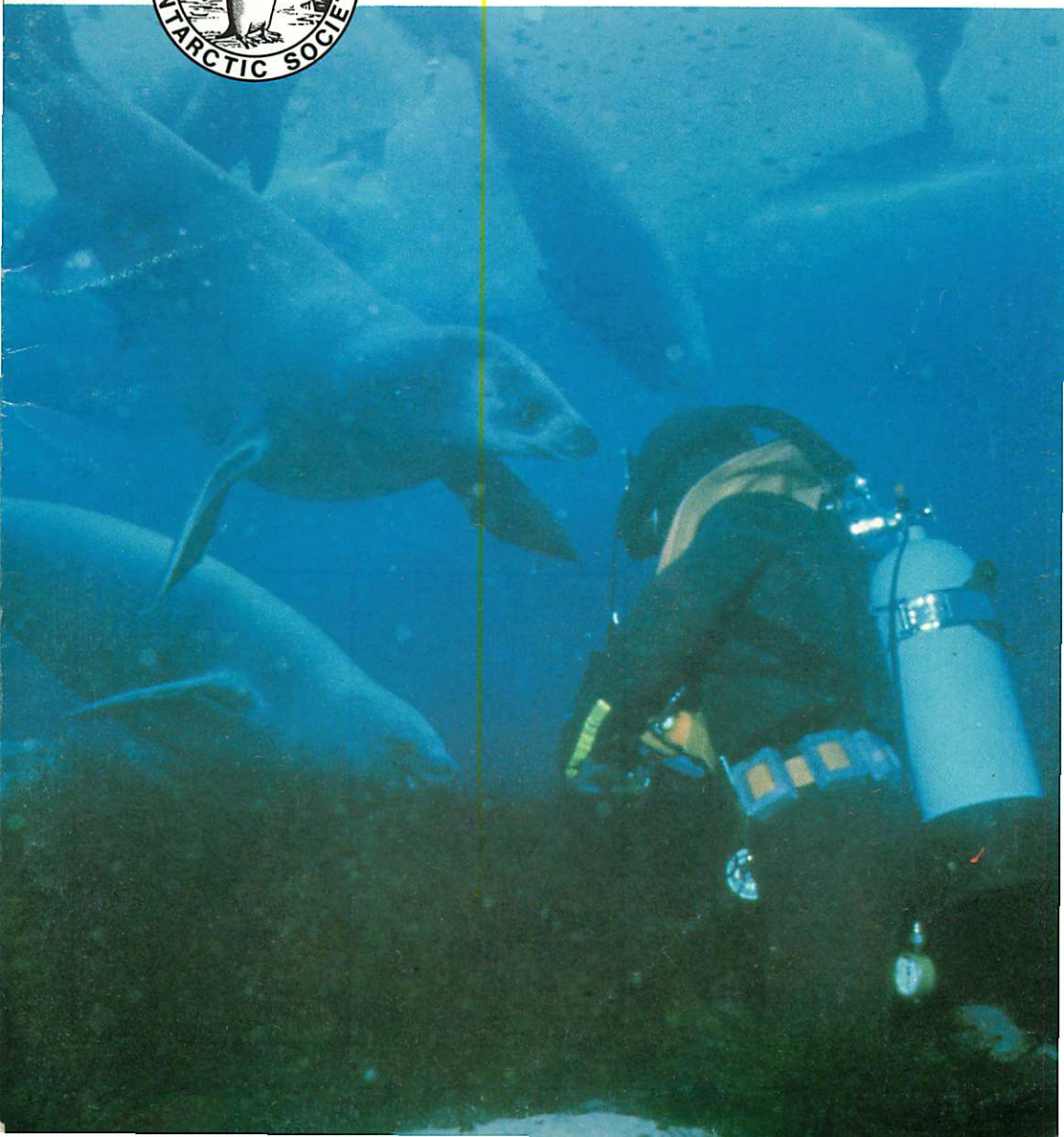


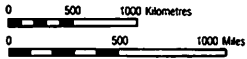
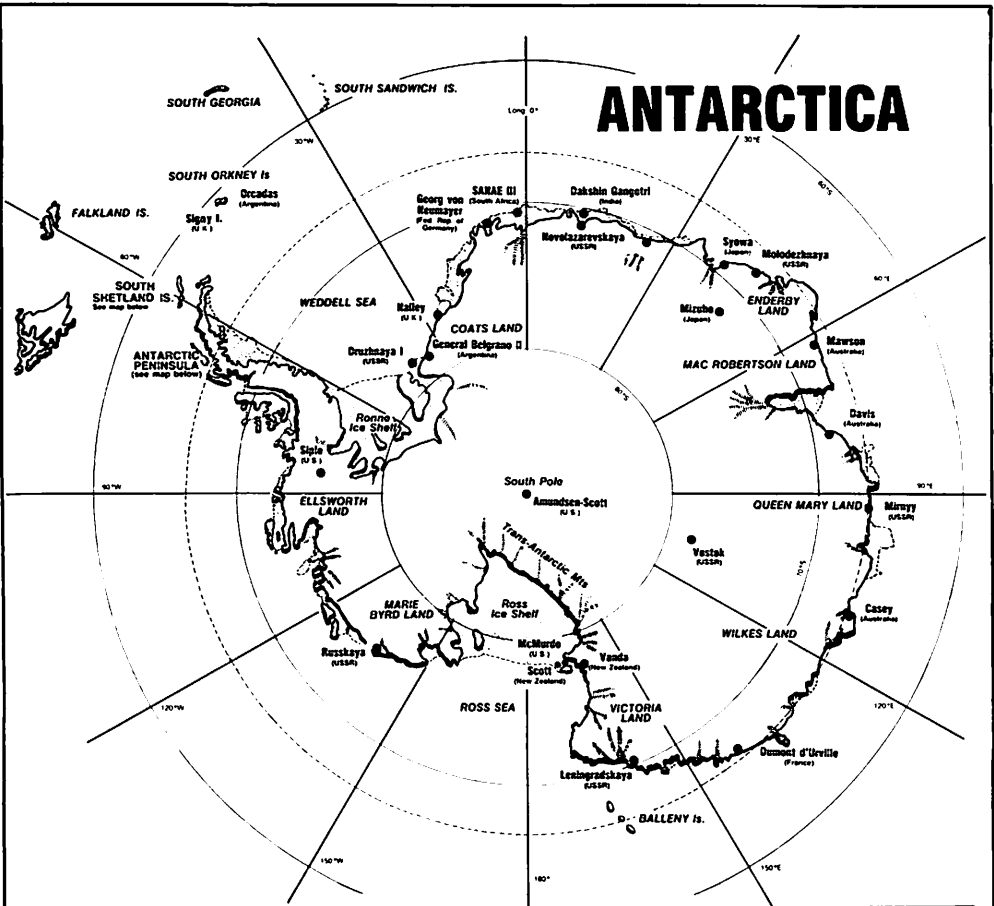
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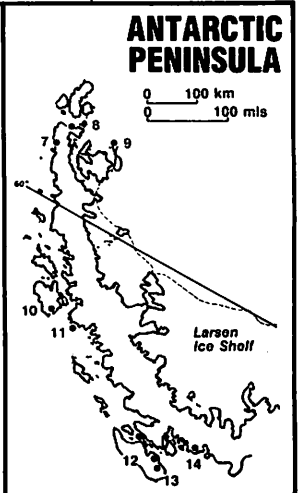
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ANTARCTICA



- 1 Comandante Ferraz BRAZIL
- 2 Henry Arctowski POLAND
- 3 Teniente Jubany ARGENTINA
- 4 Artigas URUGUAY
- 5 Teniente Rodolfo Marsh CHILE
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- 8 Esperanza ARGENTINE
- 9 Vice Comodoro Marambio ARGENTINA
- 10 Palmer USA
- 11 Faraday UK
- 12 Rothera UK
- 13 Teniente Carvajal CHILE
- 14 General San Martín ARGENTINA



ANTARCTIC

(successor to "Antarctic News Bulletin")

Vol. 11 No. 5

Autumn 1987

Issue 125



ANTARCTIC is published quarterly by the New Zealand Antarctic Society Inc., 1978.

ISSN 0003-5327

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Telephone: (04) 791-226

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Deadline for final copy for the next issue is October 23.

All administrative enquiries should go to Bulletin "Co-ordinator", P.O. Box 1223, Christchurch.

Registered at P.O. Headquarters, as a magazine.

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Cover: Biologist diving among crabeater seals at Signy Island, South Orkney Island.

Photo: D. G. Allan, British Antarctic Survey.

NZARP

New Zealand's Antarctic science programme enters 30th year

New Zealand's 30th continuous year of scientific activity in the Antarctic will involve 200 scientists and support staff working on 47 projects on and around Ross Island, in McMurdo Sound and in the Dry valleys region with one deep field geological mapping expedition to Marie Byrd Land and a four man expedition to Cape Hallett. Scientific studies will cover earth, life, atmospheric and physical sciences. The last major phase of the Scott Base building programme will be completed and the conditions of the historic huts will be further assessed.

This season's programme began in late August when ten members of the Scott Base construction team and a scientist involved in an ozone programme flew south. The major thrust of activities will begin as usual early in October.

McMurdo Iceshelf Ecosystem

This season will also see the start of a three year multi-disciplinary programme studying facets of the McMurdo Iceshelf ecosystem. It is the first time New Zealand has conducted such a co-operative environmental study in the Antarctic and it is likely to involve scientists from Auckland and Canterbury Universities, the Ministry of Works and Development, the Taupo Freshwater Laboratories and the Meteorological service. Specific individual studies will include the geochemistry of the meltwater and sediments; glaciology of the McMurdo Ice shelf, work on energy balances, aerosol chemistry, community structures and bacterial physiology of algae and protozoology.

As part of the first stage of the three year programme Drs Clive Howard-Williams of the Taupo Research Laboratory and Rick Pridmore of the Water Quality Centre in Hamilton will examine the puzzling abundance of thick algal mats identified two seasons ago by air in the melt pools of the McMurdo Iceshelf. Such growth and diversity is dependent on high levels of organic nitrogen normally generated by vegetation or, in other areas, by pollution. As neither of

these factors is present the algae is presumed to have grown over decades or be thriving because of nutrients from an unknown source.

Working across the pinnacle or dirty ice east and west from Bratina Island, the pair, accompanied by John Roberts an Antarctic Division field assistant, will look at the physiology of the algal mats, the environmental conditions for growth, the species and composition. They will also look specifically at photosynthesis and nitrogen metabolism.

A short visit will also be made to Cape Royds to collect samples of the thick algal mats for Dr Dick Castenholz of Oregon State University who may join the programme during the second year.

Dr Paul Broady of Canterbury University will spend two months collecting samples of algae from some of the tens of thousands of ponds on the McMurdo Ice Shelf. He will describe and identify algal flora and determine the ecological preferences of the major species. His project is also part of the first year of the study of the McMurdo Iceshelf Ecosystem. He will be assisted for some of the time by Alistair Surer a student from the University. Dr Broady will also be associated with the deep field programme.

From mid-December Dr Stephen de Mora and student Rob Whitehead of Auckland University will be in the Bratina Island areas assessing the geochemistry of the major elements of the melt pools on the McMurdo Iceshelf. They will look specifically at the



temporal and geographical changes in gross composition of the melt pools and the stream system that forms each year. A brief visit will be made to collect samples for geochemical and biological analysis from the Alph River which flows into Walcott Bay on the western edge of the iceshelf. A further visit will be made to the Alph River later in the season by Dr Clive Howard-Williams and his team to collect samples for comparative analysis.

Mercury levels

In conjunction with John Patterson of Chemistry Division, DSIR in Wellington Dr De Mora and Rob Whitehead will continue work on atmospheric mercury taking samples from the Scott Base area, Bratina Island and Lake Vanda. Scott Base technicians continued the programme, begun last summer, throughout the winter and preliminary results indicated some of the lowest levels of atmospheric mercury ever recorded. They will provide unique baseline data.

Bratina Island in McMurdo Sound where scientists will be conducting part of the first stage of a three year multi-disciplinary programme.

Photo: Dr Stephen de Mora.

Additional work on mercury will be undertaken by Dr Doug Sheppard and Alan Dick of Chemistry Division, DSIR in Wellington. They will be trying to obtain an historical record of mercury levels from accumulated layers of snow near Scott Base.

Samples will be melted in the field and taken to the Scott Base laboratory where the vapour will be released into a photoacoustic analyser containing gold trappings from which the level of mercury can be measured. Analysis of mercury is important as it is poisonous and the extent of contamination can only be fully assessed from accurate baseline data. Antarctica is ideal for such work as pre-industrial samples can be obtained.

Life sciences

Further work will be undertaken on the

comparative physiology of Antarctic animals by a group from Auckland University. The study aims to identify mechanisms of cold adaptation to acquire a better understanding of the general physiological principles of adaptation by examining the functions of the cells and tissues at their extreme lower temperature limits. The three projects for this season will include a joint study.

In the first of the projects further work will be undertaken on the sensory functions of lateral lines in notothenioids comparing the anterior lines with trunk lines in fish with different feeding habits. In a second project nets will be suspended on oceanographic wires to collect samples of plankton for information on the vertical stratification in relation to light intensity.

The objective of the joint plankton/fish study is to obtain information on the visual threshold for feeding in *P. Borchgrevinki* using neurophysiological and behavioural techniques. The results will be compared with the vertical distribution of light and potential prey.

Dr John Montgomery will lead the team which comprises Professor Brain Foster, John Cargill and Heiko Weix all from the University of Auckland. They will be joined by Dr Ned Pankhurst from the Leigh Marine Laboratory on Goat Island, North of the Auckland, and will be working at Scott Base, Cape Royds and New Harbour for five weeks from late October.

Cancer research

Marine benthic organisms, principally sponges, will be collected by a team of divers for scientists involved in cancer research at Canterbury University. The project is associated with the National Cancer Institute and the American National Institutes of Health.

The field leader is Dr Chris Battershill who will be accompanied by Greg Smith and Nick Nevin. Diving will be supervised by Trevor Dick, a professional diver experienced in cold water work. The organisms will be identified, quantified and the ecological relationship correlated with the sub-Antarctic. Samples will be brought back to Canterbury University where they will be

screened for the presence of anti-viral/anti-tumour compounds.

During the last four years over 3,000 different sessile invertebrates have been collected from the sub-Antarctic, in other New Zealand waters and from locations up to the equator. They represent more than 80 per cent of the sessile invertebrates known to be available. Canterbury University students will prepare extracts from the samples, isolate the compounds and send them to America for testing as anti-tumour/anti-viral constituents for drugs. This is the first year such a collection has been made in Antarctica.

Gill structure

Pagothenia borchgrevinki collected in McMurdo Sound by scientists from the University of Canterbury in 1985 often had white swollen "fluffy" gills. Samples analysed under the electron microscope reveal the growth of big spherical cells the cause of which is unknown.

