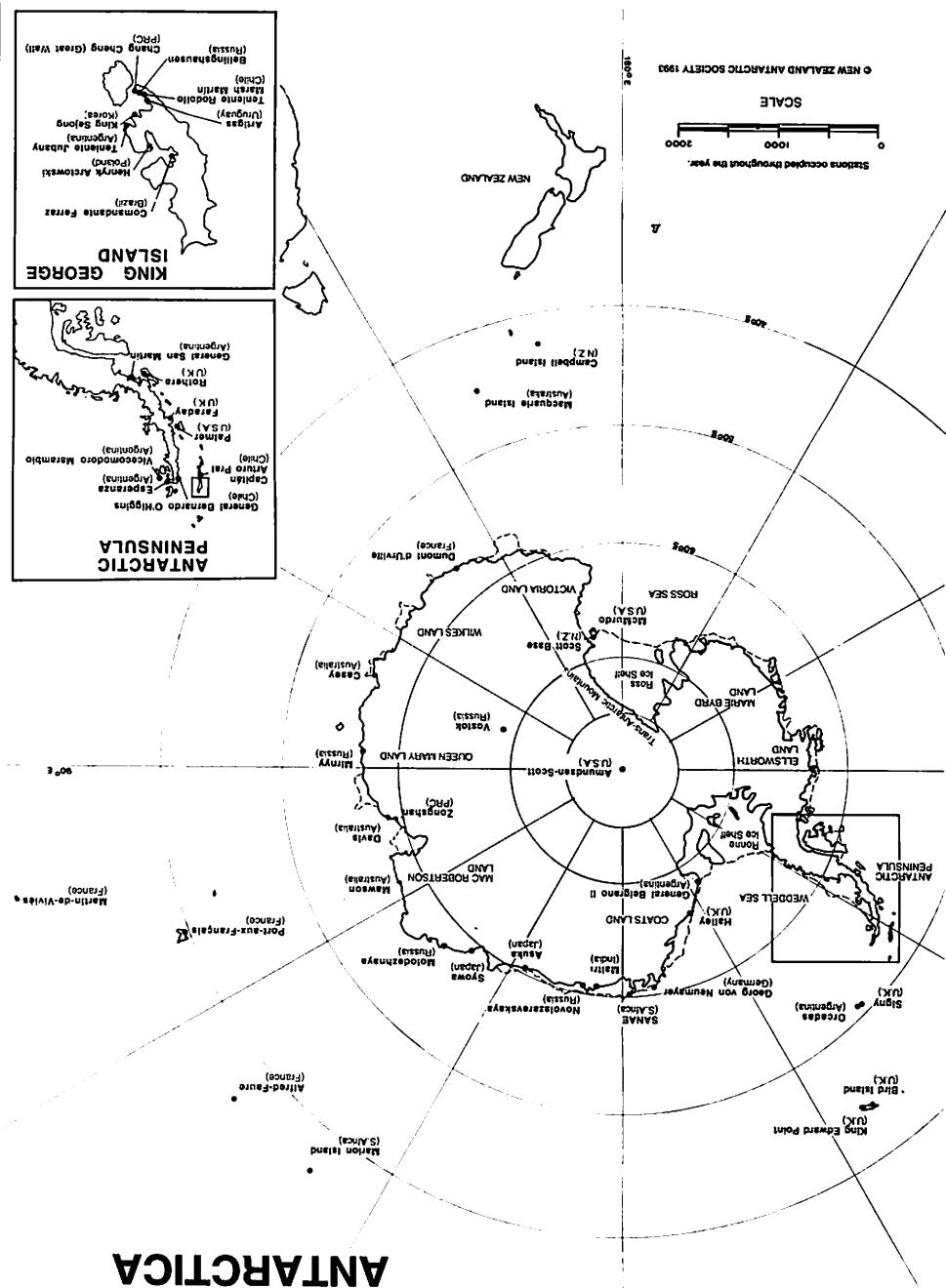
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Cover photograph:

*Relief for a field party at Vishniac
Peak*

Photo: Mike Isaac

*This issue was completed for the Society by
Robin Ormerod and Alison Welch pending the
appointment of a new editor.

COMNAP - brief

Fourth meeting of COMNAP held in Santiago

COMNAP, the Council of Managers of National Antarctic Programmes, met in Santiago from July 31 to August 4. Representatives of 22 countries attended the meeting, which was chaired by Dr Anders Karlqvist from the Swedish Polar Research Secretariat, part of the Royal Swedish Academy of Sciences in Stockholm.

The 22 countries represented this year were: Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, Chile, China, Ecuador, Finland, France, Germany, India, Italy, Japan, Netherlands, New Zealand, Norway, Peru, Poland, Korea, Russia, South Africa, Spain, Sweden, Ukraine, United Kingdom and USA and Uruguay. Representatives also attended from Adventure Network International, IAATO, the Polus Centre for Parachute and COMNAP/SCALOP.

The meeting discussed a wide range of issues of common interest to managers of Antarctic operations. Among them were:

- Tourism - Contingency planning and safety issues some operators had been called upon to help with medical emergencies created in the course of tour operations. Scheduling of visits to bases was also of concern to some operators. There was general agreement from the national operators that a common format for reporting on tourism activities be adopted. These issues will now be addressed through the ATCM.
- Regional contingency planning was discussed with a strong focus on planning for possible fuel spills. Although a number of nations have completed their own station planning there are still some plans to be completed. It was also noted that there are a number of regions where it would be appropriate for operators to work more closely together such as the United States and New Zealand are in the Ross Dependency.
- COMNAP's working association with the ATCM was discussed. It was felt that there was a need for the relationship to be closer.
- The contracting to ICAIR of the Antarctic Master directory was confirmed.
- Environmental monitoring. Two technical workshops have been planned by COMNAP and SCAR, the first for Oslo in October 1995 and the second in Texas in March 1996.
- Air Safety. The Antarctic Flight information Manual prepared by COMNAP was discussed. SCALOP is now being commercially produced to improve availability and for consistency with other flight manuals.
- International scientific/logistics co-operation - the meeting provided opportunity for bilateral/multilateral discussions on co-operative projects such as the Cape Roberts Project and Dome C re-

search

COMNAP will meet again in conjunction with SCAR in Cambridge in August, 1996.

Members of COMNAP involved in the Operational Management Group of the Cape Roberts Project took the

opportunity to bring the rest of the associated parties up to date. Arrangements are being made for the transport of the next shipment of materials to the region by the Italian supply vessel *Italica* in January 1996.

CCAMLR - *insight*

Comprehensive Agendas set for CCAMLR standing committee meetings

Preliminary agendas have been drawn up for the CCAMLR Standing Committee on Administration and Finance and the Standing Committee on Observation and Inspection. The full meeting is to be held in Hobart from October 10, to 27. The first item on the agenda for the Observation and Inspection Committee is the system of inspection and compliance with conservation measures during the 1994/95 season. The committee will consider information provided by members on the steps taken to implement and ensure compliance with the required conservation measures. Summaries of inspection reports will be presented, together with comments on the Flag States of inspected vessels.

In addition to reporting inspections, members must report on the actual number of inspectors deployed, the duration of their trips and the areas covered. All reports of inspections were transmitted to the Flag States of inspected vessels. Flag States will comment on reports of inspections undertaken and advise of any actions being considered, or which have been taken, in respect of them. The committee will consider activities of non-member states in the Convention area follow-

ing evidence of fishing by some non-member states. The secretariat wrote to the governments of the states concerned and the correspondence will be considered by the committee. Any recommendations of the Scientific Committee on the inspection system will be considered.

Improvements to the system of inspections is the second item on the agenda. After looking at the rights of inspectors the committee will look again at the definition of fishing. Last year members were invited to send their comments and suggestions of alternative ways of dealing with the problems. Responses will be discussed.

Drs I. Everson (UK) and R. Holt (USA) have prepared better forms for reporting inspections and these will be submitted for approval.

Last year also the UK proposed that new system whereby Flag States would notify the Secretariat if their vessels were entering, existing, or moving between sub-areas of the Convention area. A paper on this subject will be discussed at this meeting. A paper, prepared by the Secretariat, on the possible configuration of a CCAMLR vessel monitoring system

based on the use of Inmarsat-C/GPS, will also be discussed.

The third item on the agenda will be a report on scientific observations done in the 1994/95 season and consideration of any recommendations of the scientific committee which are relevant to the Scheme of International Scientific Observation

The CCAMLR standing Committee on Administration and Finance has, at as its first agenda item, administration. (Relocating the Secretariat from the second to the first floor of the same building will be discussed along with staffing levels which are not increasing with the greater volume of administrative work.) Other items include translation at meetings and the design of the CCAMLR flag.

Audit reports and budgeting information will be presented and the forecast budgets for 1996 and 1997 will be tabled. The committee will review the publications distribution policy, the trial period of which expires in 1995; the publication CCAMLR Science, which is in its second year having replaced Selected Scientific Papers for a three-year trial period. The Scientific Committee budget and forecast budget will be presented.

The committee will continue negotiations towards a formula to be used to calculate members' contributions.

Elections will be held for the post of chairman and vice chairman. Mr G. de Villiers (South Africa), chairman, with Chile as vice-Chairman, is eligible for re-election to a second two year term.

A preliminary agenda has been drawn up for the 14th meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources. After the meeting opens, fishery status and squid resources will be discussed. Fish, crab, and squid resources, marine mammal and bird

populations are on the agenda.

The committee will look at incidental mortality in long line and trawl fisheries and marine debris.

A report on ecosystems and monitoring and management will be put before the committee from a working group.

Other agenda items include management under conditions of uncertainty about stock size and sustainable yield, scientific research exemption and new and exploratory fisheries. The CCAMLR scheme of International Scientific Observation will be discussed along with CCAMLR data management. Item 14 on the Agenda is cooperation with other organisations, in particular, reports of observers from international organisations and reports of CCAMLR representa-

New study focussing on pack ice seals

The SCAR Group of Specialists on Seals has developed a programme to study the Antarctic Pack Ice Seals (APIS). It is expected to extend from the 1995-96 season through to the 1999-2000 season, with a major logistic effort envisaged for the 1998-99 season.