Research in the northern hemisphere suggests that the symptoms may be a virus induced cancer. Further samples of the species will be collected this season to determine the proportion of the population affected and for more detailed examination of the tissue.

Biochemical and morphological work will be carried out to determine whether changes in gill structure affect gas exchange across the gill or whether compensation is made by other tissues such as the skin.

Dr Bill Davison of the University will lead the team comprising students Craig Franklin and Peter Carey. They will be on the ice for a month from mid-November.

Seaweeds

Dr Murray Brown of the University of Otago will also be diving this season with student Johnathon Keogh and Trevor Dick. Operating at Cape Evans they will be looking for samples of two species of seaweed, iridacea and phyllophora, for subsequent testing to determine whether they exhibit any adaptations to the extreme Antarctic environment. Specifically they will be looking at photosynthesis, respiratory and growth rates and pigment content. Biomass

will be estimated, quad racks established for ongoing research and a number of plants tagged to check in future for individual survival.

Penguin studies

Vocal recognition among Adelle penguins will be studied again this season by Beth Spiers of the Zoological Department, University of Otago. She will play back some of the tapes obtained last season, observe parent/offspring recognition and differences in calls and undertake further recording in addition to experimenting with mates and neighbours. Beth Spiers will be accompanied by Dr Gary Mitchell of the University of New Mexico who will continue his observations of the birds' ability to navigate around the colony and return to their nests after foraging. An Antarctic Division field assistant Robin Johnston will also spend the four months at the colony at Cape Bird with the pair. The work is part of an ongoing programme designed to help scientists understand more clearly the factors that influence the breeding success of Adelle penguins.

Dr Richard Sadlier formerly of Ecology Division, DSIR and now with the Department of Conservation will continue radio tracking of Adelle penguins during incubation. This is the third season that the project has been underway. He will be accompanied by Ross Pickard also from DOC and Kevin Lay and Brian Karl from Ecology Division. Two members of the team will be based at Hanson's Ridge and two members at Cape Bird thus extending the range over which the birds can be tracked. Modified and improved radio transmitters will again be attached to selected birds with an epoxy resin and they will be tracked during feeding in order to determine the distances they travel.

Melatonin

Also working at Cape Bird will be Dr John Cockrem and Greta Enyon of Ecology Division, DSIR, Wellington. Dr Cockrem will continue his study of the reproductive timing of Adelle penguins. This year further blood samples will be taken from selected birds

held for short periods under artificial conditions of light and temperature. The scientists hope to determine how penguins maintain their sense of time in the light Antarctic summer; how sensitive the pineal gland of penguins is to the inhibitory effects of light; if there is a circadian rhythm of body temperature in penguins and the physiological basis for circadian timing in the birds.

Ecology Division scientists from Nelson will again conduct an aerial survey from a helicopter and an RNZAF Hercules of the Adelle penguin rookeries on Ross Island and on the west coast of the Ross Sea and as far west as possible from Cape Adare along the Adelle Land coast. This project is part of the International Survey of Antarctic Seabirds and provides data from which environmental changes in the Antarctic ocean ecosystem can be monitored. This year's team is lead by Dr Peter Wilson and comprises Dr Mick Clout and Bruce Thomas.

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Scientists Graham Wilson and John Maris from the Entomology Department of Lincoln College will survey the Adelie penguin colonies at Cape Bird, and update the rookery maps. A search will be made for perviously banded birds. Skuas nesting at the colonies will also be counted.

Captain Ian Nicholson of the New Zealand Army and Lieutenant Roger McGarry of the territorial forces will conduct a detailed survey of all snow free areas on Ross Island at which the McCormick skua Gull is nesting. They will work from Cape Royds to Dellbridge Island and from Gneiss Point to Dailey Island determining the breeding density of the gull and comparing the results with previous surveys conducted by Ian Spellberg from Canterbury University from 1965 to 1967 and subsequent data obtained by Professor Euan Young of Auckland University. Captain Nicholson is a keen and experienced ornithologist and the pair are going south as part of the army's adventure training programme. The New Zealand Army regularly assists the Antarctic Research programme with cargo handling.

Further work on melatonin in seals is to be undertaken by Dr Graeme Barrell of Lincoln College in conjunction with Dr G. Montgomery of Invermay Research Station. The results of Dr Barrell's earlier work indicate that Weddell seals may regulate the seasonal

processes such as fur moulting and reproductive changes by responding to changes in secretion of melatonin from the pineal gland.

This year the scientists will spend three weeks from mid November at the seal colonies at Big Razor Back Island, McMurdo Sound collecting blood samples at hourly intervals from individual seals for up to 24 hours. Melatonin levels in the samples should indicate natural fluctuations in secretion and effects of sleeping and activity on the emerging patterns.

Marie Byrd land

In New Zealand's major deep field project for this season, Dr Chris Adams from the Institute of Nuclear Sciences, DSIR, Wellington will work with geologist Dr Stephen Weaver, and botanist Dr Paul Broady both from Canterbury University in the Rockefeller and Alexandra Mountains on Edward VII Peninsula in Marie Byrd Land.

Adams and Weaver will undertake a programme of geological mapping of the Rockefeller and Alexandra Mountains making a detailed study of the age of the rocks using potassium-argon and ribidium-strontium isotopic dating methods to determine the petrological/geochemical evolution of the various granitoid suites and metasedimentary basement of the area.

Winter teams vote radio

New Zealanders working in the Ross Dependency this winter were able to vote in their General Election, held on August 15, as the result of an amendment to the Electoral Act which provided for their special votes to be transmitted by radio to the Chief Electoral Officer. The Act was amended in 1985 because nine men at Scott Base who voted in the 1984 snap election held on July 14 did not have their votes included in the count as the ballot papers could not be returned to New Zealand in the specified period, and the existing electoral laws contained no provision for transmission of the contents.

Provision was made in a new section of

the Electoral Act, 1985, for voting by special voters in the Ross Dependency, on Campbell Island, Raoul Island in the Kermadecs, and Tokelau. Special deputy returning officers were appointed this year to issue ballot papers to special voters, and were empowered, with the written consent of each voter, to inspect the marked ballot paper and completed declaration and dictate the contents to the Chief Electoral Officer in Wellington.

Voting papers for 22 men and women working in the Ross Dependency this winter were delivered to Scott base in February shortly before the last United States Hercules flight out to New Zealand. In the last week of July the Scott Base postmaster, Mr

Their data should help clarify the extent of the Cretaceous and Devonian suites in the region and allow for a more accurate correlation between Marie Byrd Land/Northern Victoria Land, Tasmania and New Zealand.

Paul Broady will make a basic survey and collection of moss/lichen flora in the area and will record the bird and seal colonies. This is the first time a biological survey of the area has been made since the second Byrd Expedition in 1933, although the U.S. Antarctic Service Expedition of 1939-41 made some preliminary observations in the Rockefeller Mountains. Aside from a brief visit to Scott Nunataks by members of Amundsen's expedition who obtained a few samples of lichens no other collections have been made in the Alexandra Range.

Geological mapping of the upper reaches of the Ferrar and Taylor Glaciers will be undertaken by a team of geologists comprising Alan Sherwood, Phillip Kirk of the New Zealand Geological Survey in Wellington, Fergus Anckhorn of the Ministry of Energy and Ken Woolf of Antarctic Division.

The project was initiated by Australia's New South Wales Coal Measures Study Group and began in 1980/81 with a combined Australian/U.S. expedition to the Beacon Supergroup of Southern Victoria

land. (New Zealand Geological Survey is to release the results of that work shortly.)

Two subsequent expeditions involving New Zealand geologists undertook further work and this year's team will concentrate on 1:50,000 mapping of an area including Pivot Peak, Terra Cotta Mountain, Knobhead, Rotunda, Table Mountain and the Mt. Odin area. Ken Woolf will remain with Antarctic division for six months to complete the work.

Scientists from the department of Geology at the University of Otago will continue detailed geological study of the Wright and Taylor Valleys to determine what occurred in the basement rocks 250-300 million years ago. Team leader is Dr Tony Reay who will be accompanied by Roy Johnstone, Simon Ellery, Ian Keiller and Alistair Morrison from the University and by Antarctic Division field assistants Andy Harris and Ian McAlpine.

They will study the geochemistry of the granite at Mt. Loke at the eastern end of the Wright Valley, the timing of its intrusion and the effects on the associated meta sediments and the lamprophyre dykes, vertical injections of igneous rocks, common in the area but about which little is known. The differentiation and intrusion characteristics of the ferrar dolerites in the Wright Valley will

Gavin Sanne, who was the special deputy returning officer, received by telex a list of the candidates in 19 electorates and their party affiliations.

Of the 22 New Zealanders on Ross Island 11 were at Scott Base, and eight (five men and three women) were employed by a Christchurch firm which provides catering services under contract to the United States Navy at McMurdo Station. Three other New Zealanders wintering at Cape Evans this year about 35km from Scott Base, are members of the Greenpeace private expedition. The fourth member is a West German woman scientist.

Twenty-eight New Zealanders in the Ross Dependency, on sub-Antarctic Campbell Island, and Raoul Island 1600km north-east

of Wellington, made voting history on August 13 when their special votes were transmitted to New Zealand by radio telephone for the first time. The Ross Island voters cast overseas special votes, the voters at the weather stations on Campbell and Raoul Islands recorded New Zealand special votes.

Eighteen voters on Ross Island consented to the contents of their ballot papers being transmitted to New Zealand. Campbell Island's winter team of eight all consented but only two of the team of six on Raoul Island. Regulations made under another section of the 1985 Act provide for the original ballot papers and declarations to be returned to the Chief Electoral Officer.

also be examined. They are extensive intrusions which cover an area of several thousands of kilometers and have changed over time.

Two parties from Waikato University will also be working in Antarctica this season.

Glacial drifts

Dr Chris Hendy accompanied by Fiona Judd, Willem de Lange and Kay McAdam will be working on the glacial drifts near Lake Bonney. His team will excavate, describe and sample the Taylor III glacial drifts as part of a programme which began with work on the Taylor I and II glacial drifts. They hope to prove that the glacial drifts from the Taylor Glacier correspond to periods of high sea levels in contrast to the Ross Sea glacial drifts which correspond to periods of low sea levels.

Vicki Moon and Vince Fulton will later be joined by Willem de Lange from the University's Antarctic Research Unit and be assisted for part of the time by Alan Quinn, an Antarctic Division field assistant. The team will study and sample dolerites and lamprophyres in the Wright and Victoria Valleys to determine the relationship between intact strength (hardness, compression, shear and tensile strengths) and their mineral composition. The characteristics of the rock joints will also be examined in relation to their hardness and elastic properties.

Iceberg movement in the Western Ross Sea will be further monitored by Dr Harry Keys of the Department of Conservation. He will be accompanied by Denis Fowler of the Information and Technology Directorate of the DSIR in Wellington. Photographs will be taken from an RNZAF Hercules of the icebergs in the fast ice along the western coastline of the Ross Sea and compared with those of previous years to determine the distribution, residence times and drift of the distinctive Mackay Glacier bergs.

Mt Erebus

Equipment installed to monitor the movement of the Erebus Ice Tongue will be checked by Dr Tim Haskell, from the Department of Information Technology in Wellington.

The signal strength of the video equipment installed last year at Scott Base and on the summit of Erebus will be improved and a heated window installed over the camera to facilitate year round recording of the Strombolian eruptions as they occur in the crater. The purpose is to compare the initiation, development and aftermath of the eruptions with telemetry seismic recordings to determine their cause. Such information could be used to reduce the hazard of similar eruptions in populated volcanic regions. Ray Dibble of Victoria University is team leader. Susan Ellice, also from the University, will assist in the servicing of the seismic telemetry and infrasonic telemetry stations at the summit, continue the infrared thermometry measurements on the wall and floor of the crater and spend time at Scott Base monitoring results from the equipment. They will acclimatize on the Fang Glacier and be accompanied by an Antarctic Division Field assistant.

Sediment studies

Sediment studies in McMurdo Sound will be carried a step further by scientists from Victoria University. From mid-October to mid-December Alex Pyne, Barbara Ward, Barbara Armitage and Phil Shane accompanied by plant operator Geoff Blake will collect samples from the sea floor and eight locations from McMurdo Station to Tripp Island.

Previous studies have described the sediment texture across the entire Sound but not on the coastal fringe. This limited zone is of particular interest because work on the MSSTS 1 drill core shows how variations in diversity and sediment texture may be used to show sea level changes in the quartz sequences. By sampling the shallow water areas along the Victoria Land coast they will be seeking to understand how the sediment and micro-organisms change from sites offshore into deeper water.

Dr Graeme Claridge (Wellington) and Ian Campbell (Nelson) from the soil bureau of the DSIR will continue the study of soils in Antarctica and the processes that produce them. They will spend nearly four weeks in the Alata and Towle Valleys of the Convoy

Range, Arena Valley at the head of the Taylor Glacier and Walcott Bay making observations and collecting samples to increase understanding of the significance of the soils in terms of formation of the Antarctic landscape, glacial history, past climates and influence on ecosystems.

Trace metals

As a closed and unpolluted water system Lake Vanda presents a unique opportunity to study trace metal solubility in a saline brine at equilibrium with mineral precipitates. Salinity and temperature in the lake are known to increase with depth. Dr Jenny Webster of the Chemistry Division, DSIR, Wellington will sample the lake at various depths and test for trace elements, cations and anions. Her work will extend available data on Lake Vanda.

Meteorological observations

John Griffin and Gordon Saggars of Paraparaumu will make daily climatic observations at Scott Base where recordings are made of direct and diffused solar radiation, wind temperature and pressure and atmospheric turbidity. The solar radiation programme will be continued. The routine three yearly maintenance of equipment at Scott Base, Arrival Heights and Vanda Station will also be carried out.

The meteorological programme at Vanda to be conducted by Dave Paull of Christchurch will be extended from daily six hourly synoptic observations, evaluation of data loggers and collection of data from screens in the Wright Valley to include additional recordings of the energy balance over the lake surface and long range radiation over the ice and valley floor. A pilot study using balloons to determine air circulation in the dry valleys will also be undertaken.

Representatives from New Zealand youth groups will again be part of the New Zealand programme. This year Susan Quirk an Air Training Corp cadet from Dunedin, Duane Coughland, a Scout also from Dunedin and Helen Neil, a St John Ambulance Cadet from Hamilton will be on the ice from January 11 to early February and participate in aspects of the New Zealand programme.

Two guest scientists will take part in the programme. They are Juan Acosta a marine scientist from Peru who will be with a team from Otago University working on benthic marine algae and G. Zurita from Ecuador who will work with a team from Victoria University studying sediments.

Two film teams are involved in the programme. The first, Peter Llewellyn and Janet Bertaud from Christchurch will film around Scott Base, scientists working at Cape Bird, on Hanson's Ridge and on the Ferrar Glacier for Fast Forward. A second team comprising Neil Harraway, Andrew Penniket, Paul Donovan and Ian Masterton will also be at Scott Base, Capes Evans and Bird, Mt Flemming and Vanda Station. They are making a documentary for the Natural History Unit in Dunedin. It will explore the habitats and animal plant communities under the sea ice.

A programme of snowcraft and survival training will be run under the leadership of Brian Staite from the Outdoor Pursuits Centre near Turangi. He will be assisted by Lynn Bowering also from Turangi and Steve Lassche from Arthurs Pass who will be replaced part way through the season by Andy Harris from Turoa. An American Dave Lasorsa, on the ice for his sixth season, will also help. Regular courses will again be run for New Zealand and American personal. The four instructors also form the nucleus of the combined US/NZ Search and Rescue team.

Survival Training

Three full time instructors assisted by a fourth in the early part of last season put 620 New Zealanders and Americans through survival training during the summer.

The Chief Instructor for the season was Glen Neeman, an officer in the probation service in Christchurch. He was assisted by Mary-Rose (Mike) Fowlie who is a member of the Mt. Cook Search and Rescue Team; Warren Herrick, a freelance pharmacist from Queenstown, south for his second season having spent the first as a field assistant, and Dave Lasorsa from the United States Antarctic Research Programme, who was on the ice for his fifth season. Also Max

Wenden, a pilot from Wanaka, who subsequently worked as a field assistant on Mt. Erebus, the Ferrar Glacier and in the dry valleys.

Using a course format similar to previous seasons with lectures and instruction in snowcraft, glacier travel, crevasse extraction, the students spent a night in a snow shelter and received advice on the condi-

tions associated with their particular projects. Special search and rescue training was also given to those wintering over.

In all the instructors conducted 27, 2½ day snow courses, six sea-ice courses and a South Pole survival course in addition to three one day snow courses and four search and rescue courses for those wintering over.

Summer and winter support teams

A 33-year-old senior ranger with the Department of Conservation Mr Graeme Ayres, is officer-in-charge at Scott Base for the 1987-88 summer season of the New Zealand Antarctic research programme. In the 1979-80 season he was seconded to the Antarctic Division as field leader for the Canterbury Museum geological expedition to the Ohio Range of the Horlick Mountains and spent 50 days in an area only 525km from the South Pole.

This appointment establishes a family tradition. Graeme's father, Mr Harry Ayres, was a dog expert and mountaineer with New Zealand's first Antarctic expedition which established Scott Base for the New Zealand section of the Commonwealth Trans-Antarctic Expedition and the New Zealand International Geophysical Year (1957-58) team. He was the first man selected for the New Zealand section of TAE.

Mr Ayres has been associated with mountain activities in his work with the National Parks Authority for the last 12 years. He has been senior ranger at Mt Ruapehu for the last five years.

For the summer Mr G. E. White, of Auckland, is base manager at Scott Base and deputy to the officer-in-charge. Other members of the summer and winter teams at Scott Base and Vanda Station are:

G. E. White (41), Auckland. Base manager. He is a site operations manager for New Zealand Steel, Glenbrook.

B. J. Staite, Turangi. Field leader (snowcraft and survival).

A. M. Harris, Ohakune. Field leader.

T. Dick, Dunedin. Field leader/diving supervisor.

Lynn Bowering, Turangi. Field assistant (snowcraft and survival).

P. J. Cleary, Christchurch. Field leader.

S. P. Lassche, Arthur's Pass. Field assistant (snowcraft and survival).

I. J. McAlpine, New Plymouth. Field assistant.

J. Roberts, Turangi. Field assistant.

G. D. Smith, Linton Army Camp. Chef.

M. Fraser, Trentham. Canteen manager (Armed Forces Canteen Council).

C. D. Stoneman, Christchurch. Stores officer.

A. Milliken (lance-corporal), Burnham Military Camp. Storeman/cargo handler.

C. Rudge, Tongariro National Park. Information officer.

Janet Brumby (corporal), Christchurch. Radio operator (Army).

B. G. McDonald (petty officer), Auckland. Radio operator (Navy).

A. L. Walker (sergeant), Wellington. Radio operator (Air Force).

S. Gaye, New Plymouth. Communications technician (Telecom).

Jeanette May, Blenheim. Communications clerk (Telecom).

M. J. McGuinn, Auckland. Assistant maintenance officer/carpenter.

C. S. Ross, Takaka. Assistant maintenance officer/mechanic.

A. McMillan, Linton Military Camp. Plant operator.

G. C. Blake, New Plymouth. Plant operator.

Helen Clark, Christchurch. General duties.

Angela Clay, Palmerston. General duties.

Wendy Trill, Geraldine. General duties.

Vanda Station

L. E. Grant (34), Auckland. Leader. He is a police sergeant with extensive experience in search and rescue operations.

A. J. Quinn, Blenheim. Field leader.

D. Paull, Christchurch. Meteorological technician.

Winter team 1988

T. C. Ashdown (39), Hamilton, engineering manager. He is a workshop manager with Bisley International.

R. N. Geddes (33), Nelson, base engineer. Wintered in 1979 as a fitter/mechanic, worked in Papua New Guinea before selection.

M. J. MacFarlane (31), Hamilton, operations manager/scientific officer. Leader at Vanda in 1983-84 summer, and is a Ministry of Agriculture and Fisheries at the

Whatawhata Hill Country Research Station.
D. W. Barrett (23), Auckland, electronics technician. Boat builder before selection.

P. E. Crowhurst (22), Christchurch, electronics technician. Employed by Ministry of Works and Development.

B. F. C. Davis (24), Mt Cook, chef. Holds similar position with Tourist Hotel Corporation at the Hermitage.

A. R. Fastier (27), Twizel, electrician. Works there for Energy Corporation.

J. R. Thorp (24), Paeroa, mechanic. Worked in Brisbane before selection.

P. K. Wilson (21), Lincoln, field leader/storeman. Lincoln College student.

P. S. Purves (32), Hamilton. Communications officer. He is a radio technician with Telecoms in Hamilton and wintered at Scott Base in 1986 as senior Post Office technician.

A. Meek (29), Chatham Islands. Communications supervisor. Works for Telecoms in the Chathams.

Winter teams at U.S. and N.Z. bases

This year United States bases in Antarctica had a winter population of 212 men and women. Three stations were occupied by winter teams; Siple Station in Ellsworth Land, closed for the winter of 1985, was re-opened for the 1986 winter, but this year was unoccupied and in future will be used for summer operations only. There are 195 men and 17 women at the three stations; there were 150 men and 13 women at four stations in 1986.

Of 17 members of the winter team at the Amundsen-Scott South Pole Station 1327km south of Ross Island five are engaged in scientific projects sponsored by the U.S. National Science Foundation, and 12 are support staff. The senior scientist is Mr B. Goldberg, who is measuring cosmic ray intensity at the Pole. ITT Antarctic Services, support contractors for NSF, has a team of 11 men and one woman, Dr Nancy Schnaffner, who is the station doctor. The station manager is Mr S. Bonine, of ITT Antarctic Services.

Ross Island had a winter population of

204 this year compared with 147 last winter. There were 189 men and women at McMurdo Station. The senior NSF representative was Dr Sidney Draggan, who has a Ph.D. in ecology from Rutgers University. During the winter he was concerned with environmental problems, particularly the disposal of waste materials.

Three men were engaged in scientific projects sponsored by NSF, and 73 men and 10 women work for ITT Antarctic Services under the management of Mr A. Martin. The Naval Support Force, Antarctica, was represented by 91 men and three women, and the officer-in-charge is Lieutenant-Commander J. Rand. A Christchurch firm which provides catering services under contract to the U.S. Navy had eight New Zealanders — five men and three women — at McMurdo Station this winter.

In addition to 189 Americans and New Zealanders at McMurdo Station there are 11 New Zealanders at nearby Scott Base and a Greenpeace winter team of three men and one woman at Cape Evans. The officer-in-

charge at Scott Base this winter was the base engineer, Mr Keith Martin. A former Scott Base dog handler, Mr Kevin Conaglen, is the Greenpeace leader, and with him were a West German woman scientist, Dr Gudrun Gaudian, a New Zealand radio operator, Justin Farrelly, and a New Zealand-born doctor, Dr Cornelius van Dorp, of Dutch parentage.

Palmer Station on Anvers Island Off the Antarctic Peninsula where summer operations ended in the last week of April, has a winter team of six men. Five work for ITT Antarctic Services and the sixth is a U.S. Navy medical corpsman.

Continued from page 201

Regular maintenance of the various aeriels at Scott Base and Vanda Station will be undertaken by Ron Sword, Peter Phillips and Doug Rose. Team leader is Ian Wilton. All are from Christchurch.

Two surveyors from the Department of Survey and Land Information will assist New Zealand and American projects. They are Brian Anderson from Christchurch and Garth Falloon from Rotorua.

The interior of the vehicle workshop will be this season completing the reconstruction of Scott Base undertaken by Antarctic Division, the Ministry of Works and Development and members of the Royal New Zealand Army Corps.

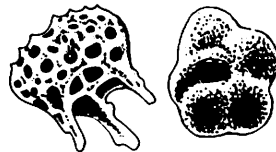
Members of the MOWD team M.J. Barrett, A.R. James, D. Jordan, S. Kahu, Denis Lankshear (clerk of works), P. McGrath, M.G. Walshe, R. Major, B. Morriss, D. Rees and T. Rossiter.

Army personnel under the leadership of Lieutenant A.R. Frizzell, include D.P. Christie, T. Culmer, R.T. Glanville, T.J. Grey, R.B. Hancox, K.J. Hanson, P.A. Hauraki, D. Jellyman, E.J. Kearns, A.G. Meha, K.J. Stewart, G.H. Sumption, O.L. Tyer and P.V. Winter. Snow clearing from under the command centre and power house will be undertaken by members of a search and rescue team from Woodbourne.

Reclamation of Hallett Station will continue. Peter Foster of Dunedin will lead the team which includes Con Faber and Norman Hill of Wellington and Donald Reid of Leeston. This is the xth year of the project which aims to return the station site to its original state.

Work on the historic sites at Hut Point, Capes Evans and Royds will be continued by Dr Neville Ritchie from the Department of Conservation in Hamilton, Nelson Cross from Goldfields Historic Park and Chris Cochrane an architect from the MOWD in Wellington. Such work was previously undertaken by the Historic Sites Management Committee of the Ross Dependency Research Committee but is now under the auspices of the newly formed Antarctic Heritage Trust. (See page). This season's activities will involve further observations of the huts and some basic maintenance.

The regular programmes will be continued. These include the aluminium corrosion project involving the return of racks to New Zealand for corrosion measurements and reinstallation at Scott Base and Arrival Heights. Laboratory programmes including the detection of infrasonic waves, will continue. Lester Tomlinson and Cas Roper from the Physics and Engineering Laboratory in Christchurch will travel south to check the field stations associated with the magnetics programme and Brian Lawrence, Bill Brown, Greg Haslett and Stephen Beuzenberg of the University of Canterbury will continue investigation of the normal and disturbed ionospheric D region in Antarctica.



Anare

Three marine science cruises planned for 1987/88

The second of eight voyages planned as part of the 1987/88 summer Australian Antarctic summer season left Hobart in early October to take scientific teams to Macquarie and Heard Islands and Davis Station. The first a three phase marine science programme will also be conducted. It is designed to allow for a survey of the crabeater seals in northern Prydz Bay, oceanographic work between Hobart and Commonwealth Bay as part of the lead up to the World Ocean Circulation Experiment schedule for 1990-95 and oceanographic and biological programmes in Prydz Bay in January.

Over 130 scientists and support staff will be involved in this season's programme which will be centred around Law Base, opened last season in the Larsemman Hills, Commonwealth Bay and Heard Island and the permanent stations at Casey, Davis, Mawson and Macquarie Island. Transport will be provided by Nella Dan and Icebird, each making four voyages during the seven month season which commenced on 6 September and will conclude on approximately 17 March 1988. Helicopter support at the Davis and Law Base will facilitate research and surveys to be undertaken along the whole coastline south-west of Davis and the eastern edge of the Amery Ice Shelf to the Reinbolt Hills area.

Operations at Casey will be centred on the Windmill Islands and Law Dome where the first stage of drilling to obtain an ice core is scheduled to commence in late November. Biological, glaciological and geological studies and surveys will also be conducted within 150 km of Casey.

Mawson programmes will be centred close to the station during the summer with a traverse to the north Prince Charles Mountains scheduled for the autumn in preparation for scientific programmes planned in the area for 1988/89.

An automatic weather station is to be erected at Commonwealth Bay as part of a study of katabatic wind flow around the edge of Eastern Antarctica. A geological survey is also scheduled in as well as a work

programme to extend the field facility constructed last season.

The first voyage of the season was completed by Nella Dan in early October under the leadership of Lorraine Francis, Anare's acting assistant director of resource management, the first woman to lead such an expedition as part of the Australian programme. During the three weeks a team of scientists under the leadership of Harry Burton was landed at Heard Island to conduct a seal census and botanical work.

Plans for Mawson huskies

Twenty-five huskies at Mawson are the last to be maintained at Australian Antarctic bases. Next summer there are plans to improve the animals and eliminate undesirable features caused by inbreeding and the lack of new blood in recent seasons.

In the 1986-87 season the first new blood for some time was introduced when Jock, a seven-month-old Greenland husky, arrived at Mawson on February 9 aboard the relief ship Icebird. Jock was born in Hobart in July last year and brought up in the home of Mr Rod Ledingham, the Australian Antarctic Division's field operations officer. He can look forward to the arrival of a young bitch in the summer.

BAS

Diverse programme successfully completed

The 1986-87 season was generally very successful, both for the marine and land-based programmes, although there were prolonged periods of bad weather. At the end of the summer there was some anxiety that it would not be possible to airlift all field parties back to Rothera before the scheduled departure dates of RRS Bransfield and the aircraft, but a brief improvement in the weather enabled this to be done.

RRS John Biscoe commenced the season with a further month's work on the long-term Offshore Biological Programme. She then picked up a marine geophysics team from Stanley in early February for a month-long cruise. This was the first time that the John Biscoe had carried out a major geophysics programme, although she had assisted RRS Shackleton in similar work in 1968-69. In the meantime, both methods and equipment had been greatly improved. The aim of the programme is to continue investigation of plate movements between South America and Antarctica, including evolution of the Scotia island arc. The main projects this year were the measurement of bottom currents in the northern Weddell Sea, magnetics and bathymetry south and east of the South Sandwich islands and dredging in the western back-arc part of the collision zone — the latter to investigate an interesting acidic welded tuff dredged up during the Discovery cruise of 1984/85.

Weddell Sea

Fine weather enabled four seabed current meters to be laid in the Weddell Sea without difficulty. The ship then rendezvoused with the ship SEDCO 471, which was drilling just south of the Antarctic Circle in long. 33.5deg W, and used their facilities for servicing a trawl warp strain meter, before commencing work south-west of the South Sandwich Islands.