As top predators, seals were likely to be sensitive to changes in the dynamics of ecosystems, and in, particular, to variations in the flow of photosynthetically-fixed carbon to higher levels in the food chain caused by climatic or ecological change.

Pack ice seals are excellent indicators of large scale environmental change and, on a smaller scale, vari-

Continued on page 453

**CONVENTION ON THE CONSERVATION OF ANTARCTIC
MARINE LIVING RESOURCES (CCAMLR)**

(Canberra, 20 May 1980)

(The Convention entered into force on 7 April 1982)

Participant	Signature	Date of Deposit of Instrument of Ratification, Accession, Acceptance or Succession	Date of Entry Into Force
Argentina °	11 Sep 1980	28 May 1982	27 Jun 1982
Australia °	11 Sep 1980	6 May 1981	7 Apr 1982
Belgium °	11 Sep 1980	22 Feb 1984	23 Mar 1984
Brazil °		28 Jan 1986	27 Feb 1986
Bulgaria		1 Sep 1992	30 Sep 1992
Canada		1 Jul 1988	31 Jul 1988
Chile °	11 Sep 1980	22 Jul 1981	7 Apr 1982
European Economic Community °		21 Apr 1982	21 May 1982
Finland		6 Sep 1989	6 Oct 1989
France °	16 Sep 1980	16 Sep 1982	16 Oct 1982
Germany °	11 Sep 1980	23 Apr 1982	23 May 1982
Greece		12 Feb 1987	14 Mar 1987
India °		17 Jun 1985	17 Jul 1985
Italy °		29 Mar 1989	28 Apr 1989
Japan °	12 Sep 1980	26 May 1981	7 Apr 1982
Korea, Republic of °		29 Mar 1985	28 Apr 1985
Netherlands		23 Feb 1990	25 Mar 1990
New Zealand °	11 Sep 1980	8 Mar 1982	7 Apr 1982
Norway °	11 Sep 1980	6 Dec 1983	5 Jan 1984
Peru		23 Jun 1989	23 Jul 1989
Poland °	11 Sep 1980	28 Mar 1984	27 Apr 1984
Russian Federation °	11 Sep 1980	26 May 1981	7 Apr 1982
South Africa °	11 Sep 1980	23 Jul 1981	7 Apr 1982
Spain °		9 Apr 1984	9 May 1984
Sweden °		6 Jun 1984	6 Jul 1984
Ukraine °		22 Apr 1994	22 May 1994
United Kingdom °	11 Sep 1980	31 Aug 1981	7 Apr 1982
United States of America °	11 Sep 1980	18 Feb 1982	7 Apr 1982
Uruguay		22 Mar 1985	21 Apr 1985

° Members of the CCAMLR Commission

NZAP

Antarctic Institute planned for New Zealand

Two parties of scientists were among the personnel who flew south this year at WINFLY, the annual series of flights for early season resupply of bases in preparation for summer activities. WINFLY began this season on Sunday August 20 and was completed on Friday August 26. This was the last direct contact with the Scott Base team until the season commenced on October 3. From then, some 220 scientists and support personnel will pass through the base or work there as part of the season's programme which comprises approximately 40 events in and around Ross Island, in the Dry Valleys and in McMurdo Sound.

NZAP staff aboard the first flights south comprised Gillian Wratt, the programme's director, Rex Hendry, Programme Support Officer and Peter Brookman, Facilities Manager. Two carpenters, Jock Walton and Richard Struthers were also among the team. They are currently altering the internal configuration of the Hatherton Lab in order to create more working space for scientists.

Dr Steve Wood from NIWA Atmosphere at Lauder in Central Otago went south to prepare for a large joint team maintaining the Arrival Heights/Scott Base/Campbell Island data base for stratospheric trace gases which allows comment on aspects of the Antarctic ozone problem. Comparison of data with modelling calculations enables scientists to obtain physical insight into the process of atmospheric change. Most particularly the work is directed towards understanding the reasons for and the

significance of the changes with time in stratospheric nitrogen and chlorine compounds. Responsibility for data acquisition is shared between visiting NIWA staff and the Scott Base technician but data reduction is carried out at Lauder and Gracefield. This season Sylvia Nichol from NIWA in Wellington, Alan Thomas and Ian Boyd from Lauder will be joined by Carlo Valenti from Italy and two American scientists Brian Conner and Jim Barrett who are involved in the programme.

Other aspects of climate are being studied. Dr Tom Clarkson, also from NIWA but in Wellington, will continue his investigation of air snow interactions which began in the summer of 1992/93 and examines the usefulness of snow core data in determining historical atmospheric data. This season they will collect data enabling them to complete analysis and model development of air-snow exchange of trace elements on the East Antarctic Plateau; complete a study of variability of ionic contaminants in plateau samples which was begun in 1993/94 and establish measurements and methodologies suitable for the assessment of atmospheric transport and deposition of trace atmospheric components in the vicinity of Ross Island collecting several snow cores near an inhabited base to determine source-receptor relationships.

Dr Clarkson is also involved in the regular programme of climate monitoring undertaken at Scott Base where recordings of wind, temperature, pressure and direct, diffuse and global radiation are made. This climatic record was

begun in 1957 and remains one of the longest continuous records in Antarctica. In additional clean air samples are taken every two weeks throughout the year near Scott Base for further analysis in New Zealand. The collection of flask samples extends comparative research on atmospheric trace gases being conducted between the New Zealand Meteorological Service and Forschungsanstalt Julich in Germany since 1988.

Early season fieldwork

The other southbound scientists at WINFLY were Drs Ian Hawes and Anne-Maree Schwarz from NIWA Freshwater in Christchurch. They were taking advantage of the opportunity to obtain some early season data for their project which broadly aims to increase the fundamental knowledge of the physical, chemical and biological processes occurring in Antarctic inland water bodies, by focussing on dry valley lakes and their catchments. Their programme will provide information on how this link may be affected by human activities and/or localised climatic change. In order to achieve this, the key processes are examined to determine how community composition, trophic structure and function are maintained. They are investigating how aquatic system organisms and communities respond to changes in their environment over diel, seasonal and longer time scales and quantifying the links between spatially separated communities and processes. Their work comprises studies of inorganic nutrient processing in lakes and streams, suspended sediment transport and its effects on aquatic communities, trophic structures and physiological and phylogenetic adaptations to Dry Valley environments. They will return to New Zealand early in October and go back to Antarctica in early January for one

month. It is part of a larger environmental component which is increasing in the New Zealand Antarctic Programme.

Working at Bratina Island this season will be Carol Hulse from the Cawthron Institute in Nelson. This project, being undertaken for Drs Doug Mountfort and Henry Kaspar, also from the Institute, focuses on anaerobes and cyanobacteria in the Antarctic aquatic ecosystems. It complements the NIWA programme by describing the processes which degrade dead cyanobacteria and recycle the nutrients for cyanobacterial production. It quantifies the major processes of terminal carbon and electron flow and proposes the unique coupling of the carbon and sulfur cycles in Antarctic habitats. The programme aims to establish the relative importance of sulphate reduction and methanogenesis in at least six sediments in the McMurdo area. From this a methodology for testing the hypothesis that these sediments produce dimethylsulphide during the decay of cyanobacterial biomass and transform it to methane and sulphide will be established. A description of at least one psychrophilic anaerobe each from freshwater and saline ponds will be completed as part of a programme isolating and characterising the key anaerobic ecotypes.

Trace metal studies at Vanda

Dr Jenny Webster and Pete Nelson from ESR: Environmental in Auckland along with Drs Ian Hawes and Clive Howard-Williams from NIWA, and Professor Bill Fyfe the University of Western Ontario in Canada are undertaking a study of the interactions of trace metals and cyanobacteria at Lake Vanda. The objective of the research is to study the processes by which indigenous bacterial communities interact with both naturally-occurring levels of trace met-

als, and levels raised by contamination of soil and water. In Lake Vanda, bacteria in the water column and at the base of the lake are exposed to constant low level flux of trace metals derived from the Onyx River. By contrast, at the site of the former base at Vanda, cyanobacteria will come into contact with soils containing higher levels of trace metals, as the lake level rises and contaminated soils are flooded. A gully formerly used for greywater disposal, for example, will provide on site study. This work is urgent because the level of the lake is rising and the sites will shortly be flooded.

Human activity monitored

Oil pollution in Antarctica is a direct result of human activity. Significant oil spills in the region have been reported and deleterious effects on Antarctic biota noted. As the fate of oil in the environment depends on microbial activity, particularly that of bacteria, a team comprising Jackie Aislaby, Gareth Lloyd Jones and Malcolm McLeod from Landcare Research NZ Ltd in Hamilton are proposing to isolate both cold-tolerant oil degrading bacteria and the genes involved in oil degradation directly from Antarctic soils that have been chronically contaminated with hydrocarbons. The environmental parameters that limit biodegradative activity *in situ* will be investigated and the information used to study the possible use of bioremediation for cleanup of oil contaminated soil in Antarctica.

Also studying aspects of the impact of human activity in Antarctica again this season will be Dr Iain Campbell from Land and Soil Consultancy Services in Nelson. Dr Campbell's work focuses on soil systems and involves measuring the properties of permafrost at an experimental site near Scott Base and sampling soils near Vanda to deter-

mine the rate of contaminant movement through soils.

At Scott Base, measurements of changes in the water content of permafrost, following experimental disturbance by removal of the summer thaw layer, will be made using a neutron probe. Measurements made this summer will complete two years of observations at the disturbed site along with comparative measurements at an adjacent undisturbed site. The information gained will assist in predicting the impact of global climate change on Antarctic permafrost.

Near Lake Vanda, soils at a leaching trial site will be sampled at the end of year two of an experiment for subsequent analyses of lithium chloride. This was applied earlier as a tracer to determine its rate of movement through soils, providing an indication of the rate and extent of contaminant movement through soils in the arid dry valley environment. Results for this experiment are to be compared with results for a similar trial carried out in moist coastal zone soils.

Fish research continued

The Auckland University fish research group will continue its study of the anatomical, biochemical and physiological aspects of adaptations in Antarctic fishes. For most of this time studies have concentrated on mature fish but recently it has become apparent that juveniles exhibit major differences in environmental strategies.