Unfortunately, the weather then deteriorated drastically and remained very bad for the next few weeks. On one day the wind did not drop below storm force 10, and

for much of the time was up to and in excess of hurricane force 12, with what were described as "awesome" sea conditions. Bergs, bergy bits and growlers added to the problems. When the wind abated poor visibility made navigation in the ice-strewn waters very hazardous. However, for most of the time the ship carried out magnetometer runs interspersed with dredging. The dredging proved to be a difficult process, and the cable finally parted when it snagged on some obstruction; it was clear that the trawl equipment would have to be modified.

Eight month cruise

At the beginning of March the ship proceeded north to Uruguay — in continuing bad weather — towing the magnetometer as far as lat. 48deg S. She arrived at Montevideo in mid-March, and remained there for two days before sailing for home. She docked at Grimsby on April 7.

A record 85 percent of the total 8-month cruise had been spent at sea and, in spite of encountering such severe conditions, the ship arrived home in excellent condition.

RRS Bransfield began the season by relieving Signy (South Orkney Islands) and Halley. At the latter, large items of ionospheric equipment were delivered and brought out for servicing, and ice cores that had been collected in Coats Land for heavy metal studies were taken on board. After an uneventful journey back to Signy, the ship headed north-east to South Georgia, called at Bird Island, rendezvoused with the John Biscoe and returned to Falkland Islands.

She then proceeded to the west coast of the Antarctic Peninsula, putting another party of geologists ashore on Livingston Island (South Shetland Islands) en route. Cargo delivered to Rothera in mid-January included materials for a new building which will complete the station's development.

Bransfield then sailed north in very rough weather, calling at Stanley before making a mid-season visit to Montevideo to change over senior ship's officers. Cargo and mail were collected for Faraday and Rothera and for Uruguay's Artigas station on King George Island (South Shetland Islands). The ship arrived at Artigas on February 19, after picking up the BAS geologists from Livingston Island. The geologists were then landed briefly on Greenwich Island before being put ashore at Deception Island, and Bransfield proceeded south to Faraday and Rothera. Cargo handling at Rothera was delayed by continuing strong winds, but the unoccupied Horseshoe Island base was inspected in the interim. By mid-March the ship had revisited Signy, called at Marsh station and returned to Deception Island. A day was spent undertaking hydrographic survey and coastal photography around Deception, and the geologists were put

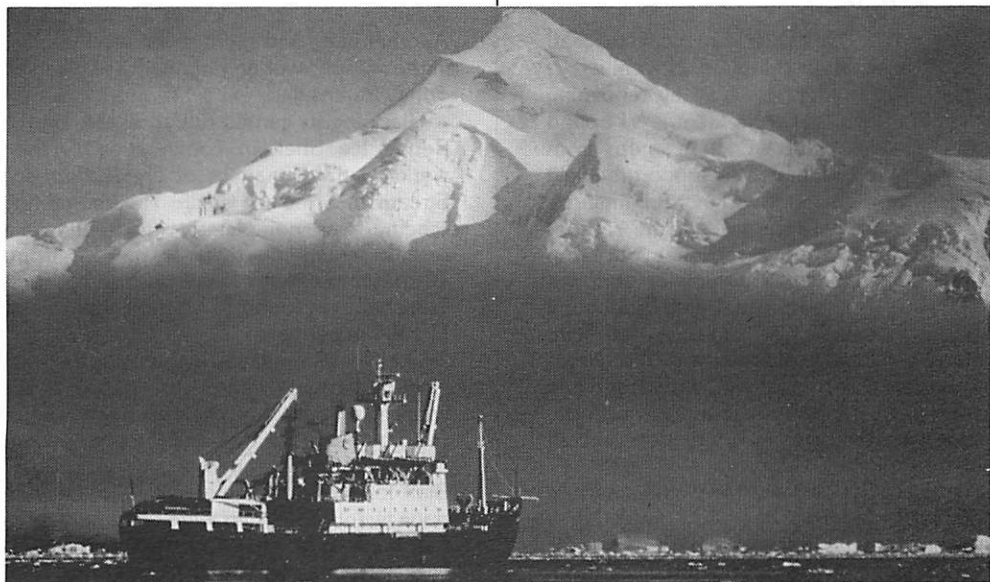
ashore for a further ten days. The ship then headed south again.

By that time, a brief lull in the weather had allowed the remaining field parties to be flown back to Rothera; 28 men were taken on board, leaving 25 winterers, and the ship finally left the area on March 21. Three days were then spent in the vicinity of Faraday, replenishing depots on a number of islands. The Damoy hut (Wiencke Island) was also checked, the Deception Island party picked up and the ship arrived back at Stanley on the 29th.

A week later, summer personnel — including three women biologists — were picked up from Signy and the ship headed for South Georgia. Rough seas again prevented cargo handling at Bird Island, so biologists and a geomagnetics party were taken to Grytviken. A further four days elapsed before it was possible to complete work at Bird Island. Bransfield then returned to Grytviken and finally departed northwards on April 14.

The Deception Island party (travelling around on four-wheeled, soft-tyred motor-bikes) had taken 1500 spot temperature

*RRS Bransfield off Adelaide Island
Photo: B. Thomas, BAS*



measurements around the central harbour, Port Foster. Temperatures were found to be generally low, indicating a low state of volcanic activity, but there was still a marked smell of sulphur. Bransfield's support had proved very valuable: at least two new submarine vents were discovered — one of which was the possible source of the third eruption column seen in December 1967.

The French yacht *Damien II* was chartered again this summer. She was used first by biologists to complete a survey of surface-breeding seabirds around South Georgia and then by geologists for two months' landings in the Antarctic Peninsula area. The geological cruise, investigating the geochemical characteristics of the Antarctic Peninsula volcanics, covered about 1350 nautical miles and included more than two hundred landings. Some proposed mainland sites were inaccessible because of fast ice, but excellent results were achieved both on the mainland and on numerous islands. Supplies were collected from Damoy and Faraday en route and Palmer station was also visited. The geologists and their rock samples were transferred to the Bransfield at Rothera at the end of February, and *Damien* then departed northwards.

Fossil Bluff

The three Twin Otter aircraft which had arrived back at Rothera on November 7, began the summer, as usual by reopening Fossil Bluff field station in George VI Sound and ferrying field workers south from Damoy. They continued to support the field parties, one aircraft working full-time on aeromagnetics. By the end of the season, the planned aeromagnetics network from US Siple station was complete, and two lines were also flown from Fossil Bluff, but it was not possible to fit in a proposed flight between Thurston Island and the Jones Mountains. The excellent facilities made available to the party at Siple were greatly appreciated — especially when the aircraft was grounded by bad weather.

In spite of a late start the surface geophysics traverse was also completed. It covered a circuit at the base of the Antarctic Peninsula, west of the Ronne Ice Shelf (from

the English Coast to Sky-Hi Nunataks, Fowler Peninsula, Rutford Ice Stream, Siple and back to the English Coast), and included gravity, magnetic and ice-thickness measurements.

The other two aircraft ferried and supplied field parties, as necessary. There was a second flight to Halley at the beginning of February to take in urgent ozonesonde equipment. Shortly after this, the same aircraft was fitted with a large-format aerial camera. The test run was successful but little photography was possible this season because of the persistent bad weather. However, coverage of the Black Coast was obtained to supplement field work by a joint BAS/US Geological Survey party. This should fill the last major blank in the geological map of Palmer Land. The aircraft also enabled a number of key areas to be visited throughout eastern Palmer Land in preparation for future more detailed studies. The area appears to be one of marked tectonic variation.

Alexander Island

Other geologists continued work for a second season on Alexander Island, investigating probable accretionary prism assemblages related to the Palmer Land Mesozoic arc. It is an area of major crustal shearing and spectacular slump zones. Another party had spent seven weeks earlier in the season, working on the fossil plants of Trinity Peninsula.

Glaciologists carried out a traverse on the Ronne Ice Shelf in continuation of their work on the dynamics of the Rutford Ice Stream and the ice shelf. The monitoring scheme was completed with four strain rosettes extending towards the ice front. 10-m temperatures were also measured. The shelf was found to be moving at a rate of 1384 m per year.

The weather delayed flights to pick up the field parties and specimens (including ice cores for chemical analysis from the Palmer Land plateau) at the end of the season. Some parties had been grounded at Fossil Bluff for more than two weeks, and at one stage twenty-four men were crammed into a four-bunk hut! However, all were safely back at Rothera by March 13 and Fossil Bluff

was closed for the winter. The aircraft left the area three days later, and arrived in the UK at the end of the month.

Other movements

A Twin Otter aircraft operated by "Adventure Network International" and flown by ex-BAS pilot Giles Kershaw landed at Rothera in mid-December. It was returning from the Ellsworth Mountains to Punta Arenas via the Chilean Marsh station.

Two West German Dornier aircraft flying between Marsh and their Filchner summer station and Neumayer, called at Rothera in late December and late February. One of them also picked up a geophysicist from the West German ship Polarstern at Halley in mid-January and flew him over the Theron Mountains and Shackleton Range. The Dorniers paid a final visit to Halley in late February, and were grounded there for several days before being able to resume their journey home via Rothera. Polarstern visited Halley twice in mid-January and again in early February. She had also called there in late October 1986. The South African ship Agulhas called at Halley in December, and the US Polar Duke visited Faraday in April.

Visitors

A Chilean Otter from Marsh called at Rothera in mid-February to pick up a sick man who had been evacuated from Te-niente Carvajal station, Adelaide Island.

The tourist ship *World Discoverer* arrived at Faraday in early January, but ice prevented the *Society Explorer* from making a scheduled call there in early February. However, three yachts — *Northanger*, *Matuhiva* and *Kotick* — managed to reach Faraday in February, and both tourist ships were able to visit Signy — *World Discoverer* in December and *Society Explorer* in February. Damien also called at Signy. A small Chilean ship arrived at Rothera with ten American and Canadian tourists aboard in mid-March — unfortunately only a few hours before the final visit of the *Bransfield*.

The stations

A wide range of biological programmes continued at Signy and Bird Island. Three

women biologists were among the summer field workers at Signy. (One studied the lakes which involved wet-suit diving, sometimes under ice.) Two of them also worked on the lakes in the vicinity of Faraday. All Signy personnel participated in a fur seal census in late February: 13,000 fur seals were counted — 2000 more than last year; they included five pups born on the island in comparison with only two last year.

In an earlier census on Bird Island, 3000 fur seal pups were counted and many marked; several species of birds were also ringed. Other projects continued in spite of Bird Island's usual 'foul' weather. Some of the work was made easier by the construction of a new raised walk-way over mud-flats favoured by the seals.

Television crew

An Anglia Television crew spent some time at Faraday during the summer after filming *Bransfield's* relief operations at Halley and elsewhere. Some Faraday personnel visited the mainland in January to replenish the Rasmussen Peninsula refuge hut. Further recreational journeys were undertaken from Faraday and Halley in March and April, and from Rothera in April.

At Signy a short length of railway line was re-laid to facilitate the handling of heavy equipment, and the boat slipway was repaired.

A three-man building team arrived at Rothera in the early summer to complete foundations for a new two-storey building and clear a site for new fuel pillow-tanks. A further nine builders and technicians arrived with the building materials on the *Bransfield* in January. When the building is complete the station will provide accommodation and working facilities for 72 men. Rothera is the centre of BAS air operation and most of the men are earth scientists in transit to and from summer field work sites. The wintering population is normally about 14 but is increased to 25 this year, by the technicians who are completing the interior fittings. Work on the new building progressed well; the roof panels were in place by mid-February and the whole structure was weatherproof by early March.

A number of short field journeys were undertaken after the departure of the ships — mostly for recreation. One Halley group also remeasured stakes indicating the movement and deformation of the Brunt Ice Shelf.

BAS winterers total 71 this year: in addition to the 25 at Rothera and the 17 at Halley, there are 10 at Faraday, 16 at Signy and 3 at Bird Island.

USARP

Major fossil find on Seymour Island

R. Ewan Fordyce of the Department of Geology, University of Otago, Dunedin was a member of a joint U.S. New Zealand party of 13 earth scientists who spent three weeks on Seymour Island off the Antarctic Peninsula last summer.

The Island, which is about 20 km long and between three and ten kilometers wide and lies to the east of the Antarctic Peninsula just north of the Antarctic circle (64deg15'S/54deg45'W), is one of the few places where a Cretaceous to Eocene sequence is exposed on land in Antarctica giving a rare insight into the past geological history of the south. It is rich in a diversity of fossils. Fordyce found a major skeleton of a whale, the biggest such find in Antarctica and the most complete archaocete collected in the Southern Hemisphere.

Antarctic would like to thank Ewan Fordyce for his assistance with this article which gives an account of the expedition and its fossil finds.

Scientific studies on the geology of Seymour date back to Larsen's visit of 1893 and the Nordenskjöld Swedish South Polar Expedition of 1901-03. The recent U.S. phase of activity was initiated during the mid-1970's with work on fossil vertebrates developing significantly since 1982.

This year's party of 13 earth scientists, headed by invertebrate paleontologist Bill Zinsmeister, included four vertebrate paleontologists led by Mike Woodburne of the University of California, Riverside with Ewan Fordyce, Judd Chase and Dan Chaney. They travelled on USCGC Glacier from Punta Arenas in Southern Chile to Seymour in five days and were landed by the vessel's two Sikorsky helicopters which were later used extensively in fossil recovery and other field work.

Fordyce's party camped in good weather on the northwest coast towards the northern end of the Island within walking distance of the La Meseta Formation from which he collected. The unit includes some 700 metres

thickness of fossiliferous marine silt, sand, occasional conglomerate and local shellbanks of Late Eocene and possibly Early Oligocene age (about 40 million years). The area had been mapped in detail by Peter Sadler of Riverside; the map, and the shallow attitude of the beds of La Meseta allowed the units to be followed easily.

The northern end of the island is dominated by the "meseta" a flat topped and often muddy plateau covered in glacial erratics and till. Its slopes formed by unconsolidated sands are commonly dune like and the sections often oversteeped by massive sandstone beds. Deep gullies incised into the slopes carry small streams; heavily charged with sediment which coalesce on the lower slopes to give larger sluggish flows in muddy valley floors tens of metres wide. Members of the party crossed the area routinely preferring to use ice or snow bridges in spite of the permafrost which limited the distance they would sink.

Previous expeditions had established that

the La Meseta formation is richly fossiliferous. Invertebrates collected during the season included bivalve molluscs (such as relatives of living scallops), gastropods (snails), rare scaphopods (tusk shells), cephalopods (shelled relatives of living squid), brachiopods, colonial corals, articulated crinoids (sea lilies), ophiuroids (brittle stars), asterozoans (starfish), echinoids (sea urchins), crustaceans (crabs) and barnacles. (Some of those fossils, rare in New Zealand, formed a carpet that could be scooped up by hand.)

Most of the collection was subsequently shipped to the States but a selection was sent to Otago University to be used in assessing the taxonomy, stratigraphy and geographic relationships of the New Zealand Paleogene faunas.

Fordyce also visited Cockburn Island, a few kilometres northwest of Seymour, in search of invertebrate fossils. This steep-sided island has a horizontal basalt cap which overlies shallow-dipping sediments that locally contain Cretaceous (over 65 million year old) fossils. He and a colleague searched the relatively barren north face of the island, finding few fossils other than those in fallen blocks of "Pecten Conglomerate" (probably Pliocene, about 6 million years). Similar and roughly contemporaneous macrofossil-rich shallow water units are known elsewhere in Antarctica; one at Australia's Davis Station has yielded the as yet undescribed skull of a new genus and species of dolphin.

In 1982, Woodburne's group had discovered a few fragments of terrestrial mammals — polydolopids, an extinct group of South American opossum-like marsupials on Seymour Island. No further remains were found this season, but bulk matrix was taken back to Riverside for sorting. One noteworthy recent find was the robust beak of a large flightless carnivorous land bird possibly related with South American fossil forms. These land vertebrates and plant fossils (including perhaps southern beech, *Nothofagus*) indicate a complex terrestrial ecosystem during the Eocene, and they may also help interpret broader past geographic

patterns of biotas in the Southern Hemisphere.

Other fossil vertebrates were also collected. Shark teeth were common lower in the section, and occasional ray and chimaeroid elements were found. Many isolated penguin bones (typically the heavy resistant limb elements, but also some vertebrae and scraps of skull) were collected, mostly from the flats below the meseta on the eastern side of the island, as well as the articulated partial skeleton (sacrum, vertebrae, some limb elements) of a penguin. Most of the penguin fossils have gone to U.S.A. for study, but a small selection of isolated elements was brought to the Geology Museum at Otago to supplement a collection of fossil penguins.

Of particular interest to Ewan Fordyce were fossil cetacean (whale) bones reported previously from the upper part of the La Meseta Formation. The fragmentary specimens collected on past trips suggested *Plaster-jacketing ribs at the Archaeocete site on Seymour Island in January 1987. Photo: Dr R. E. Fordyce*



that both large and small archaeocetes (archaic cetaceans) were present. Isolated bones were found sporadically during the first few days of field work. However, prospects for a major find did not seem good, since invertebrates suggested deposition in waters too shallow for skeletons to remain articulated. He was fortunate therefore, to discover a major skeleton in the uppermost La Meseta Formation on 4 January.

The site was located on the east of the island near the top of the meseta, inauspiciously close to the edge of the present rubbish dump for the nearby Argentine base (Marambio). The specimen comprises a broken skull, teeth, jaws, earbones, vertebrae, ribs, and possible forelimb fragments. It was excavated over about 16 man-days, with the aid of hand tools.

The excavation, which was some 3 metres long and 2 metres wide, was benched into the hillside. It reached a depth of about a metre, and thus extended below loose sediment into permafrost.

A gas torch had to be used to melt ice that had frozen concentrically around bones before the elements could be plaster jacketed. Jacketing was helped by the use of pre-plastered orthopedic bandages. Fragmentary damp bones were consolidated with molten polyethylene glycol wax (water compatible) before removal. Many elements were in concretions, which were labelled then removed without jacketing.

1.5 tonnes

The roughly 1.5 tonnes of material was crated up on the site before being flown to the icebreaker. It was shipped to McMurdo, Christchurch and Dunedin where it awaits preparation and serious study.

The estimated size (skull length about 1.5 metres; body length perhaps 10 metres) of the whale suggests that it is a species of basilosaurine archaeocete. Basilosaurines, or zeuglodon, were specialised Late Eocene whales which, because of their large size and elongate vertebrae, were probably somewhat removed from the lineage which led to modern whales. It will not be possible to confirm this identification until the specimen is prepared.

Less complete cetacean remains include skull fragments which may well belong to dorudontine archaeocetes, the smaller dolphin-like relatives of basilosaurines from which modern whales and dolphins may have evolved in the latest Eocene or Early Oligocene. Archaeocetes were plausibly like some seals (phocids) in their ability to haul out on sandy beaches, but there is no reason to think that they could move freely on land as suggested by some newspaper reports of this find. Dorudontines and basilosaurines have been reported provisionally from the Late Eocene of New Zealand, and it will be interesting to see whether the Seymour-New Zealand relationships for these groups are as strong as those suggested for fossil penguins and many invertebrates from the two now-distant localities. Preparation work on the cetacean fossils should be started soon.

New finds

The new finds of archaeocetes suggest that prospecting on Seymour and other southern localities may yield other specimens which may help in the study of the history of whales and of the development of the Southern Ocean. The southern fossil record of whales, which comprises almost wholly fossils from temperate latitudes, was known previously to include odontocetes (echo-locating toothed whales and dolphins) and mysticetes (filter-feeding baleen whales); representatives of both groups are still living. New Zealand fossils provide some of the oldest records of odontocetes (early Late Oligocene, perhaps 28 million years), and the oldest records of mysticetes (Early Oligocene, perhaps 30-38 million years). Both groups probably evolved from archaeocetes in about the latest Eocene or Early Oligocene, and their early development was marked by the appearance of new feeding modes. The structure of the archaeocete ancestors of these two modern groups suggests that they are unlikely to have filter-fed or echo-located.

The Oligocene evolution of cetaceans may reflect major geological changes in the Southern Hemisphere. The last fragmentation of the southern supercontinent of

Gondwana occurred at about this time, with the movement north of Australia and South America away from Antarctica. The climate of Antarctica, formerly moderated by the influence of coastlines continuous with northern, more temperate regions, deteriorated as the continent became thermally isolated by an extensive circum-polar Southern Ocean. Continental cooling probably enhanced latitudinal temperature gradients from the pole to the tropics, and initiated the water flows (for example the biologically unexploited cold, deep waters of the psychrosphere, which radiate northwards away from Antarctica along the deep ocean floor) characteristic of modern oceans. The physical isolation of Antarctica also allowed the evolution of the eastwards-flowing Cir-

cum-Antarctic Current. Since these features today influence productivity in the Southern Ocean, they may have done so in the past. The evolution of new groups of cetaceans, characterised by new feeding strategies, may well be related to the development of these new oceanic and climatic patterns. More temperate to high-latitude fossils are needed to investigate this hypothesis.

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New US tanker's first voyage south

One of five new oil tankers built for the United States Military Sealift Command at a cost of US\$315 million to replace the Maumee class made her first voyage south last season with aviation and diesel fuel for American stations, aircraft and ships in Antarctica. The 30,000-tonne G. W. Darnell, which has a cargo capacity of 8,336,848 gallons of fuel, reached McMurdo Station towards the end of January with up to 5.5 million gallons of aviation fuel and marine and Antarctic diesel. Part of her cargo was for Scott Base.

Originally the first of the new tankers, the Paul Buck was to have gone south in place of the 30-year-old USNS Maumee which was scrapped after 29 years' service and 15 Antarctic voyages since the 1969-70 season. The G. W. Darnell which was delivered in 1985 was met and escorted to the ice edge at McMurdo Sound by the United States Coast Guard icebreaker Polar Sea after their rendezvous in the Ross Sea.

While the tanker waited at the ice edge the Polar Sea, which had been refuelled at sea by the tanker, began clearing the ice channel leading to Hut Point. The channel,

10 nautical miles long, also had to be widened enough for the G. W. Darnell to negotiate. The operation took several days but the tanker finally began discharging her cargo on the night of January 8.

Built for Ocean Carriers, Houston, the G. W. Darnell and her sister ships, Paul Buck, S. L. Cobb, R. G. Mathieson and L. H. Gianella, are under long-term charter to the Military Sealift Command which arranges for their operation by the Trinidad Corporation. The G. W. Darnell which weighs 39,000 tonnes fully loaded, has a range of 12,000nm and cruises at 16 knots.



South Korea plans base on King George Island

South Korea, which acceded to the Antarctic Treaty in late November last year, plans to start construction of a permanent scientific station on King George Island in the South Shetlands during the 1987-88 season. The Minister of Science and Technology (Mr Lee Tae-Sup) announced late in May that the base would be completed by March next year and would be used by up to 30 scientists in the summer and manned by a staff of 20 in the winter.

A suitable site for a permanent base was found by scientists of a South Korean expedition which worked on King George Island in the summer of 1985. Three members of the expedition's mountaineering team made a successful ascent of Antarctica's highest peak, the 4897m Vinson Massif in the Sentinel Range of the Ellsworth Mountains.

No indication of where the base will be built was given by Mr Lee in his announcement published not long after the return to Seoul of a party of six which made a 40-day trip to Antarctica. There have been suggestions that the site is in the Keller Peninsula area of Admiralty Bay where Brazil established its permanent station, Comandante Ferraz, on February 6, 1984, at 62deg 05min S°58deg 23.5min W.

South Korea, which has sent four krill and fisheries research expeditions to the Southern Ocean aboard chartered commercial fishing vessels in recent years, will be the eighth country to establish permanent stations on King George Island. Existing bases are: Teniente Jubany (Argentina), Comandante Ferraz (Brazil), Teniente Rodolfo Marsh (Chile), Great Wall (China), Henryk Arctowski (Poland), Bellingshausen (Soviet Union) and Artigas (Uruguay).

In mid-September a South Korean cargo ship will leave the port of Incheon for King George Island with construction materials for the new base. The station will consist of

seven buildings with a combined floor space of 1650m, and will be built of newly-developed materials resistant to the weather and low temperatures.

Leader of the 1985 expedition, organised by the Federation of Korean Maritime Boy Scouts with Government backing, was Yoon Sok-Sun. The scientific and mountaineering parties left Seoul on November 6 and returned on December 16. They arrived in Punta Arenas, Chile, on November 13, and on November 16 were flown to the Ellsworth Mountains and King George Island.

Yoon Sok-Sun's research team was flown to Rodolfo Marsh Station by a Chilean Air Force aircraft and after surveying the terrain set up a temporary research centre and base of six tents. During their 25 days in Antarctica the scientists conducted geological, biological and meteorological studies.

One purpose of the expedition was to study all the research stations on King George Island and introduce the South Koreans to their scientists and support staff. Yoon Sok-Sun's main task was to make diplomatic calls on all the other bases to pave the way for an exchange of research data and future joint projects.



Chilean scientific station

Chile has established another station on King George Island in the South Shetlands. Fildes Station is a scientific station operated by the Chilean Antarctic Institute (INACH), is located 30 metres from the Chilean Air Force Teniente Rodolfo Marsh Station, and is in Ardley Inlet next to Fildes Bay.

Completed last year Fildes Station consisted first of four standard container-type modules 6m x 2.4m x 2.4m. Three were designed as laboratories and one for storage of equipment and spare parts. As part of the station complex a module designed as an ionosphere recording station for an INACH-University of Concepcion project, and an accommodation building for research workers, have been added.

This main building is prefabricated and covers 104 square metres. It is situated near the Villa of the Stars, the civilian settlement on the island, and consists of a living room-dining room, three dormitories, kitchen and bathroom, and water, power and sewage systems.

Fildes Station's laboratories have been designed for multi-disciplinary purposes and are equipped with the necessary instruments and equipment, particularly for biological studies. In addition communications have been improved by the installation of Racal

satellite equipment. This will enable communications to be maintained with INACH in Santiago all the year round.

Since the International Geophysical Year (1957-58) scientific interest in the South Shetlands by countries which signed the Antarctic Treaty has continued to increase. The installation of Chilean bases and the creation of INACH have led to more scientific activity and co-operation between Chile and other countries. Now the major percentage of Chilean and foreign scientists is concentrated on King George Island.

Therefore INACH's long-term planning took into account the need for resources which would allow research workers to carry out field projects in those places nearest to the geographical area of their interest. The station has been designed, accordingly, to support permanent scientific investigations for the whole year and with the maximum intensity between November and March, the summer period in which INACH carries out its expedition.

Sub-Antarctic

Marion Island airstrip plan dropped

South Africa has decided not to proceed with plans to build an airstrip on sub-Antarctic Marion Island in the South Indian Ocean 1241 nautical miles south-east of Cape Town because of the impact it would have on the island's fragile environment. More than 2 million seabirds breed on the island, among them 15 per cent of the world's Wandering albatrosses.

Since 1947 when it annexed the island South Africa has maintained a permanent scientific and meteorological station there. An airstrip designed to take Hercules transport aircraft and costing £4 million (NZ\$11.12 million) was planned for medical

emergencies, search and rescue operations, and control of the fishing zone around the island.

Late last year the Minister of Environment Affairs and Fisheries (Mr John Wiley) announced that an ecological evaluation would be the first step before a decision to build the airstrip was made. A panel of six scientists, four from the Council of Scientific and Industrial Research, was appointed to investigate the likely impact of the development. Dr Nigel Bonner, deputy director of the British Antarctic Survey, and an authority on the biology of the Southern

Ocean, was also appointed to review the panel's report.

Early in May Mr Wiley's successor, Mr Gert Kotze, announced that he had accepted the scientists' report which advised that an airstrip could threaten the near

pristine condition of the island's ecology. Mr Kotze said that although there was a need for a landing strip on Marion Island provision of such a facility was not desirable because of the impact it would have on the fragile environment.

Heard Island fisheries research

A Soviet fisheries research programme conducted off sub-Antarctic Heard Island in May and June this year is expected to provide Australia with valuable information about one of its least known fish resources. The research vessel Professor Metsiatsev worked in the Australian fishing zone which extends up to 194 nautical miles from the island.

Australia will have access to all the information collected on the cruise. This will include data on finfish distribution and the environmental factors which affect them. Results of the cruise will also be made available to the wider scientific community through the Commission for the Conservation of Antarctic Marine Living resources. Australia and the Soviet Union are members of CCAMLR which has its headquarters in Hobart.

A New Zealand marine scientist, Mr Paul

Ensor, of Christchurch, was the Australian observer aboard the Professor Metsiatsev and took part in the research programme. He was appointed to monitor the progress of the Soviet programme and to ensure that the information collected was accurate.

Although reports of the research project named Mr Ensor as an Australian marine scientist he began his Antarctic research with the University of Canterbury. He worked for several summers with the university's Antarctic biological research unit in the New Zealand Antarctic Research Programme. In recent years he has been with Australian National Antarctic Research Expeditions, taken part in several international surveys of minke whale stocks in Antarctic waters, and served as a biologist with the 1981-82 Oceanic Research Foundation expedition led by Dr David Lewis which worked in Commonwealth Bay and off the French Dumont d'Urville Station.