It is known that most Antarctic fish species hatch in spring or early summer so their early larval life occurs at a time when zooplankton production is high and light conditions are appropriate for visual feeding. Some species have a short pelagic phase and settlement occurs at the onset of the first winter, whereas, other species extend the

pelagic phase over several seasons. Whichever mode is part of the pattern the winter darkness will represent a critical period in which scientists have hypothesised that there will be shift in the relative importance of visual and non-visual senses in the development of individuals within the species.

This season Dr John Montgomery, accompanied by Mat Halstead and Bjorn Sutherland will spend three weeks on the ice observing whether Antarctic *notothenioid* fishes share a common pattern of brain development with other fish species which undergo an ontogenetic shift in the sensory basis of their feeding. This work will be linked with ongoing studies of the sensory biology of larval and juvenile New Zealand fish species.

Also studying aspects of Antarctic fish again this season will be Dr Bill Davison from the Department of Zoology at the University of Canterbury who will lead a team comprising Malcolm Forster and Angus Forster. The circulatory system of a fish is used to transport oxygen, obtained at the gills, to the tissues of the body. In Antarctic *nototheniids*, cold adaptation has led to unique modifications to control mechanisms of this system. In the proposed programme this team of scientists will further investigate these mechanisms by analysing beat to beat control of heart rate. They will also investigate the control of oxygen uptake and regulation of resistance across an isolated gill preparation. In addition they intend to purify and determine the structure of proteins from Antarctic fish tissues.

The team will be on the ice from November 13 to December 5 and will be working at Scott Base. Specifically they will use spectral analysis techniques to study and analyse heart beat; develop an isolated gill preparation for use with healthy and X-cell diseased fish and examine protein and structure and

function in order to advance their knowledge of the circulatory system.

Chemical sediments studied

Dr David Craw and Yvonne Cook of the Geology Department of the University of Otago, will spend two weeks working at the Skelton Glacier. Their objective is to continue detailed investigations into the nature of the chemical sediments in the Skelton Group, to provide a systematic study of the chemical nature and evolution of the hot spring system in the proximal portion of the late Precambrian rift zone. The structure of the sequence will also be investigated. This is part of a Ph.D research programme in which associated geochemical and mineralogical studies of the hot spring system constitute a related but separate portion of the project. The study is of interest because the rocks make up the Wilson Terrane which constitute the remnants of a 400-500 million year old mountain belt which formed during the subduction of oceanic crust beneath the East Antarctic Shield. The mountain belt is founded upon sediments and volcanic rocks deposited in a suspected continental rift about 700 million years ago. The results of the project will help the scientists ascertain the physical and chemical nature of the sediment depositing system and the nature of the deformation which accompanied the re-crystallisation. Results will be compared with earlier work in the more deformed and re-crystallised rocks farther to the north and with similar rocks in North America.

A team of five geomorphologists comprising Marcus Vandergoes (an MSc student), Robin Bonny Hooker (MSc student and holder of an RDRC scholarship), Sarah Mager (BSc (Hons) student) and Professor Regi Lorrain (Free University of Brussels) led by Dr Sean Fitzsimons from the Department of

Geography at the University of Otago will spend one month in Antarctica this summer. The objectives of their research are to investigate the origin and preservation of glaciotectonic and sedimentary structures in deposits that form at the margins of cold-based glaciers; establish field criteria that can be used for the interpretation of Pleistocene glacial deposits and establish processes of entrainment at the ice-rock and ice-sediment interface in polar ice masses. Their work comprises a combination of field and laboratory investigations of the structural glaciology, ice marginal depositional processes and sedimentary products of alpine glaciers in the Dry Valleys. The research will contribute to the understanding of the relationships between climate, glaciological processes and sedimentary and geomorphological products. Their field programme will take them to the Taylor, Wright and Victoria valleys.

Penguins and skuas

Dr Peter Wilson and his team from Landcare Research in Nelson will continue their programme of aerial photographic surveys and assessment of the population dynamics of penguin rookeries on Ross Island.

This season the field team comprises Kerry Barton, Joanna Rees, Peter Wilson and Brian Karl from Landcare Research and Mike Beigel and Nat Polish from AVID Electronics (USA).

The team will be based at Cape Bird, where an automated weighbridge and data-logger will be set up to measure foraging effort of breeding Adelie penguins. The first party will fly south in late November and part of the team will be in the field until the end of January. At the end of the breeding season, just before the chicks fledge, a count will be carried out at each colony on Ross Island to measure breeding success, a

sample of chicks at each colony will also be weighed and measured to index chick condition. Chicks will be banded at these colonies, to assess natal philopatry and the relative direction of emigration. Satellite imagery will be used to assess sea-ice conditions that affect penguins access to feeding areas and breeding space available for nesting.

The aim of this project is to investigate the factors regulating the population size and colony distribution of Adelie penguins through studies of the importance of key resources such as nesting space and food, and the way they are allocated by behavioural traits such as philopatry, immigration and emigration.

Factors responsible for colonisation and growth in penguin colonies will be modelled to help scientists understand population regulation, the present effects of climate and predict future trends.

Skuas resident at Adelie penguin colonies at Capes Royd and Bird have exclusive access to food. Preliminary research at Cape Crozier during the summer of 1993/94 established that much of the penguin colony there could be exploited by all skuas in the local area. Any skuas can attack the penguins in the open groups but observations show that only resident territorial pairs may attack penguins in the second group. This season Dr Euan Young, from the Ecology and Evolution Section of the School of Biological Sciences at the University of Auckland, will return to Antarctica to determine how the central area becomes accessible to all local skuas and if the penguin egg and chick mortality is significantly different in breeding groups of penguins open to all skuas compared with groups in territories of pairs of skuas. The research has implications for the conservation of both species in places where significant human disturbance occurs.

Professor David Beaglehole returns to Antarctica this summer to study the

amount of UV and assess biological impact on the sea ice algae. The measurements, to be undertaken at three sites, involve time variation of the sky intensity, angular variation and wavelength distribution at three sites near Tent Island, near the edge of the sea ice and at the South Pole. The site at Tent Island has been studied before and provides a useful check on instrumentation. The site near the edge of the sea-ice will show albedo effects. The South Pole site should show ozone hole asymmetry effects if these are present. UV effects on the sea-ice algae near Tent Island will also be studied. Professor Beaglehole will be accompanied by Bhagie Rammandkhan. They will be in Antarctica for three weeks from October 23.

Sea ice processes studied

Dr Tim Haskell from Industrial Research Limited at Lower Hutt, near Wellington, will continue his multiscale, multiprocess study of the sea-ice, its breakup and effect on the climate of the Southern Ocean. Other members of the team comprise Professor Paul Callaghan, Drs Gary Eccles and Joe Seymour from Massey University and Dr Colin Fox from Auckland University. The purpose of the multi-scale approach is to enable scientists to understand the features relating to sea-ice breakup. This is important because the manner in which it breaks up determines the floe size distribution which together with a redistribution due to ocean currents or winds, alters the fluxes between the atmosphere and the underlying ocean. The study is therefore important for analysis of the climate of the southern hemisphere. Data relating to the physical properties of sea-ice, its mechanical properties, the way it fatigues and its breakup by sea waves will be integrated with available satellite imagery to en-

able climate related issues to be addressed.

The regular programmes

The regular programmes at Scott Base will continue. In addition to climate monitoring, these include Dr Andre von Biels' work on the Antarctic Mesosphere Ionisation and Dynamics. Dr von Biel, who works for the Department of Physics and Astronomy at the University of Canterbury, is concerned with the ionisation mechanisms, scattering characteristics and the dynamics of waves and tide observed in the wind patterns of the Antarctic mesosphere. This involves the operation, interpretation and maintenance of a 2.9 MHz backscatter radar and the acquisition, analysis and interpretation of experimental data which are collected on a synoptic basis for at least one solar cycle. It continues an existing programme which has been yielding reliable data since 1984 and enables scientists to gain an insight into and an understanding of the mechanisms and processes which influence the ionisation, scattering characteristics and the dynamics of the polar middle atmosphere. All of these features are of particular interest because of Scott Base's proximity to the geographic pole as well as its high geomagnetic latitude and the associated solar terrestrial effects in the upper atmosphere.

Dr Fank Fahy's study of atmospheric corrosion of architectural aluminum also continues. This is part of a long term project to determine the corrosion resistance of an architectural aluminium alloy in the atmosphere. Different thickness of anodic film to corrosion are being evaluated by exposure to a range of atmospheres in a number of different countries. Each year the samples, maintained at Scott Base and Arrival Heights, are returned to the De-

partment of Mechanical Engineering at the University of Canterbury for analysis before being reinstated at these locations.

In a joint project scientists from the Departments of Physics at the Universities of Newcastle and Otago are studying the characteristics of naturally occurring waves in the 0.1-5 Hz range associated with the earth's magnetic field. The waves propagate into the polar regions from the magnetosphere and through the ionosphere. The instrument at Arrival Heights extends the network of stations currently operated by ANARE and the University of Newcastle at Mawson, Davis, Casey and Macquarie Island. The observations relate to fundamental ion cyclotron and hydromagnetic wave processes in the polar cap and cusp regions. Recent results have shown that a wide spectrum of distinctive Pcl-2 emissions occur in the polar cap regions but the generation of these emissions has not yet been explained within the current theoretical framework.

The seismological observatory has operated at Scott Base since 1963 but with improved equipment from 1967. It records data on a continuous basis and transmits it to New Zealand and international agencies but the final analysis is undertaken at the Institute of Geological and Nuclear Sciences Ltd in Wellington. Scott Base has one of the few seismographs in Antarctica and makes a significant contribution to New Zealand and global earthquake studies. It includes a system for monitoring the nuclear test ban.

Annual maintenance

In addition to the regular scientific programmes the annual maintenance and installation of Telecom equipment will be carried out under the auspices of staff from Bear Operations base in

Christchurch.

Defence personnel and other visitors

RNZAF and RNZN personnel will assist with various environmental assignments mainly at Lake Vanda. These duties will be shared by army personnel who will also work at Lake Fryxell.