Yellow-eyed penguin studies on Campbell Island

A study of the yellow-eyed penguin in the South Island of New Zealand is to be extended to Campbell Island this season and will be conducted by Peter Moore of the Department of Conservation in Wellington. Assisted by Roger Moffat of Kaiapoi, the pair will be trying to determine the extent, distribution, numbers and breeding performance of the bird in order to estimate population size. They will also establish permanent grids and photo points for mollymawks, albatrosses, and elephant seals and continue a small amount of research into the reasons for the decline of the rockhopper penguin population (Ant-

arctic Vo. 11. No's 2 & 3, page 100). Further work on the sheep population will also be undertaken as part of an ongoing management programme.

It will be Moffat's second year at the remote station. He was mechanic with the last team which is being replaced by Scott Freeman of the Ministry of Transport from Auckland who will be leader; meteorological technicians Karl Anderson of Wellington and Robyn Pope of Palmerston in North Otago. The new mechanic is Neil Dunn of Balclutha and the telecommunications technician Robert Crawley of Wanganui. Wendy Stridd of Auckland will be the cook.

First Macquarie Island Symposium held in Hobart

The first symposium on science and management on Sub-Antarctic Macquarie Island was held at the University of Tasmania from 11 May to 15 May, 1987. Hosted by the Antarctic Division, Department of Science and Technology which operates the ANARE station on the Island and the Tasmanian Department of Lands,

Parks and Wildlife which manages the island as a nature reserve it was attended by 100 delegates from Australia and New Zealand, many of whom had worked on the Island. The 45 papers presented covered issues in archaeology, biology, geography, geology, history, management, meteorology and physics. The proceedings will be published early in 1988 in volume 122 of the Papers and Proceedings of the Royal Society of Tasmania.

90 Degrees South

No safety margin left to achieve goal

Dr Monica Kristensen, leader of the private British/Norwegian 90 Degrees South Expedition, and her three companions, needed only an extra 10 days to achieve their goal of retracing Amundsen's journey to the South Pole and returning to the Bay of Whales. They had agreed to make a decision whether to abandon their attempt when they reached their fourth depot on the Polar Plateau on January 24 but the decision to turn north was not made until January 29, and the return journey began on January 30.

In a preliminary report on the expedition Dr Kristensen, the British glaciologist Dr Neil McIntyre, and the Danish dog drivers, Jan Almqvist and Jacob Meisner Larsen, give the reasons for their decision. Their late departure on December 17 from Amundshemen, the Bay of Whales base, put them behind schedule but since then progress had been good. They expected to take 10 more days from Depot 4 to reach 90deg S on February 3 and do the return trip some 30 per cent faster than had been possible coming south.

Therefore, the party would be back at the Bay of Whales at the end of the first week in March. This, however, left no safety margin to cover unforeseen problems and delays. It might have forced the party to winter at Amundshemen (sufficient supplies had been left there to cover the possibility) and could also have put the Aurora and her crew in a difficult situation.

"We were not willing to accept this risk so had no choice as to our next move. With considerable reluctance and disappointment we agreed to turn in our tracks and head for our rendezvous with Aurora."

"Antarctic" is most grateful to Dr Kristensen, Dr McIntyre, Jan Almqvist, Jacob Larsen, and Captain Bernt Steinsland for their help in the preparation of this account of the expedition. In addition to provision of the preliminary report 28 questions about the Pole party and the Aurora were answered in detail by Dr McIntyre and Captain Steinsland, the ship's master.

By the northern autumn the full story of 90 Degrees South will be known when the expedition's book is published first in Norway. The book has been accepted for publication in several other countries and a New Zealand edition is likely.

"Antarctic" has used the preliminary report, logs of the sledge trip, the return journey, and the Aurora's voyage from the Falkland Islands to the Bay of Whales, to prepare an accurate account of the Pole party's 72 days away from its base. Times, dates, and distances, based on scanty or inaccurate information at the time, have been adjusted.

Dr Kristensen and her companions actually reached 86deg S only 444km from the Pole before they turned back. They took 39 days to reach Depot 4 at 85deg 57min 65sec S, covering 966,9km. The average daily distance travelled was 24.8km. From Depot 4 to the Bay of Whales the party took 28 days to cover 918,9km, and the daily average was 32.8km.

Scientific work

Four main glaciological investigations were carried out by the Pole party throughout the journey from Amundshemen to 86Deg S and back. It was not possible to collect snow samples from ice cores on the Polar Plateau as planned because this was to have been done in the last 300km before the Pole. Surface snow sampling for later chemical analysis was done, however, at intervals of about 40km on the way south.

Scientific work was done in the evenings after the day's travel had been completed. Most of it was carried out on a regular basis throughout the journey and the time taken varied between one and five hours. Before the return journey began six days were used to do additional work on the Polar Plateau.

In the following account New Zealand Standard Time has been used for the time of the Pole party's departure from the Bay of Whales on December 17, and the times for the arrival, stay, and departure of the Aurora on March 1. Amundshemen was acutally on the Ross Ice Shelf about 5.37km from the Aurora's position (78deg 21.5min S/165 deg 07min W) in the Bay of Whales.

Sledging South

Amundshemen, Bay of Whales (78deg 21.5min S/165deg 05min W) to Depot 1 (80deg S).

Departed December 17, 1625 NZ Standard Time.

Arrived December 24 (time uncertain).

Distance travelled: 182,7km.

Daily sledging average 22.8km.

Each team of the Pole party's 22 Greenland huskies was given a name. The Nelly team, driven by Monica Kristensen and Jacob Larsen, was: Larm (leader), Paika/Nimrod, Aage/Syster, Anti/Attak,

Lobo/Jesper, Anton/Kivitok. Neil McIntyre and Jan Almqvist drove the Billy team: Blackie (leader), Kasper/Balder, Mikke/Freia, Kassin/Rocky, Viking/Garm, Buck/Bleik.

While the party negotiated a crevassed area just inland from the Bay of Whales the Aurora and the Twin Otter aircraft headed for Terra Nova Bay and New Zealand. Temperatures were consistently high in the first week of the journey, making the going especially difficult for the dogs so the party switched to sledging at night. This routine was maintained for the whole of the trip south.

In this first week the snow surface was generally soft and the party's highest daily run was only 25km. But Depot 1 was reached in eight days in time for the party to celebrate Christmas. The Christmas Day menu included a fine Norwegian salmon put in by the Swedish/Danish team which laid the depots with the Twin Otter.

Depot 1 to Depot 2 (82deg S).

Departed December 26 (time uncertain).

Arrived January 2 (time uncertain).

Distance 254.8km.

Daily average 31.9km.

This stage of the journey took another eight days. The party headed south-west to the 170deg W meridian and passed the heavily-crevassed area now known as Steer's Head without any problems. Amundsen's party was trapped in the area soon after leaving Framheim.

Depot 2 to Depot 3 (84deg 03min S).

Departed January 4 (time uncertain).

Arrived January 12 (time uncertain).

Distance 239.4km.

Daily average 26.6km.

When the party set off it encountered firmer surfaces and the better glide enable the sledgers to push the daily distance up at times to more than 45km. The four were in the region of the depot within five days but visibility deteriorated and strong winds raised a wall of blowing snow. Caught in a blizzard and unable to find Depot 3 because they could not take accurate celestial measurements, the sledgers had to make methodical searches for it on foot.

These proved unsuccessful and after three days the four decided to return northwards. But a last-minute search early on the fourth morning when conditions were slightly better proved successful. The depot was discovered only 3km from the camp just as the party was digging out its sledges before returning north. The depot was hidden in a slight depression not discernable when put in by the Twin Otter.

Depot 3 to Depot 4 (85deg 57min 65sec S/173deg 13min W).

Departed January 14 (time uncertain).

Arrived January 24 (time uncertain).

Distance 290km.

Daily average 26.4km.

Refreshed by a day's rest the party pushed on towards the Transantarctic Mountains, now clearly visible and 150km away. Making good time the four crossed the ridge into the valley of the Axel Heiberg Glacier on January 18. Just before entering the valley the dogs were most affected by high temperatures (plus 6deg Celsius was recorded at night).

Sheltered from the strong south-easterly winds which sweep the face of the mountains, the snow was much softer and deeper than on the Ross Ice Shelf. But the dogs coped well, and the party ascended the Axel Heiberg at the same speed as Amundsen and his men, camping on the glacier four times as he did. This time each camp was made at night.

But as in Amundsen's day 76 years ago the ascent was not easy. Slopes between the main terraces of the glacier were such that it was often necessary for the party to ascend with only half-loaded sledges and then return for the rest of the loads. By the time the party was at 2000 metres temperatures had fallen by some 10deg Celsius to minus 15deg C.

Clear weather favoured the party however, and it was rewarded by spectacular views. But parts of the climb, which took five days, were desperately hard work for both dogs and their drivers, who were relieved to make it to the Polar Plateau on January 22.

Depot 4 was some 70km away at that stage and the party still had two more days to go. By then conditions were markedly

different from those on the ice shelf; it was always below minus 20deg C and a wind of 20 to 30 knots blew continuously in the faces of the four.

It was at Depot 4 that the party had agreed to make a decision regarding the remaining distance to the South Pole. An advance of another 1.6km from the depot put the party at its most southerly point, 86deg S, 444.76km from the Pole.

Return Journey

Six days were used to carry out some more work on the expedition's scientific programmes, and on January 29 the party decided "with considerable reluctance and disappointment" to turn in its tracks and head for the rendezvous with the Aurora. On January 30, having raised the national flags of three countries — Britain, Norway and Denmark — the four sledgers headed back for the mountains.

As the party approached the head of the Axel Heiberg it was engulfed in low cloud and was forced to descend the upper half of the glacier in a white-out. Eventually, the sledgers picked up the small marker flags set out during their ascent. But half a day was lost in camp waiting for the weather to clear so the descent of the most heavily-crevassed section — the Amundsen Icefall — could be made in slightly better visibility.

Despite the white-out and the loss of half a day the actual descent of the Axel Heiberg was completed in three days. The run down to the ice shelf was straightforward and most enjoyable.

On February 3 the party camped next to Mt Betty (85deg 11min S/163deg 45min W) like Amundsen, who named the small ridge overlooking the Ross Ice Shelf for Betty Andersson, nurse and housekeeper in the Amundsen family for many years. There the party was able to visit the stone cairn built by Amundsen on his way back from the Pole in the first week of January, 1912, and left a small bronze plaque to mark his achievement.

As the sledgers pushed north across the ice shelf the weather closed in again and although they made excellent progress (59km one day) sun fixes were impossible. They

searched for one day for Depot 3 but could not find it. A quick decision was made to cut their losses and continue north. They found their small cache of dog food some 80km further on but sledgers and dogs were on short rations all the way to Depot 2.

Depot 4 to Depot 2. Arrived February 13 (time uncertain). This included day spent looking for Depot 3.

Distance covered: 484km (from Depot 4).

Daily average 32.3km.

Departed: February 15.

Depot 2 to Depot 1. Departed February 15. Arrived February 22.

Distance covered: 240.6km.

Daily average 30.1km. This included 1.5 days' wait for a white-out to clear in a heavily-crevasses area.

Departed: February 23.

Depot 1 to Bay of Whales. Arrived February 26.

Distance covered: 194.2km.

Daily average 48.6km.

From Depot 2 onwards the sledgers were able to travel faster because of the recent hardening of the snow surface. A few crevasses were encountered near Steer's Head (one 12m wide) but otherwise the run in to Amundsheimen went very smoothly. The last 200km across the Ross Ice Shelf took four days, and the four reached their base in the early hours of February 27.

In the previous three weeks the temperature had been dropping fairly steadily and the party spent its last days on the Ross Ice Shelf in temperatures between minus 30deg and minus 36deg C. The four also saw for the first time in several months the sun touching the horizon. They had covered in their journey a total distance of 1885.7km from the Bay of Whales to 86deg S and back in 67 days.

On January 22 when the Pole party reached the Polar Plateau the Aurora arrived at Peter I Island off the Eights Coast of West Antarctica with the Norwegian Polar Institute's geological and biological expedition. The ship sailed for the Argentine port of Ushuaia, Tierra del Fuego, on February 2,

arriving there on the afternoon of February 8 to disembark the expedition which flew back to Norway.

After refuelling at Port Stanley, where she arrived on the afternoon of February 11 the Aurora sailed from the Falkland Islands early in the evening for West Antarctica to make her rendezvous with the returning sledgers at the Bay of Whales.

When the sledgers were at Depot 2 between February 13 and 15 the Aurora had her first taste of stormy weather and rough seas. The master, Captain Bernt Steinsland, reported that for the rest of the voyage from February 21 gales and stormy weather continued all the way off the coast of Marie Byrd Land.

Aurora first met the ice when she was 30

Norwegian salmon left behind

A fine Norwegian salmon, some drums of fuel, five depots, three on the Ross Ice Shelf, two on the Polar Plateau, and a small bronze plaque are still reminders of the 90 Degrees South Expedition's attempt to reach the Pole. The salmon was put at Depot 5 (88deg 30min S) nearly 167km from the Pole by the Twin Otter team which landed there early in December.

As the Pole party never reached 88deg S the salmon, brought all the way from Oslo, is presumably still there. A second salmon put in at Depot 1 (79deg 58.1min S) was on the menu for Christmas dinner the day after the party arrived there.

On the return journey Dr Kristensen and her companions camped next to Mt Betty on February 3. Amundsen named this small ridge overlooking the Ross Ice Shelf at 85deg 11min S on his way to the Pole and stopped there on January 6-7, 1912, to build a stone cairn. The 90 Degrees South team left the bronze plaque beside the cairn to mark his achievement.

When the Aurora sailed from the Bay of Whales for New Zealand on March 1 with the sledgers and their 22 huskies she left some drums of fuel at Amundsheimen, the base on the ice shelf. They are still there.

nautical miles from the Bay of Whales and the area of open water was growing smaller each day. On March 1 she reached the fast ice in the Bay of Whales at three o'clock in the morning. Seven hours later the Helicopters (NZ) Ltd chartered Bell Jetranger was assembled and ready to start its ferry flights between Amundshemen and the ship. The pilot, Cranleigh Lee, and his Australian flight engineer, Christopher Nelson, working in a temperature of minus 30deg C and frost smoke, had the Jetranger in the air by 10.15 a.m.

By 10.45 a.m. the Pole party, 22 huskies, sledges, and equipment were safely aboard the Aurora. Supplies left behind at Amund-

shemen more than two months before in case the party had to winter there after its return were also taken off. Only some fuel drums remained behind.

First ship in the Ross Sea during the 1986-87 season, the Aurora became the last one out when she departed from the Bay of Whales at 12.45 p.m. She headed for open water but did not reach it until she was 50nm from the Bay of Whales at 77deg 30min S/167deg W. The new ice was about 4cm thick and there was still some old ice. The rest of the voyage north was without incident and by March 12 the expedition was back in Lyttelton, the port from which the Aurora first went south.

Transglobe Expedition

Ice teams and Lady Fiennes receive Polar Medal

More than four years after the British Transglobe Expedition completed the first circumnavigation of the world by sea, ice, and land, using the Greenwich meridian as a basic route, the leader, Sir Ranulph Fiennes, his wife, Virginia, Charles Burton, and Oliver Shepard, have been awarded the Polar Medal. Lady Fiennes who was responsible for the expedition's communications, wintered in both the Antarctic and Arctic, and is the first woman to be awarded the Polar Medal.