Survival training for RNZAF C130 crews in Antarctica will continue. An RNZAF helicopter detachment will assist in support for NZAP and USAP science and logistical activities. A Navy officer may be deployed to a USCG Icebreaker to gain experience with Antarctic operations. Senior Defence force staff are likely to travel south to observe activities.

Other distinguished visitors, media representatives will also visit the base as part of the regular Antarctic programme.

Antarctic Heritage Trust

Lawrence Smith, a photographer and recording specialist from Waikato Museum and Sheridan Easdale, the Trust's conservation co-ordinator from Christchurch will implement the next stage of the annual preventative maintenance programme at Capes Royds, Evans and Hut Point. Identification and security of artefacts for conservation, a reserve collection, completion of photographic records, installation of an improved hut environment monitoring system and identification of scientific equipment and machinery requiring further specific research will be among the tasks assigned to them this season.

Maj de Porter from Greenpeace in Auckland will also travel south this season as part of the programme. She will be monitoring the effects of the World Park Base on the site at Cape Evans.

Preparations will also continue for the six nation geological project at Cape Roberts with visits to the location by Alex Pyne from Victoria University and Jim Cowie from the New Zealand Antarctic programme.

Just as the bulletin was going to press it was announced that the func-

tions of the Ross Dependency Research Committee, which approves the science component of the New Zealand Antarctic Programme, which provides the support activities, are to be combined. The new organisation will be called the New Zealand Antarctic Institute. Details have yet to be announced.

Australia

140 science projects for 1995-96 season

The 1995-96 Antarctic season is shaping up to be one of the most complex and comprehensive programmes ever attempted by the Australians according to the recently released autumn 1995 edition of ANARE NEWS, a publication which has been in abeyance for nearly 23 months*. They report that the operational activities will extend over a substantial area of land and sea from 60 to 150 degrees East (over 4,000 km or 20% greater than the distance between Sydney and Perth).

Field research activities will be undertaken in the Bungar Hills, Amery Ice Shelf, northern Prince Charles Mountains, Law Dome, Larsemann Hills, Rauer Island and Scullin Monolith-Kidson Island.

The season will include seven voyages, of which six will be undertaken by the Australian vessel *Aurora Australis*, with an additional voyage planned for the specialist heavy cargo vessel the *Polar Bird*, previously known as *Icebird*. Activities for the season were expected to begin on 17 July and will continue until 18 April 1996.

Of the time the *Aurora Australis* spends at sea 101 days will be dedicated to marine science programmes, which is more than double that undertaken in previous years.

More than 140 science programmes are being undertaken with a major focus on climate change and ecosystem management research.

The highlight of the season will be a major survey of the biomass of krill over the region of the AAT stretching from 80 degrees to 150 degrees East. The survey covers the CCAMLR stations statistical area 58.4.1 and will provide data to establish for the first time, a precautionary catch limit on the krill fishing in that area. This is an essential measure considering that the area covers most of the waters off the AAT and krill serves as a primary food source for many of the higher order marine species. Equally important will the integrated oceanographic studies being undertaken for the first time in this region to determine the physical and chemical parameters of ocean current circulation and their influence on the dependent marine ecosystems. Further related studies on this voyage include work on the distributions of phytoplankton and zooplankton, bird and whale observations and penguin tracking from Casey to Dumont d'Urville.

The first voyage of the season involves winter research on the formation

and distribution of sea ice along with further detailed oceanographic studies supporting the World Ocean Circulation Experiment (WOCE) investigation of Southern Ocean dynamics and Antarctic bottom water formation. The second voyage will further stages of the studies of the activity and biodiversity of seals in the pack ice zone.

Integrated glaciology, geomorphology and geophysics research programmes, contributing to a greater understanding of structure and climate changes will continue in the Prince Charles Mountains and on the Amery Ice Shelf, outlet of the world's largest glacier and a key to understanding the dynamics of the Antarctic ice cap.

Ice core studies at Law Dome will provide information on past climate regimes, while research in the seldom visited Bungar Hills will further advance understanding of the Antarctic ice sheet history.

In the marine and lake environments around Davis significant research will continue on the carbon cycling pathways at various levels of the ecosystem and the impact of UV on micro-organisms, while biodiversity studies of seals, penguins and other flora and fauna will continue at the continental stations and Macquarie Island and during the marine science programmes.

A LIDAR (light detection and ranging) system providing observations of the structure, dynamics and climate of the middle and upper atmosphere, the region where ongoing changes in the climate are first expected to be clearly evident, will be prepared and tested over 1996 before installation at Davis the following season.

Further environmental protection activity will be undertaken with the continuation of the alternative energy wind turbine project at Casey, use of the *Polar Bird* for the removal of accumu-

lated rubbish at the station, particularly the old Casey tip, completion of fuel farm bunding at Mawson, construction and introduction of a new fuel barge for use at the continental stations to improve environmental safety of fuel transfer and establishment of solvent storage facilities at all stations.

Other operational features include heritage assessment of the old Davis buildings, initial construction of the new Mawson workshop, which is subject to consideration of heritage aspects of the station; transfer of construction materials for a new wharf at Casey to improve resupply and rubbish removal operations.

At Macquarie Island the Southern Aurora donga block will be refurbished and a new station leader's office and accommodation block built.

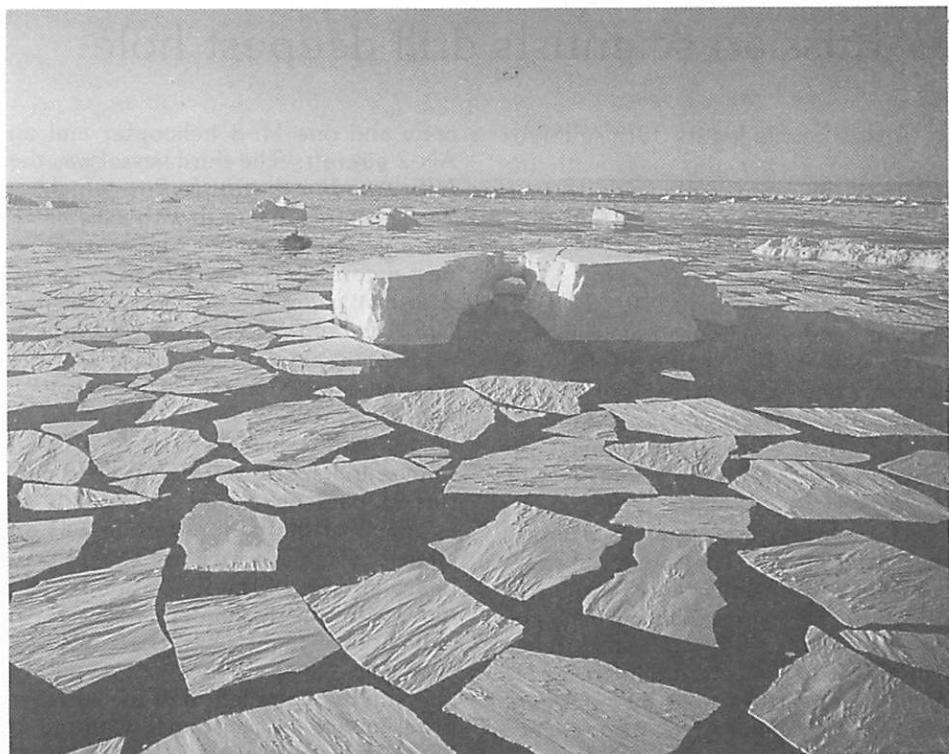
A priority is reconstruction of the foundations of the Davis ASP and Operations Building to correct recent subsidence problems with the building's current foundations.

Shipping schedule for 1995-96

Voyage 1. Aurora Australis departs Hobart July 17 returning on September 2. The whole voyage was dedicated to Marine Science, oceanographic and sea ice studies.

Voyage 2. Departs Hobart September 15 for Macquarie Island, marine science and seal surveys, Mawson and Davis ice edges before returning to Hobart on October 31.

Voyage 3. Leaves Hobart on November 2, for Casey, Mawson and Davis ice edges before returning to Hobart on October 31.



Voyage 3.1 from December 17 to 27 includes a three day visit to Macquarie Island.

Voyage 4. This leaves Hobart on December 31 and will go to Davis, carry out marine science programmes, deploy, check sea ice moorings, before resuming marine science and krill/hydrographic work. It will then head for Casey before carrying out more marine science and work on krill and hydrography before going to Casey. Further marine science, krill and hydrographic work will then be undertaken but include studies of deep water production and a visit to Macquarie Island before returning to Hobart on March 17 1996.

Australia's Antarctic icebreaker *Aurora Australis* is dwarded by icebergs and floes off the Antarctic Coast. Photo: R.Easterh

Voyage 5. In the meantime *Polar Bird* will leave Hobart on January 12 for Casey, Davis, Mawson, marine science programmes and geoscience mooring before going to Sandefjord Bay, Law Base, Davis, Casey and Hobart where it will arrive on March 6.

Voyage 6. The *Aurora Australis* is scheduled to leave Hobart for the final voyage of the season on March 18. It will go to Davis, support further marine science work, deployment and recovery of sea ice buoys, and visit Casey before returning to Hobart on April 17.

Russian scientists drill deepest hole.

Russia concluded its 39th Antarctic expedition earlier this year with the return of the summer teams to the Federation of Russian states. Scientists worked at Bellingshausen in the SANAE region, at Arctowski, Novolazarevskaya, Molodezhnaya, Mirnyi, Prydz Bay, Bunger and at McMurdo as well as in MckMurdo in the region of Peter Ø Island. They also carried out marine work between 62-66deg S and 68-84 deg E and in the Bransfield Sound. Over the winter of 1995 the scientists drilling at Vostok reached 3058 metres which is greatest depth ever as part of their programme. They retrieved an ice core with represents layers deposited 300,000 years ago which will be examined by scientists flown in to the area in October. The previous drilling record in polar conditions was held by the Americans working in the Arctic who reached 3054 metres.

The 39th expedition was led by A.M. Sochnikov whose assistants comprised V.N. Mosalov responsible for Geology and Geophysical research and A.B. Budretskii who was in charge of logistics.

Logistic support was provided by four vessels. Three belong to the Arctic and Antarctic Scientific Research Institute (AANII) of the Russian Federal Service for Hydrometeorology and Environmental Monitoring. They are the NEHs *Akademik Federov*, 141.2 metres in length with a displacement of 16,200 tonnes and speed of 16 knots. It can carry 260 passengers and crew and 2 MI-8 helicopters. The second vessel was the NEHs *Mikhail Somov*, with a length of 133.13 metres, displacement of 14,185 tonnes and speed of 16.2 knots. It carries 144 passengers and

crew and one Mi-8 helicopter and an AN-2 aircraft. The third vessel was the *NIS Akademik Shuleikin* which is 71.62 metres in length with a displacement of 2,140 tonnes and carries 76 passengers and crew but no aircraft. Also involved in the proramme was the *NIS Akademik Aleksandr Karpinskii*, a scientific expeditionary vessel of the Russian State Committee for Geology and Mineral Use. It is 103 metres in length with a displacement of 5,5000 tonnes and speed of 14.5 knots. It carries 92 passengers and crew.

Each of the major stations has an airstrip some of which are able to take heavy aircraft of the IL-76 and IL-18d types with wheeled under carriages. An indicatlon of flight operations was not available.

With the completion of the summer programmes 44 personnel wintered at Molodezhnaya under the leadership of L.G. Gindin; 34 wintered at Mirnyi under the leadership of L.A. Popolitiv and 13 at Vostok where E.N. Pugachev was the leader. Eighteen scientists and support crew spent the winter at St Novolazarevskaya under the leadership of N.K. Dmitriev while 13 stayed at St. Bellingshausen where V.A. Kuchin was the leader. Summer work only was carried out at Bunger, Druzhnaya and Progress.

In broad terms the focii of the scientific programmes were aerometeorology including ozone studies, a geophysics programme, glaciological work and geodesy as well as medical studies.

At Molodezhnaya hydrometeorological information was collected as part of an international programme for Antarctica, the Southern Ocean, the southern parts of Africa,

South America, Australia and Oceania. Ground analysis synoptic maps were compiled and transmitted to relevant organisations by facsimile. Information from artificial earth satellites was received and processed and cloud analysis maps were compiled and transmitted daily from the Satellites and received at Bellingshausen. Maps of ice conditions in the Antarctic seas were also prepared. Weather forecasts particularly of stormy or dangerous conditions and sea ice conditions are available from the stations at the request of fishing and expeditionary vessels. At Bellingshausen satellite information is received and processed; cloud analysis maps compiled and transmitted; weather informa-

tion is made available, ice maps and the results of ice surveys are compiled and transmitted.

Summer work at Mirnyi comprised inspections of the magnetic variation stations established in central Antarctica during the Mirnyi-Vostok transport expedition; fulfilment of a programme of environmental protection and ecological measures and of setting up a transport park for intra-continental expeditions.

At Novolazarevskaya a joint Russian-German programme entitled Ecology of the Shirmacher Oasis was being undertaken and automatic recorders of the physical-chemical state of waters in the Oasis were tested.

Oceanographic bias to Korean programme

The eighth Korean Antarctic Research expedition will shortly come to a close. It comprised a summer programme supported logistically by *R/V Yuzhmorgeologiya* under charter from the CGGE in Russia and a further winter team who are at King Sejong Station on King George Island. Some of the summer and winter parties were flown to the station by Chilean C-130 Hercules aircraft.

R/V Yuzhmorgeologiya arrived in Punta Arenas in October 1994 and left in mid December for King George Island. Between then and January 1995 Korean scientists undertook an oceanographic survey in the Bransfield Strait and in the Weddell Sea. They collected biological, physical, and chemical oceanographic data from both areas, and marine geological and geophysical data

from the Bransfield Strait.

Teams studied the coastal benthic ecology in Maxwell Bay while others collected geological samples from Livingston, Elephant and Gibbs Islands. This party comprised Drs M.Y. Choe, J.I. Lee, C.W. Rhee and Mr H.C. Kim. The leader of the summer party was Dr Y Kim and the leader of the winter party due to be relieved in October is Dr S.K. Chang. Most of the scientists are from KORDI but two were from Korean Universities.

Winter operations at King Sejong include maintaining a weather station, high resolution Fabry-Perot interferometer, magnetometer and seismograph system

BAS

New facilities for Rothera

New facilities, mainly for biological research, are to be made available at Rothera research station as part of the BAS restructuring programme. By 1997/98 Rothera, which is currently operating as the hub for the BAS geoscience, glaciological and remote sensing programmes, will also become the centre for the BAS terrestrial and inshore marine biology programmes in Antarctica.

The new facilities will increase the accommodation and scientific capacity available at Rothera and enable BAS to cope with the heavy demand for places at the station. Combined with the air-strip and deep water wharf facilities already implemented at the station more short-term visitors, particularly senior scientists from BAS, the universities and other institutions normally precluded from spending long period overseas, will be able to work there and in the deep-field.

Rothera Point on Adelaide Island off the west coast of the Antarctic Peninsula was chosen as the location for a new major British research station in Antarctica in 1974/75. Following a biological site survey conducted in 1976 building began and the station was officially opened on 1 February 1976. Since then it has been progressively expanded and now is the largest base currently operated by BAS in Antarctica. Currently it can accommodate 76 people. The average summer population is 40 with up to 15 normally in residence over the winter.

In the 1989/90 and 1990/91 summer seasons a 900 metre crushed rock air strip was constructed at Rothera

Point. Associated facilities include parking area, hangar and fuel storage tanks. A deep-water wharf was built at the same time for vessels to facilitate easier resupply of cargo and fuel and the removal of waste. Both were built after BAS undertook a Comprehensive Environmental Evaluation (CEE) of the potential impact of the activity on the Antarctic environment.

Currently Rothera is the centre for earth, ice and climate studies carried out by BAS in the Antarctic. The majority of this research is undertaken by small mobile field parties working at remote locations often far from the station. To support these activities BAS operates a fleet of four ski-wheeled de Havilland Twin Otter aircraft (DHC-6) and a four-engined de Havilland Dash-7 (DHC-7) in Antarctica between November and March of each year. The Twin Otters are used to ferry field parties from Rothera through the Antarctic Peninsula, Ellsworth Land and farther south. The main task of the Dash-7 is to transport personnel and light cargo directly from the Falkland Islands to Rothera.

BAS decided to expand the facilities at Rothera for three reasons. Firstly, limited increased funding made available by government to BAS to complete the restructuring of facilities in the Antarctic was insufficient to rebuild Signy Research Station (see *Antarctic* Vol. 13 No. 10 June 1995, page 416) as had originally been planned. Secondly, because of the need to increase efficiency and reduce costs BAS opted to move terrestrial and inshore marine biological research from Signy to Rothera



and thirdly, the new air facility and deep-water wharf can offer logistical support unmatched by other stations in the Antarctic Peninsula region. In addition the establishment in the summer of 1993/94 of air links to Rothera from the Falkland Islands using the Dash-7 aircraft now allows for fast, frequent and efficient transfer of personnel and light cargo.

Rothera Point is a low rocky promontory, at the southern extremity of the Wormald Ice Piedmont, south-eastern Adelaide Island. It covers an area of approximately 439.700 square metres and rises to a maximum height about sea level of 39 metres.

The isthmus between the Wormald Ice Piedmont and Rothera Point was originally a raised beach composed of small stone and pebbles which was destroyed during the construction of the airstrip. Rothera Point, itself, comprises a dissected rock ridge, running

The hardrock runway at Rothera greatly enhances the station's logistic capability. BAS photo

north-east to south-west, an area of raised beach on the south-eastern side composed of rounded boulders and an area of permanent ice at the southern end.

A sloping ice-ramp with a gradient of 1:5 leads from the isthmus to the Wormald Ice Piedmont. In recent years this has deteriorated due to melting because of a general rise in temperatures in the Antarctic Peninsula region and also ablation due to dust deposition from construction and logistical activities at the Point. There are three main bodies of water and meltwater pools in the area, and, while there are no streams, temporary melt-water runnels flow from snow patches for a short period in the summer. The rocks in the area are predominantly heterogeneous intrusions

of diorite, grand granodiorite and some adamellite of the mid-Cretaceous Lower Tertiary Andean Intrusive Suite. There are small areas of soil, mainly glacial till and sand on the rock bluffs. There are also a wide range of intertidal and subtidal substratas at Rothera including vertical bedrock faces, boulder and cobble beaches as well as flat beds of soft silt. The seabed around the Point shelves steeply and depths exceeding 500 metres can be reached only five kilometres from the base. Waters less than 200 metres deep are restricted to the immediate fringe of the coastline around which currents are minimal with only the channel between the Point and Killingbeck Island, on the eastern side, having speeds in excess of 0.5kts.

Rothera Point is relatively cold and dry, its climate representing the transition from the more oceanically influenced "maritime" Antarctic to the north and the more extreme climate of "continental" Antarctica to the south. The mean air temperatures in summer are -2deg C to +1deg C while in winter they range between -05deg C and -20deg C. It has no direct sunlight for a few weeks at mid-winter and some 24 hours of sunlight during December. Sea ice conditions vary greatly throughout the year with the Point sometimes totally locked with fast ice from July to February but completely free in another year. Pack ice often drifts north from Marguerite Bay when the wind is in the south or during calm periods and can rapidly fill South Bay.

The proposed extensions to the base focus on the construction of five buildings. The biological laboratory, aquarium and diving area will comprise terrestrial and marine sciences laboratories, a seawater aquarium and SCUBA diving facility with emergency recompression chamber. The accommodation building will house up to 48 people during the summer and will con-

tain 12, four person bunkrooms, washrooms, laundry facilities and storage. This building will be closed and sealed each winter.

A new boathouse will accommodate a rigid-hull inflatable boat some 5.5 metres in length and two smaller rigid-hull inflatables. The boats will be lowered into and raised out of the sea from the wharf using a small mobile crane.

The power-house will contain three diesel generators each producing up to 450kVA and associated plant, fuel tanks and control equipment. Only one generator will be in use at any one time. Linked to the main living complex by corridor will be a building to accommodate a reverse osmosis plant for fresh water production and associated pumps, valves, pipework and tanks.

The existing powerhouse is to be refitted as a combined laboratory and workshop with a mezzanine. The existing computer and mapping room will be made into a computer facility and fuel and water pipelines around the station will be re-routed.