Between 1979 and 1982 the Transglobe Expedition covered 56,330km. One ice team crossed Antarctica by way of the South Pole to Scott Base; a second crossed the Arctic by way of the North Pole to Spitsbergen.

Lady Fiennes shared the winter of 1980 with her husband, Burton, and Shepard at the expedition's base, Ryvingen, in Queen Maud Land. When the ice party began its journey she remained behind to maintain communications between the several elements of the expedition and to break camp. On each leg of the journey she was ahead of the ice party to organise its arrival and co-

ordinate supplies. She was at Scott Base to greet the party when it arrived on January 11, 1981.

After the Antarctic crossing Shepard returned home for personal reasons. Fiennes and Burton navigated a 5.4m Boston whaler through the North-West Passage to Ellesmere Island and arrived on foot at Alert, a Canadian meteorological station at the northern tip of the island on September 26, 1981. They and Virginia Fiennes wintered there until the start of the Pole journey.

During the winter Virginia Fiennes was again responsible for all communications and radio support for her husband and Burton who reached the North Pole on April 11, 1982 and became the first men in history to reach the North and South Poles by surface travel.

For another 4½ months Virginia Fiennes continued her arduous task during the ice party's hazardous crossing of the Arctic Ocean ice from the Pole until the two men were picked up by the support ship Benjamin Bowring on August 4 and taken to Spitsbergen.

Private expeditions to get mail

Personal messages for private polar expeditions will now be carried on Antarctic flights as a humanitarian concern by aircraft supporting the United States National Science Foundation's Antarctic research programme. The exception to the United States policy of non-assistance to private Antarctic expeditions was made, with the agreement of the New Zealand Department of Scientific and Industrial Research, after consideration of an appeal from representatives of Greenpeace, the international ecological organisation, in Washington.

An NSF statement released in Washington on August 20 said that the US policy of non-assistance to private Antarctic expeditions remained in place. Nothing but envelopes with personal messages will be carried; packages, supplies and other cargo are still excluded. Personal messages will be received in Christchurch and hand-carried by an NSF representative to Antarctica. The exception to the non-assistance policy has been made out of regard for individual expedition members and their families.

NSF gave three reasons for the fundamental policy of non-assistance. It rests

on a conviction that such expeditions are unnecessarily dangerous to their participants, the fact that US resources must be tightly controlled to support planned scientific activity, and a reluctance to put other scientific and support personnel at additional risk in the eventuality of a private expedition getting into serious difficulty.

Greenpeace, which established a small base at Cape Evans in January, appealed to NSF on behalf of three New Zealanders, Kevin Conaglen (leader), Justin Farrelly (radio operator), Dr Cornelius van Dorp (medical officer), and a West German woman scientist, Dr Gudrun Gaudian. They have been at Cape Evans since the expedition ship, Greenpeace, departed on February 13.

Mail addressed to the Greenpeace winter party was not carried on the United States Air Force Starlifter which made winter air drops of mail and cargo to Ross Island and the South Pole in mid-June. As a result of the change in US policy the four received their first mail in seven months when US Hercules aircraft made eight flights to Ross Island between August 26 and September 4.

Antarctic medals awarded

Four Tasmanian Antarctic expeditioners were among 16 inaugural recipients of the new Australian Antarctic medal at Mid-winter. The medal represents the first recognition of Antarctic service to be provided under the new Australian system of honours and awards. It is ranked in the system immediately under the Australian bravery medal and is awarded for outstanding service with Australian Antarctic expeditions. Conditions of the award include a stipulation that the recipients must have worked for more than 12 months south of 60 degrees south or where the rigors of Antarctic climate and terrain prevail.

The four Tasmanians are Harry Burton, a scientist from North Hobart whose citation

records that he has spent two winters and six summers in Antarctica conducting research on Antarctic biology. Much of his work has been conducted from remote field camps in difficult conditions. Dr Lloyd Fletcher of Kingston, a veteran of four years in Antarctica and participant in a number of summer programmes, who led the first field party to occupy the new Law Base in a previously little explored part of Australian Antarctic territory. Raymond Morris, a physicist also from Kingston, who has spent three years on the continent engaged in pioneering research on the Upper atmosphere. The fourth, Herman Westerhoof is a radio technical officer from Howrah who was cited for his contribution to maintenance of the Antarctic communication system at Casey in 1981.

Antarctic Heritage Trust established in New Zealand

An Antarctic Heritage Trust was formally established in Christchurch on April 13, 1987 to further the conservation and preservation of the historic huts, sites and associated artefacts in the Ross Dependency and elsewhere in Antarctica. The New Zealand government has, through its administration of the Ross Dependency since 1923, taken responsibility for the preservation and maintenance of the eleven historic sites in the area, a role formalised under the conventions of the Antarctic Treaty (1959) and encouraged by member nations.

The huts of Carsten Borchgrevink built at Cape Adare in 1899, of Captain Robert Falcon Scott at Hut Point 1902, Cape Evans in 1912 and Ernest Shackleton in 1908 contain stores, clothing and equipment. Like the outbuildings, graves, field depots and campsites which also include some from Shackleton's British Imperial Trans-Antarctic Expedition, they serve as a unique memorial to what is generally regarded as a remarkable era in polar history and the genesis of modern scientific research.

The trust will be administered by a board, chaired by Mr Peter Skellerup, CBE R Denmark, AHRIHNZ, RNZIM, JP and includes Mr Richard McElrea, deputy chairman and past president of the New Zealand Antarctic Society and Solicitor, the secretary of New Zealand's Ministry of Foreign Affairs, British High Commissioner to New Zealand (Mr Terrance O'Leary CMG), the American Ambassador to New Zealand (Mr Paul Cleveland), chairman of RDRC (Dr Trevor Hatherton), the Director of New Zealand Historic Places Trust (Mr John Daniels) and director of Antarctic Division, DSIR (Mr Bob Thomson). The President of the New Zealand Antarctic Society is represented by Harry Burson and the Director of Canterbury Museum by Margaret Bradshaw. Mrs Christine Day of Antarctic Division is the secretary.

Patron of the AHT is His Excellency the Most Reverend Sir Paul Reeves, GCMG, GCVO, Governor General of New Zealand. The associate patrons include two men with

deep family interests in Antarctica, The Right Honourable Lord Shackleton, KG, OBE, PC son of Sir Ernest Shackleton and Sir Peter Scott, CH, CBE, DSC son of Captain Robert Falcon Scott. Sir Edmund Hillary, ONZ, KBE and Sir Vivian Fuchs FRS, leaders of the Commonwealth Trans-Antarctic Expedition of 1955-58 are also associate patrons.

The Antarctic Heritage Trust was the brainchild of Dr Trevor Hatherton, chief scientist in the New Zealand party of IGY in 1959, chairman of RDRC and currently President of the Royal Society of New Zealand. Although it supercedes the Historic Sites Management Committee (HSMC) established in 1959 by RDRC to advise on restorative work HSMC will continue to have an advisory function. David Harrowfield, recently appointed executive officer, will be based in Antarctic Division to handle the day to day administration of the Trust.

Since the initial clearing of the huts by members of the Trans-Antarctic Expedition of 1956-57 interim maintenance has been undertaken through Antarctic Division of the DSIR. In 1960-61 Scott's hut at Cape Evans and Shackleton's hut at Cape Royds were restored and parties have worked at Scott's hut at Hut Point in 1963-64 and in 1964-65. Since 1970 the New Zealand Antarctic Society has provided volunteer caretakers, to undertake further work on the three huts as required for Antarctic Division. Although seldom visited, assessment and some limited

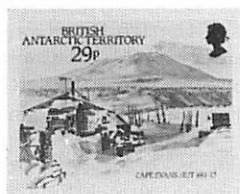
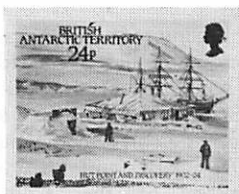
work was also carried out on Borchgrevink's huts at Cape Adare by field parties in 1961, 1963 and by a team from Canterbury Museum led by David Harrowfield in 1982.

In the past work programmes were compiled on the basis of recommendations put forward at the end of each season. In 1979 as a result of a report for the "Strategy of the Preservation and Management of Historic Sites in Ross Dependency, Antarctica" and on site investigation over two summers the HSMC formulated a five year corporate plan. It emphasised the need for larger resources, funding and administrative support for the expanded level of activity required to

forestall the present processes of decline and allow long term preservation of the huts and artefacts.

Action on these recommendations is almost complete and the establishment of the Antarctic Heritage Trust will herald a new era in the preservation of a most significant part of the history of man's endeavour in Antarctica. Fund raising in New Zealand and overseas has already begun. The trust hopes to achieve professional restoration of the sites by the turn of the century.

'Antarctic' thanks Harry Burson and Gerry Turner for their assistance with this article.



Two of the four Scott Stamps released in March 1987 by the British Postal Service in commemoration of 75th anniversary of the death of Captain Robert Falcon Scott and his party. They depict Discovery Hut at Hut Point built and used by members of Discovery Expedition and the hut at Cape Evans used by members of the ill-fated journey to the Pole and their support team. A 10 and a 58 p stamp show Scott himself with the team manhauling in the background and the party at the Pole.

“Scott's last man” now 99

As a prelude to his 99th birthday on April 7 William Burton, now the last member of Scott's 1910-13 expedition, was introduced to New Zealand radio listeners in a special programme presented on March 29 to mark the 75th anniversary of the deaths of Scott, Wilson and Bowers. In the programme, “Scott's Last Man”, listeners heard the firm, down-to-earth voice of Bill Burton recalling his Antarctic service aboard the Terra Nova and his memories, still clear, of Captain Scott. There were other voices in the programme bringing the past to life, those of two scientists, Sir Charles Wright and Sir Raymond Priestley, recorded on their visits to New Zealand long after the expedition.

Former Chief Petty Officer Burton, R.N., was interviewed also a week before the

broadcast for a Wellington Sunday paper, but his actual birthday was celebrated quietly with his family and a few old friends who have close links with later Antarctic generations. It was also a small naval occasion because birthday greetings from the Royal Navy were sent by Admiral Sir William Staveley, First Sea Lord and Chief of Naval Staff, through the British High Commission in Wellington, and by Rear-Admiral L.J. Tempero, Chief of Naval Staff, on behalf of the Royal New Zealand Navy.

Appropriately, the Royal Navy and the Royal New Zealand Navy were both represented on the day. Lieutenant-Commander D. T. Watson, Resident Naval officer, H.M.N.Z.S. Pegasus, who brought the messages, served for 10 years in the Royal Navy, and joined the Royal New Zealand Navy 13 years ago.

Bill Burton, who made three voyages south in the Terra Nova, has lived in Christchurch since 1921. He joined the Canterbury branch of the New Antarctic Society when it was founded in 1955, and has been

a life member of the society since 1964. One of his first birthday greetings arrived from the society's president, Robin Ormerod, on behalf of all members in New Zealand and other countries.

Last relic of Morning

A writing table from the Morning, one of the two relief ships for Scott's 1901-04 expedition has been given to the Canterbury Museum's Antarctic Centre by the Alexander Turnbull Library in Wellington. Sir Joseph Kinsey, who was Scott's agent in Christchurch for both his expeditions, was given the table when the Morning was at Lyttelton in 1903.

Bequeathed to the Turnbull Library by Sir Joseph Kinsey, the table was labelled incorrectly for many years as coming from the

Nimrod, the ship used by Shackleton for his 1908-09 expedition. The mistake was found when the museum asked for details of the table. When the museum sought to have the table sent to the Antarctic Centre, the library agreed.

Mr Baden Norris, honorary curator of the Antarctic Centre, says the table probably served several other purposes in the Morning. It is the only remaining part of the ship which was sunk on December 24, 1915 when carrying munitions for the Russian Army from Brest to Archangel. H.M.S. Cedric rescued all the crew.

Obituaries

Veterans of four nations pass from polar scene

More than 50 years ago two notable Antarctic expeditions sailed south from Britain and the United States. One in 1928-30 attracted world-wide attention because its leader, Rear-Admiral Richard E. Byrd, made the first flight to the South Pole in 1929. The other, led by the South Australian explorer John Rymill spent two winters and three summers in Antarctica but its achievements were not widely known at the time.

Rymill's British Graham Land Expedition (1934-37) is now regarded as a model of privately organised exploring expeditions for its scientific achievements with limited funds, and its use of an aircraft, sledge dogs, and the wooden French-built topsail schooner Penola (130 tonnes) to supply field parties. Only seven of the 16 men who sailed with Rymill now remain. **Captain Robert Ryder**, V.C. R.N. (retd.) skipper of the Penola, died suddenly at sea on January 29 last year.

"Red" Ryder sailed the Penola 26,896 nautical miles, 15,496 under sail alone, in

two years 11 months with a crew mainly of amateurs. He entered the Royal Navy in 1927 and was in Hong Kong in 1933-34 when, with four other naval officers, he designed and built a ketch and sailed it to Britain. There Rymill invited him to skipper the Penola. He accepted and faced the challenge of hazardous ice conditions and stormy weather with another naval officer, Lieutenant-Commander H. Millett, who was chief engineer, and only a few of his crew with experience of ocean sailing. One was his brother, Captain L.C.D. Ryder, Royal Norfolk Regiment, who was second

engineer and surveyor with the shore party.

In World War II Ryder faced a greater challenge when he led the Combined Operations raid on the St Nazaire docks in March, 1942. For his actions he was awarded the Victoria Cross. After he retired from the Navy in 1950 he continued to serve his country as a member of the House of Commons for five years.

Early Byrd Men

Of the 41 men who wintered with Byrd at Little America I in 1929 and those who sailed south in the City of New York and the Eleanor Bolling only eight remain. **John Bird**, one of the crew of the City of New York in 1929-30, died in Washington on January 11 this year. Leland Barter and Carroll Foster are believed to be the last of the crew veterans.

Survivors of the shore party are: Dr Laurence Gould (geologist and second-in-command), Henry Harrison (meteorologist), Howard Mason (radio engineer), Edward Goodale and Norman Vaughan (dog drivers) and Dean Smith (pilot).

A Harvard graduate like several other members of the expedition John Bird was later an ornithologist and firearms editor of "Sportsman Magazine". He served in World War II and the Korean War, attaining the rank of colonel. In 1967 he retired after 16 years with the Office of the Chief of Ordnance but continued as an Army consultant until the mid-1970s.

Three New Zealanders are also entitled to be listed as veterans of BAE I. They are John Morrison (Dunedin), now 85, who served in the Eleanor Bolling, Norman Shrimpton (Nelson) radio operator on the ship's first voyage, and Percy J. Wallis (Auckland) who made two trips south in the City of New York. John Morrison went back again with BAE II on the Jacob Ruppert's second voyage to the Bay of Whales in 1935.