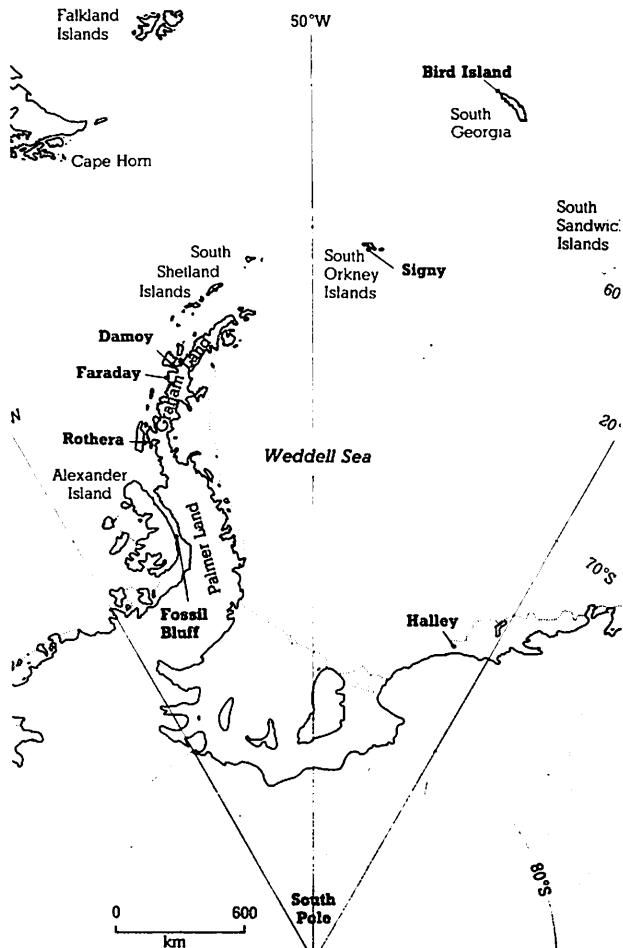
With the exception of the boathouse and powerhouse the new buildings will be single storey and constructed using timber panels with a solid foam core. They will be supported on either concrete slabs (raft foundations), concrete piers or suspended concrete slabs on dwarf walls. The exteriors are to be plastic coated steel, bonded to the timber panels. The boathouse is to be an arched metal building ("miracle span") and the power-house a proprietary insulated building.

Services are to be contained in timber ducts with heat-tracing and raised above the ground on wooden bearers attached to timber trestles and the existing surface fuel pipelines running parallel with the airstrip are to be re-routed to provide space for the new biological laboratory. Site preparation, foundation and construction work began last

attached to timber trestles and the existing surface fuel pipelines running parallel with the airstrip are to be re-routed to provide space for the new biological laboratory. Site preparation, foundation and construction work began last season and the final fitting out is planned for the coming summer. The buildings are designed for a life of 20 years.

During the 1994/95 summer the contractor built and operated a construction camp at Rothera Point which will be used until the expansion is complete. Prefabricated temporary buildings were erected on the site of the former sledge dog spans on North Beach and the camp consist of an accommodation block and a kitchen block with lounge and office. A diesel generator and reverse osmosis water production plant are housed in containers while a further four containers are being used for storage. Personnel and materials for construction have been and are being transported to Rothera by BAS vessels and aircraft. In the 1994/95 and 1995/96 seasons a maximum of 40 contractors are expected to be on site for up to 117 days.

By 1997/98 the expansion of the station will be complete with marine and terrestrial services fully operational. The station will then be able to accommodate 124 people but it is unlikely that the full operational level people will be reached for some years and then



they will only stay at this level for between two and three weeks at the beginning and end of each summer field season when research parties are preparing for and returning from the field. The average occupancy of the station during the summer is likely to be approximately 60 to 70 people while in the winter up to 30 people will undertake long-term, all year scientific research and provide logistical support. The increase in winter numbers is attributable to the introduction of marine and terrestrial scientists to the station.

\$220 million rebuild for South Pole Station

The National Science Foundation has announced plans to rebuild the Amundsen Scott South Pole Station at an estimated cost of \$220 million.

Designers have been working for a year on plans which will see three basic U-shaped buildings, raised several meters off the ice surface to permit snow to blow underneath. This will prevent the problem of snow accumulation, which is occurring with the current geodesic dome and buckling the arches.

The dome is to be taken to pieces and removed from Antarctica, in compliance with the spirit of the Madrid Protocol.

Funding the reconstruction has yet to be resolved. The National Science Board, which approves major initiatives in the NSF, has asked the NSF to continue to review alternatives before it will decide to support the plans.

South Pole Station currently comprises 3504 metres of heated space and 4118 square metres of unheated space. However, it cannot continue to support current and developing research without extensive reconstruction. The buildings and utilities have exceeded their 15-20 year life span and are rapidly deteriorating due to age, intensive use and climate conditions. Scientists and support personnel are already constrained by the deficiencies of the base, which are likely to further limit research activities.

The proposed reconstruction will take place over eight to ten years, while serviceable portions of existing facilities are used to continue science and education projects.

The planned buildings will incorporate modern architectural and engineering improvements.

They include modular, elevated buildings with laboratories, dormitories and offices; upgraded heat, power, water, wastewater and fuel systems; and demolition and removal of old structures and utilities.

Elevation of buildings will prevent snow buildup and lessen snow removal costs. Better technology will make station operations more efficient and reduce the number of maintenance staff needed. NSF has put forward four alternatives for reconstruction, which range from a station of 45 people 25 people in the austral summer to one that would accommodate up to 200 people at one time. They range from low-level investment to building a renewed, up-to-date station able to support significantly better programmes.

Alternative A: Low-level investment or no action. This option would see only the most inefficient structures, utilities and equipment replaced over the next decade. If a critical portion of the station were not repaired or replaced, any affected operation or service would terminate, as would science and education projects. The station numbers would remain at a maximum of 125 in summer and 27 in the winter dropping slowly over the next decade.

Alternative B: Rebuild over eight to ten years without expansion. This option would see the station rebuilt to accommodate the total population and to support the science and education programme at present levels. An increase in personnel numbers would be possible. The electrical generation capabilities, telecommunications capabilities and other technical backup would increase.

Alternative C: Rebuild in eight to ten

years with expansion.

The station would be rebuilt over about a decade with year-round capacity to support science and education programmes and projects increased. There would be more capacity to support astronomy and astrophysics research. A flexible station design would allow for changes in programs as research areas grow or decline along developing paths of investigation. When finished the station would support 150 summer residents and 50 in winter.

Alternative D: Reconstruct over five years with expansion. This option would see a rebuilt station much like the one in

alternative C, including the elevated structures and expanded remote science facilities. However it would be done over a five year period rather than eight to ten years. The science population and support staff would probably decrease during reconstruction. About 100 reconstruction crew would work during the austral summer, along with about 25 during each austral winter. When finished the new station could support 150 summer staff and 50 winter staff.

The preferred alternative remains C. NSF has prepared a draft environmental impact statement on all four alternatives.

Sub-Antarctic

Heard Island's special qualities recognised in draft management plan

Conservation of a unique sub-antarctic wilderness containing Australia's only active volcano is the central aim of a new management plan for remote Heard Island and the nearby McDonald Islands.

The Heard Island Wilderness Reserve Draft Management Plan was released for public comment in January of this year by the Acting Minister for the Environment, Duncan Kerr.

Heard Island and the McDonald Islands is an Australian territory in the Southern Ocean 4100 km southwest of Perth. The territory is dominated by the heavily glaciated 2700 m cone of Big Ben, Australia's only active volcano.

"This icy volcano in the stormy southern ocean is a dramatically beautiful place, but Heard Island also is the least disturbed subantarctic environment on earth, fully deserving World Heritage Listing, Mr Kerr said. The island group's animal and plant life in an undisturbed environment, its permanent glaciation, its unique geological forms and its history have been identified as significant values for which management strategies are outlined.

The Territory, which is on the register of the National Estate, was nominated by the Australian Government in 1990 for inclusion in the World Heritage list on the basis of the area's outstanding biological and physical processes, its role in a globally important ecosystem, its range of landform features and its physical grandeur. The nomination was deferred by the World Heritage Bureau pending a wider study of the application of the World Heritage Convention to subantarctic islands.

The plan sets out four key goals for management of the Territory

- to conserve the Territory's values by preventing undue human modification of natural processes and features;
- to facilitate scientific research in the Territory;
- to conserve, record and interpret the Territory's cultural heritage; and
- to promote public appreciation and enjoyment of the Territory's features.

About 40 public submissions about the plan, mainly concerned with strengthening its conservation provisions, are now being considered in preparation of the final plan, due to be submitted to Parliament and published later this year. *Reprinted with permission from ANARE News Autumn 1995, page 35.*

To all Polar Medallists:

A review is currently being undertaken of the official roll of those awarded the Polar Medal. A letter from Rear Admiral J.A.L. Myers, Secretary of the UK Polar Medals Committee, explains that a number of discrepancies in the roll have been found and contact is being sought will with all recipients or with their families.

The Admiral is particularly interested in those medals issued during the current reign as there is a semantic problem with the inscription on the obverse of a number of them and he would like to annotate the roll with the "type" issued to each recipient. He explains:

"At the beginning of the present Sovereigns reign the inscription around the Queen's head on medals including the Latin diminutive for Great Britain - BRITT OMN - and the whole inscription translated reads Elizabeth II by the Grace of God Queen of Great Britain, Defender of the Faith."

After a few years, however, it was modified because medals were also awarded to citizens of Commonwealth Countries for whom Her Majesty's style of "Queen of Great Britain" was not appropriate. In the case of the Polar Medal this apply particularly to Australians and New Zealanders whose medals probably carry the inscription "Elizabeth II by the Grace of God

Queen, Defender of the Faith."

Although the Polar Medal was one of the last to be modified it is believed that those carrying the inscription were issued from the late 1950's (when the first New Zealanders received their awards).

More recently it has emerged that the medals with the old obverse are being struck again. The reasons are uncertain but enquiries are being made at the Royal Mint (which has moved from London to Wales).

A new obverse die has now been prepared Dr Margaret Bradshaw, President of the New Zealand Antarctic Society, was two years ago, awarded one of these.

The Admiral has issued a questionnaire, copies of which can be obtained either from him or from the Secretary, New Zealand Antarctic Society, P.O. Box 404 Christchurch. From the responses he hopes to establish when the changes in obverse inscriptions took place and mark the roll with the type of obverse used for each medal.

For direct communications the UK address is: Rear Admiral J.A.L. Myers, C.B, Secretary, UK Polar Medal Assessment Committee, Hydrographic Department, Lacon House, Theobalds Rd, Holborn, London WCIX 8RY.

UK - AHT conservation programme begins at Port Lockroy

Active conservation work will be undertaken at the abandoned British Base Port Lockroy this coming season. It is one of four to be designated this year with Historic Monument Status at the XIXth Antarctic Treaty meeting at Seoul in May 1995 (*see Antarctic Vol 13. No. 10 June 1995*). This seasons programme will see the base, "tidy, secure and fit for the education and enjoyment of visitors."

The historic status follows a recommendation which emerged from a survey of nine of the 15 abandoned British Bases undertaken by conservation architect Chris Cochran of Wellington New Zealand and Ian Collinge Logistics Officer with the British Antarctic Survey in 1994 for the UK Antarctic Heritage Trust. (*See Antarctic 13. No. 7 pages 310 ff.*)

Port Lockroy was established by the British Government in 1944 during the wartime Royal Navy "Operation Tabarin". Although its first purpose was to permit a military presence in the area it was also used for scientific research and exploration.

After the end of the Second World War it continued to be used as scientific research station through the International Geophysical Year of 1957 until 1962 when it was abandoned. The original buildings from 1944 survives today with in some internal alterations and additions which have been made at various times during the 18 years in which it was actively in use. A boatshed and storage building are largely unchanged from when they were constructed in 1858 but a Nissen Hut which was part of the original base has collapsed and is

not considered restorable.

Under the conservation programme the buildings will be preserved in the form, but not the condition, in which they exist today. The fabric will be repaired, stabilised and maintained with as little change as possible. It is intended that the base building will appear largely as they were when abandoned in 1962 but as though regular maintenance has been carried out during the intervening 33 years. This involve repairs using materials to be matched if possible or at least closely matched. Details and standards of work-

Continued from page 432

ations in seal distribution, abundance and features of their behaviour and physiology in different localities, years and seasons, can provide insights into changes in oceanographic features.

These seals could be used as free ranging platforms for oceanographic instruments to record and relay (via satellites) data on sea temperature, salinity and ambient light at depth. There is also an urgent need to asses their functional significant in Southern Ocean ecosystems.

The programme can be expected to produce information of value to several Antarctic research programmes and inter-governmental organisations. These include CEP CCAS, CCAMLR (including CEMP), Scientific Committee on Oceanic Research (SCOR) Southern Ocean - Joint Global Ocean Flux Study (SO-JGOFS), SCARGLOCHANT, and International Whaling Commission (IWC).

manship will be matched in the effort which is designed to extend the life of the buildings for as long as is reasonably possible.

The conservation policy which has been adopted allows for ongoing regular maintenance, monitoring of the condition of the buildings and minimising risk of further collapse or fire. Detailed records of the work of the on the base buildings will be maintained at British Antarctic Survey and as far as resources permit detailed research will be made of the buildings and their associated ob-

jects. All the records are to be held at BAS. In due course interpretative material will be prepared for visitors.

Precise dates were not available at press time but it is known that the 1995/96 conservation work is planned for late this coming season in order to minimise disturbance of the Gentoo penguin colony that occupies the whole of Goudier Island. Chris Cochran will be a member of conservation party.

Adapted from the conservation report prepared by Cochran and Collinge for BAS, June 1995.

Port Lockroy as it was in 1957 -
BAS photo.



A triumph for a Colonel

Colonel Norman Vaughan finally made it, three days before his 89th birthday. Made what? The summit of Mt. Vaughan the mountain named for him because of his participation in the 1929 Geological Party of the 1928/29 Byrd Expedition. (And it is all the more remarkable because he did it, accord-

ing to the newsletter on 16 December 1995 - a misprint of course.)

The Mt. Vaughan Antarctic Expedition had a long gestation. As early as 1991 Colonel Vaughan and a party comprising his wife and three climbers planned to leave a support party of two at the Patriot Hills Camp, fly across the

continent in a chartered DC-3 with 22 huskies, establish a depot and trace the route of the 1929 geological party culminating in a climb to the summit of the Mountain named for the colonel. (see Antarctic 13. No. 1 page 38 ff).

The expedition ran into troubles from the start. They went south first in November 1993 requiring six DC-6 flights to transfer the party, fuel and equipment from Chile to Patriot Hills. Underfunded they were only able to charter three of the five flights DC-3 to transfer the expedition to a support base. From here the picture is a little confusing for they were involved in the charter of an Allcair Air Transport DC-6 which crashed out of Patriot Hill in January 1994.(It is presumed that the DC-6 would have taken them to their base camp.) Injuries in the crash were minor but four dogs ran off and could not be recovered. The expedition now had no aircraft and after 16 days of bad weather, there was insufficient time to complete their objective before the end of the season.. They returned to Chile in a South African C-130 chartered by ANI.

From 1 April 1994 dogs were prohibited in Antarctica and by the following season the expedition had sufficient remaining funds only for the Colonel, his wife Carolyn, climber Vern Tejas and an to fly south for another try. ANI's C130 took them to Patriot Hills where they were joined by ANI guide Gordon Wiltsie flew by Twin Otter to Mt. Vaughan some 750 miles away. Eight days later they reached the summit of the 10,302' high mountain. The following day they returned to base camp in just 12 hours before breaking camp - a day later and returning to Patriot Hills.

From the top of the Mountain the 88 year old adventurer said "By climbing this mountain for my 89th birthday, I dare to fail and met success. I have fulfilled a 65 year old dream."

The Colonel and his wife are fulfilling a round of speaking engagements and working on a book about the expedition but hope to return to Antarctica this coming summer as tourists. If this eventuates it will be the colonel's sixth visit to the frozen continent.

DANTE: Can you help?

There is soon to be a dictionary of Antarctic English the contents of which will be drawn from history, heroic endeavour, scientific exploits and language. DANTE is being compiled by Bernadette Hince from the Abbotsford Campus at the Museum of Victoria. She was an editor at BMR, the Bureau of Mineral Resources, now the Australian Geological Survey, in Canberra for three years. While there, the "Antarctic types" used words which aroused her curiosity and she began collecting them.

About five years ago Ms Hince also began reading polar literature and collecting quotations using Antarctic English which she interpreted as liberally as possible. They included words significant for Macquarie, Heard, Campbell and Auckland Islands as well as the Falklands and the Antarctic continent itself.

Each word was used in the Antarctic or had special Antarctic significance. Many were used for ice and landforms, oceans, weather phenomenon and fauna - Antarctic convergence, Antarctic tern, aurora, brash ice, crevasses, DUKW, emperor penguin, goney, king penguin, larcies, lead, packcake ice, snow bridge, snow petrel, stinker, water sky, whiteout and young ice were examples. Others relate to the locations, history and the paraphernalia of human activities such as apple hut, banana belt, changeover expeditioners,

mukluks, overwinterers, ventiles.

Ms Hince says the words that she has collected so far fall into ten categories.

1. Descriptive/scientific which deals mainly with aspects of science such as weather, marine science land and ice forms and animals. Most of the antarctic seabirds, penguins, and mammals have common names and they make up a large element in this category; Adelie penguin, emperor, rockhopper, Wilson's storm petrel, ice fish. Patagonian toothfish, blue whale, sooty albatross and wandering albatross are among them. She has found that many of the quotations relating to these animals concern their food value for early explorers. Adelie penguins' eggs are one example. *Adelie penguins' eggs are about the size of a goose's; they are either white or of the same shade as a duck's, but have much coarser shells. They are excellent to eat; the white being semi-transparent and gelatinous, and the yolk delicate of flavour.* 1921 Ponting, Great White South, 246. Others are ice terms, such as bergy bits. *Even in daylight when heavy seas are running, bergy bits and growlers lying in the troughs of waves are difficult to identify.* 1963 BAS Bulletin 2:16

2. Political history, quotations can illuminate and document politics and history, either directly or by more subtle allusion "Structurally Pole Station is in worse shape than Byrd. Either a new station must be built or the South Pole must be abandoned as a research site. With the Soviet Union maintaining bases in Antarctica, there are reasons other than science for occupying the Pole. 1969 Polar Times 69: 11/3

3. Our view of the world/our environment.

Terms such as frozen wastes or ice wastes clearly indicate an evolution of

these are regarded as areas by dwellers of more or less temperate climes, as useless. *Others have regretted ever succumbing to the challenge of adventure which beckoned them to the those frozen wastes.* 1966 A. Baum Antarctica: Worst place in the world 77

Others have seen the only value of the South as being its harvestable resources, or its potential to contribute to human wealth and knowledge.

4. Use of these resources

There is considerable historical detail on resource use and in approaches to these resources. The familiar pattern of rapid and unsustainable use of a newly discovered commodity is seen in a quotation on Antarctic cod. "*Undisputed evidence of overfishing of some finfish species exists for several areas of the Southern Ocean. In the South Georgia areas, for example, stocks of Antarctic cod (Notothenia rossi) have crashed from an estimated 400,000 tonnes in 1970 to a meagre 866 tonnes in 1983.* 1986 Ant Soc Australia Newsletter 7:5

5. Familiar words used in unfamiliar ways

These include words most people wouldn't ordinarily think of applying to a subject, for example, the use of the word decay or rotten ice: *The West Antarctic Ice shelf, itself of special interest because it is thought to be the most vulnerable of such sheets to decay.* 1993 Nature 365: 608

The ice sheet, up to a metre thick, was rotten and, especially when a swell came in, tended to break up around the ship. 1975 Ant Journal X(1):2

Others in this category are the weasel tracked vehicle (how many non-Antarctic people know what a weasel party is?): *The efficiency of dog and weasel travel decreases with higher sastrugi and more crevasses to zero. A prolonged period of bad weather can rec*

reduce efficiency of man and dog parties, but not remarkably affect a weasel party. 1965: E.E. Hedblom *Polar Manual* 93. Pressure pack, which in this case has nothing to do with the ozone layer but concerns the state of the pack ice: We were disappointed at soon meeting heavy pressure pack which forces forced us to go west.

1964 D.F. Styles *Narrative Coastal expedition Kemp Enderby Lands* 13.
6. Earliest use of familiar words
 Speaking of the ozone layer, the term of ozone hole can easily be claimed for Antarctic English. The marked thinning of the ozone layer was first observed in the Antarctic.

Although this category of familiar words could well be the smallest in this list it will probably include one surprising and fascinating term for an item which one uses everyday - the humble tea bag. Although no-one would have thought of this as an Antarctic term, the earliest quotations I have found for it are all Antarctic. And they are almost 50 years earlier than the first quotation which is unambiguously for a similar object in the Oxford English Dictionary. "Our small supply of butter and Glaxo was saved for emergency, while a few tea-bags which remained were boiled over and over." 30 December, 1912. D. Mawson in 1964 p Mawson of Antarctic 81

7. Words we could guess the sense of, but might wish not to know: This is a small category but might include new words s such as retrograded. In stark contrast to McMurdo, everything except food and sewage is retrograded from Palmer.... Sewage and food scraps are both macerated and put into the sea. 1991 ASA News 25:13
8. Words including reference to the Antarctic

Terms which include the word Antarctic, or part of it, are the most obviously Antarctic English words of all.

They include Antarctic deep water; Antarctic convergence, Antarcticist and Antarctican.

"The dry valley area is regarded by Antarctica as the banana belt' of the continent where scientific work can be carried out in shirt sleeves on some days. 1975 J.G. McPherson *Footprints on frozen continent* 87. [Note It also describes the Peninsula -ed] Some animal and plant names which would also fit into the first category such as Antarctic tern and pearlwort Antarctic pearlwort.

9. Slang words and contractions.
 Slang words are a rich part of any language, especially where people have a common job or occupation, and Antarctic slang is flourishing. It includes work words like kodak attack (or kodak poisoning); banana belt, blitzed in, diesos and slot.

Harry Woodberry and Snow Williams moved the Met caravan across to Fischers Nunatak where they promptly put the new D4 into a slot. 1963 Aurora (June) 6

*I can hear bits of ice tinkling further down into the blue depths of the slot".
 1991 T. Bowden Antarctica and back 60 days 84.*

10. Arctic connections
 Some biological links between the two polar areas; the Arctic tern migrates each year from Antarctica to its breeding grounds in the Arctic. There are many parallel historical and linguistic links, as words have migrated from Arctic life and exploration.

Many words are common to life and exploration in both polar regions. Words like finnesko, sastrugi and nunatak were brought into Antarctic literature by early explorers with Arctic experience, such as Roald Amundsen. The "Finnesco" a Finnish Reindeer Skin Boot, 1900 F. Cook, *Through the first Antarctic night (caption. opp)* 224.

Many of the early explorers in the Ant-

arctica - if not all - had extensive libraries on Arctic exploration which were often taken south on the ships.

Regional forms

Many Antarctic words are used only within a particular national group and won't be used by other Antarctica. There are noticeable differences between the usage of Australians, New Zealanders, Americans, British and South Africans. Because the human population of the Antarctic is so impermanent, sometimes words are used only by those on one base for one season. If recorded in DANTE they will be more enduring.

Other words like Donga might not even be understood by non-Antipodeans. *Fifty yards up from the shore building began - a row of dongas (insulated living quarters). 1987 D. Lewis Ice-bound in Antarctica 82. Donga is especially confusing because it has a South African meaning which has nothing to do with the Australian (and later Antarctic) meaning of housing or shelter - in South Africa it refers to a water channel or gully.*

The finished dictionary.

Like the Oxford English Dictionary it will give quotations from published works for each word defined providing the reader with the earliest quotation found for each word as well as later examples, variant spellings and difference in meaning.

DANTE will contain enough information to satisfy the keen reader. It will be a reference work of the lively nature, providing information about the history of Antarctica since Captain James Cook made the first known crossing of the Antarctic Circle.

Can you help?

Amassing the necessary quotations for any historical dictionary is an extremely slow job even for such a comparatively small body of works. What is needed are quotations from South African, Brit-

ish, American, and New Zealand bases, newspapers and popular magazines relating to the Antarctic - if you can help the Abbotsford Campus is at 71 Victoria Crescent, Abbotsford, Victoria 3067. Adapted from *Aurora* June 1995 p 30ff

Obituary:

Maurice Conly - Antarctic artist

by Neville Peat

Antarctica lost one of its most accomplished advocates with the death on 19 July 1995 of artist Maurice Conly at Waikanae, near Wellington, aged 75.

Wing Commander Conly, official artist for the Royal New Zealand Air Force, visited Antarctica twice in the summers of 1971-72 and 1973-74 and thereafter maintained a strong interest in Antarctic activities and issues.

His book *Ice On My Palette* (Whitcoulls, 1977) introduced many New Zealanders to the scenery of Antarctica, the scientific work carried out there, and the living conditions. He also designed a number of Ross Dependency postage stamps. Three Conly dioramas form backdrops for displays in Canterbury Museum's Antarctic Hall.

In 1981 he was awarded the New Zealand Antarctic Society's Conservation Trophy and in the same year he received the MBE for his services to art in New Zealand.

His artistic and design talents were in constant demand and his output was prodigious. He helped out in countless ways. The painting he produced for the cover of *Looking South*, the New Zealand Antarctic Society's 50th Anniver-

sary book, is just one example.

Robert Maurice Conly was born in Dunedin on 3 February 1920 and showed artistic talents at an early age. He worked in the art department of a Dunedin printing firm before joining the RNZAF in 1941 as a trainee pilot. When he could not pursue a flying career for medical reasons, he turned to working for the Air Force as an artist, a vocation that would last 54 years.

In the mid-1950's he began designing stamps. Through this medium he portrayed all manner of New Zealand affairs, from the Islands (Tokelau, Niue, and Cook) to the ice. There are more than 150 stamp designs in his portfolio.

As an active reserve officer of the RNZAF he was steadily promoted until he reached the rank of Wing Commander in 1985. He illustrated *Portrait of an Air Force*, published in 1987 to mark the 50th anniversary of the Air

Force.

Antarcticans, however, will remember him for his superb portrayal of Ross Dependency landscapes, wildlife and buildings, especially the historic huts of Ross Island. He excelled at portraying the huts of Scott and Shackleton paintings memorable for their poignancy and meticulous in their detail.

In *Ice on My Palette*, he says in an introductory note: "As I painted [the huts], I recalled seeing, as a youngster, the expeditions of Byrd and others passing through Dunedin on their way south. I used a Tilly lamp to brighten the interior of Scott's hut at Evans, and by warming my hands on the lamp and

The photograph, which appears on the cover of *Ice on My Palette*, was taken by George Madgwick of Wellington at Cape Royds. He was a caretaker for the historic huts during the 1973-74 Antarctic season.



occasionally running on the spot, managed to complete the painting in one session...."

"With temperatures constantly below freezing, I found that brushes froze solid or slivers of ice palette attached themselves when least expected. Sometimes washes lifted off the paper in layers of sparkling frost. Wind, accentuating the cold, would usually force me to pack up; yet I was acutely aware that for an artist there is no tomorrow in Antarctica - tomorrow might bring a raging storm, if not colder temperatures, or perhaps a scheduled helicopter pull-out back to base."

The life of Maurice Conly had many dimensions. Certainly his involvement with the Air Force dominated much of it, but he also treasured his association with the Antarctic and Antarticans, among whom he had many friends.

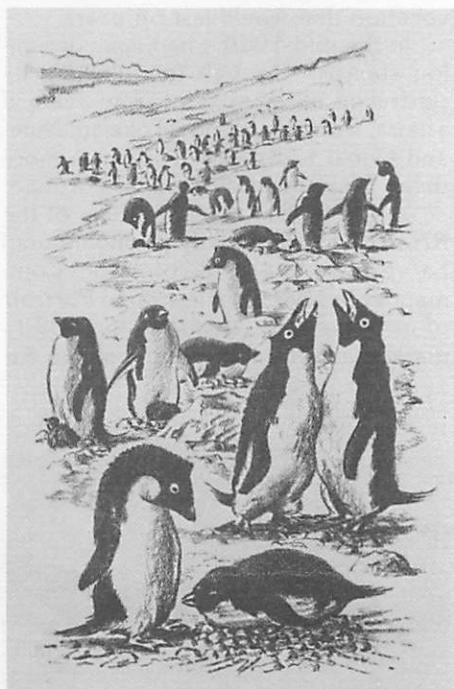
Ice was the first of his books - and, because I contributed the text, mine as well. We produced five books together over the next decade, include *Snow Dogs* and *Tokelau*. Maurice was regularly called upon to design covers for books. What with his stamp designs, coin designs (he was responsible for the \$1 and \$2 coins in current use), his Air Force work and his private commissions, I scarcely knew how he managed it all, how he maintained his extraordinary standards in the face of such output, and, more than anything, how he always kept a cheerful humility.

To all who knew him well and to many others who knew him only by his work, Maurice Conly will really never die. He is as close as our bookshelves, stamp collections, the coins in our pockets, and such special places as the Canterbury Museum Antarctic Hall.

Postscript: Maurice Conly died five days before the scheduled launching of his biography, *Send for the Artist*, narrated to and written by Paul Harrison and published by Random House. The

book focuses largely on his Air Force life but there are chapters on his Antarctic experiences. Maurice saw a copy of the book before he died.

PPS. Maurice was also responsible for the design of the cover and layout of *Antarctic* in its present form. The Society very much appreciated the assistance. Editor.



New editor for Antarctic

At the recent meeting of the Council of the New Zealand Antarctic Society Greg Williamson of Head Consultants in Christchurch was appointed editor of *Antarctic*. The appointment follows the recent retirement of Robin Ormerod after 12 years in the position. The new address, telephone and fax numbers appear on the contents page of this issue.

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 vitally interested in some phase of Antarctic exploration, history, development or research.

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