Society Veterans

Two men who contributed much to the revival of the New Zealand Antarctic Society after its war-time recess have passed from the Antarctic scene recently. They were **H. C. Gray**, a former president of the Dunedin

and Canterbury branches, and **Dr John Cumpston**, an Australian diplomat and historian who was the society's first life member. Both were closely concerned with the society's efforts to persuade reluctant governments to establish a New Zealand presence in Antarctica.

Colin Gray, who died near Wellington last year was one of the Dunedin enthusiasts headed by Harold Griffiths who reformed the Dunedin branch in 1952. He was president 1954-57 and when transferred to Christchurch as local manager for Burroughs Ltd he joined Harold Griffiths, who had arrived earlier, and the recently-formed Canterbury branch of which he became president in 1969.

Byrd Fellowship

A post doctorate fellowship amounting to approximately \$NZ55,000, or U.S. \$24,000 a year is being established at Ohio State University to further aspects of Antarctic or arctic research and in memory of Rear-Admiral Richard Evelyn Byrd and his wife Marie Ames Byrd. It is being funded by a major gift from the Byrd Foundation and will be administered by the Institute of Polar Studies of the Ohio State University, Columbus, Ohio, USA.

The purpose of the Byrd programme is to provide fellowships at the Ohio State University to men and women with distinguished academic backgrounds pursuing advanced research in polar problems. The field of study is open but the degree of Doctor of Philosophy must have been attained within five years of selection.

Further details are available from the Byrd Fellowship Committee, Institute of Polar Studies, The Ohio State University, Columbus, Ohio 43210 USA.

In the critical years after the revival of the Dunedin branch Colin Gray was active in the society's efforts to convince the Government that New Zealand should be represented in the Trans-Antarctic Expedition and the International Geophysical Year. Early in 1955 he represented Dunedin in a delegation from the three branches — Wellington, Auckland and Dunedin — which was sympathetically received by the Ministers of External Affairs and Scientific and Industrial Research. Four months later the Government committed itself to both TAE and the IGY.

Colin Gray maintained his association with the Canterbury branch after his retirement in the late 1970s. He moved north about five years ago to live at Waikanae and joined his third branch — Wellington — soon after his arrival.

Australian help

John Cumpston, who died in Canberra this year, aged 77, was a career officer with the Australian Department of External Affairs from 1935 until he retired in 1969. He was concerned with Antarctic and Sub-Antarctic developments and assisted in the preparation of the world's first reliable map of Antarctica, published by the Australians in 1939.

From 1950 to 1953 he was official secretary at the Australian High Commission in Wellington. He joined the council in 1951 and was associated with Frank Simpson in

the preparation of the society's first publication, "The Antarctic Today — A Mid-Century Survey", which brought together in 1952 the best information available at the time on Antarctic research and exploration. His next task for the society was to draft a revised constitution.

Because of his knowledge of Australia's Antarctic aspirations John Cumpston was particularly helpful to the society in its efforts to have a base established in the Ross Dependency. Before his New Zealand posting ended he was elected the society's first life member in 1953 and presented with a leather-bound copy of the book he helped to produce.

Australians and New Zealanders concerned with polar affairs in the last 20 years remember John Cumpston as author of "Macquarie Island", the standard reference book on the history of the island and its links with sealing, whaling and Antarctic exploration. It was published in 1968 when he was historian in the Department of External Affairs and is now regarded as a classic in the Antarctic story.

After his retirement John Cumpston, still a life member of the New Zealand Antarctic Society, established the Roebuck Press which specialised in publishing Australian historical documentary material. He maintained his interest in the Antarctic Society to the end.

James Caffin

Dean Smith flew with Byrd in 1929

Dean Cullen Smith, last of the four pilots with Rear-Admiral Byrd's first Antarctic expedition in 1928-30 died in Easton, Maryland, on March 4, aged 86. He learned to fly as a 16-year-old United States Army sergeant, and had a distinguished career in civil aviation, first as a pilot until 1943 and then with aircraft corporations up to 1965.

Most of the flying during the expedition was done by Bernt Balchen, who flew Byrd to the Pole in November, 1929, and Smith. Byrd had high praise for Smith and in his story of the expedition, "Little America", he said he had great faith in those splendid

pilots — Balchen and Smith — and both had superb records. After the expedition returned, however, Smith — a powerful man mentally and physically — developed a feud with Byrd which was never resolved.

Smith played a significant part in the first flight over the Pole. He piloted the aircraft which established the southernmost base in the world at that time — a fuel dump at the foot of the Liv Glacier for Byrd to use on his return to Little America.

Byrd's expedition took three aircraft to Antarctica. The largest was the Ford tri-engined all-metal monoplane flown to the

Liv Glacier by Smith and then by Balchen. A small Fokker Universal single-engined monoplane was wrecked beyond repair in a gale after it had flown a geological party led by Dr Laurence Gould to the foot of the Rockefeller Mountains. Dean Smith was pilot of the Fairchild folding wing monoplane which flew from Little America to rescue the party.

After 56 hours and 45 minutes of flying instruction at Kelly Field, Texas, Smith was commissioned as a second lieutenant but did not go overseas in World War I. He showed so much promise as a flight instructor — at 17 the youngest in U.S. Army history — that he was retained for the duration.

When he was discharged in 1919 Smith barnstormed for a short time at carnivals and State and county fairs. Then he became one of the pioneer pilots of the air mail service established by the United States Post Office. This lasted for eight years before deliveries were absorbed by commercial airlines.

Pioneer

Unscheduled and haphazard landings on roads or ploughed fields were part and parcel of pioneering a scheduled service across the United States nearly 70 years ago. Mail planes in those days had open cockpits and the engines either conked out or burned out. Pilots used road maps for navigation charts and learned of approaching bad weather only when they flew into it.

Dean Smith had his share of troubles. On one flight out of Chicago his engine quit over a field where cattle were grazing and where he was forced to land. Of course, the mail delivery was delayed. The explanatory telegram Smith sent to the mail superintendent in Washington is now a part of American aviation history and has been quoted often as a classic of brevity.

"On Trip 4 westbound. Flying low. Engine quit. Only place to land on cow. Killed cow. Wrecked plane. Scared me. smith."

In 1927-28 Smith gave up flying air mail to become a commercial pilot with United Airlines. He joined Byrd's expedition in August, 1928, and when he returned in

1930 transferred to the embryonic American Airlines. His next job was as a test pilot and sales representative with the Curtiss-Wright Corporation.

Smith stopped flying commercially in 1943 and spent the remainder of his career as director of development for the Fairchild Engine and Airplane Corporation, and then as director of customer relations for the Hughes Aircraft Corporation. His last post, in 1965, was as consultant to the Douglas Aircraft Corporation.

Inaugural flight

Dean Smith came back to New Zealand after more than 40 years in 1973 as a guest of Air New Zealand on the inaugural flight of the airline's first DC10. He was unable to return to Antarctica but did see ice, snow and mountains on his brief visit, flying first to Milford Sound and later to Mount Cook where he made a ski-plane landing — as a passenger — on the Tasman Glacier.

Over the years Dean Smith's services to aviation were recognised by such awards as the Distinguished Flying Cross, the Harmon Trophy, given annually to the person judged to be America's most outstanding pilot, the Collier Club Award and the Detroit News Trophy. He was the last president of the National Air Pilots Association before it became the Airline Pilots Association and belonged to such path-finding aviation groups as the Air Mail Pioneers Association and the Quiet Birdmen.

Permanent reminder

Smith Peak (72deg 05min S°99deg 28min W) on Thurston Island off the Eights Coast of Ellsworth Land is a permanent reminder of the part Dean Smith played in Byrd's first expedition. It is a prominent peak of the Walker Mountains, a range of peaks and nunataks which forms the spine of Thurston Island. The peak was delineated from aerial photographs taken by the U.S. Navy's Operation Highjump in 1946, and was named by the U.S. Advisory Committee On Antarctic Place Names (ACAN).

James Caffin

References: "Antarctic", June 1973; "Los Angeles Times", March 17, 1987.

Books

New volumes cover private expeditions

The reviewer of this autumn selection of books covering private expeditions is Colin Monteath of Christchurch. A former logistics officer with New Zealand's Antarctic Division of DSIR, he is a well known mountaineer who has travelled extensively in polar regions often serving as tour guide on the Lindblad Explorer and World Discoverer.

Brabant Island Expedition

Antarctic Year

Written by Chris Furse, published by Croom Helm, 1987, ISBN 0-7099-1058-4, hardback, 223 pages, 280 x 210mm, U.K. £14.95, N.Z. \$59.95

Those who enjoyed Chris Furse's documentation of the 1970-71 and 76-77 British Joint Services expeditions to Elephant Island (published Anthony Nelson 1979) will find Antarctic Year equally as good.

In 1983, the fifth Joint Services expedition, led by Commander Chris Furse sailed for Brabant Island in HMS Endurance. Their plan was to spend a year living in tents and snow caves on the island, carrying out over 60 scientific tasks, climbing peaks and, as they had done on Elephant Island, explore

the wild Brabant coast by zodiac and sea-going kayak.

Antarctic Year is a detailed, month by month account, of a large expedition, that despite military logistic support, required phenomenal personal contribution, drive and dedication under very demanding conditions. The book is illustrated mainly in black and white. Combined with excellent reporting, appendices on science and logistics the photographs contribute significantly to our scanty knowledge of an infrequently visited part of Antarctica.

"Ship in the wilderness"

Keith Shackleton and Jim Snyder, published by Dent & Sons, London, Melbourne, 1986, ISBN 0-460-04719-1, hardback, 208pp, 330 x 220mm £14.95 or N.Z. \$49.95.

The MS Lindblad Explorer has been to more environments than any other vessel. She still ventures each year to the Antarctic under her new name Society Explorer, chartered by Society Expeditions of Seattle. As the first vessel to be designed for cruising in the polar regions the Explorer will take a unique place in Antarctic history.

With text by naturalist Keith Shackleton and photographs by Lindblad tourist cruise director Jim Snyder "Ship in the Wilderness" is a tribute to the ship that has changed the lives of so many.

Keith Shackleton was a naturalist-lecturer on SOD (Southern Ocean Driver of zodiacs) on the maiden voyage of the Lindblad Explorer in 1969. He left her 15 years later after she had made the first passenger vessel transit of the North West Passage. His text and vignette paintings reflect a great en-

thusiasm for polar travel. Snyder's photographs include some of the best studies of polar life that, in my opinion, have ever been published; take a look for example at the diving humpback whale on the title page or the fulmar coming in to feed its chick on Bear Island.

The book comprises sections on the Falklands, the Scotia Arc, the Ross Sea sector, the Atlantic Arctic and the transit of the North-West passage. The Explorer is also famous for the journeys in tropical waters and a third of the book is devoted to remote Pacific Islands, the Galapagos and the mysterious Asmat people of Irian Jaya. My only criticism is that I don't think the publishers have the right to reverse a scene of a well-known Antarctic landmark — Mt Scott at the southern end of the Lemaire Channel — simply to fit their cover design!

Northern Lights

Rolf Bjelke and Deborah Shapiro, Macdonald Queen Anne Press, London 1986, ISBN 0-356-12250-6, 270mm x 221mm, hardback 116 pp, U.K. £9.95, N.Z. \$43.99.

Polar yachting is becoming very popular and each year at least half a dozen vessels can be found in Peninsula waters. In the genre of books published on Damien I and Damien II (the most recent being Sally Poncet's "Le Grande Hiver" which has never been translated from the French) Swede Rold Bjelke and American Deborah Shapiro have produced the tale of their 40,000 km Arctic-Antarctic Voyages in the 12 metre steel ketch "Northern Light".

The short, well written chapters, alternatively handled by the two authors, take the Northern Light from Svalbard and

Greenland fjords across the tropics via Easter Island and down to the Chilean fiords and the Antarctic Peninsula.

Most impressive among the features of the book are the 150 colour plates portraying the amazingly contrasting conditions experienced by the team in Antarctic waters. Extraordinary efforts have also been made to obtain photographs of the vessel against a wide variety of backdrops. The result is a professional account of a two year voyage which should appeal to the sailor as well as the polar buff.

Project Blizzard and Australia's Antarctic Heritage Going to extremes

Johnathon Chester, Doubleday, Sydney-Auckland, 1986, ISBN 0-86824-171-7, hardback 308, 228 x 224mm, U.K. N.Z. \$49.95.

When William Blunt woke one morning in the Kashmir Himalaya and decided to organise an Australian expedition to an Australian part of the Antarctic he sparked off a remarkable chain of events that now form an important chapter in the history of private expeditioning to the Antarctic.

Spirit of Adventure Pty Ltd privately published the Heard Island Expedition Report in 1983, documenting their voyage under canvas to the sub-antarctic island in the southern Indian ocean and their ascent of volcano Big Ben, Australia's highest peak.

Back in Australia, expedition members, including photo-journalist Jonathan Chester, immediately began the years of planning and fund-raising necessary to take them to the Antarctic. Their quest, an assessment and hoped for restoration of "Mawson's Home of the Blizzard" base that had been largely ignored by the Australian government, in part, due to its accessibility.

The book that eventually emerged won the 1986 Best Illustrated Reference Book

and Best Designed Book of the Year awards in Australia.

While Going to Extremes graphically outlines the voyages of the ketch Dick Smith Explorer to Commonwealth Bay and the subsequent efforts to document and publicise the state of the huts, the book encompasses a great deal more.

We are treated to the first detailed summary of Australia's involvement in the Antarctic; from the many individuals of Australian origin that joined the expeditions of the Heroic Era such as Hurley, Taylor, Debenham, Richards and Priestly, to the 1929-31 BANZARE voyages and modern-day ANARE national programme.

As in Reader's Digest's "Antarctica" the Project Blizzard narrative is mixed with neat double-page overviews of the historic expeditions, with an emphasis of course on the epic journeys of Mawson. It is pleasing to see John Rymill's "Southern Lights" 1934-37 BGLE expedition receiving its due.

The sketch maps, mixture of well-reproduced colour and historic black and

white plates and even unusual chapters on Australian philatelic history, make for a most professional book that fully merits the awards it has now received. Minor errors such as the Irvine Gaze and Owen Jack

being wrongly labelled in a chapter heading yet correctly in an accompanying plate do not overly detract. It is exciting to see a publisher with the courage to do justice to the creative energy Chester displays.

Society news

Services to Antarctic conservation rewarded

Mr David Harrowfield of Christchurch has been awarded the New Zealand Antarctic Society's Conservation Trophy for his work in relation to the historic huts of the Ross Dependency.

The trophy is awarded each year, if possible, to any person or organisation contributing significantly to any aspect of Antarctic or sub-Antarctic conservation, which in this context, includes the preservation of flora and fauna, buildings, sites, artifacts of historic significance and of the natural features of Antarctica for the sub-Antarctic. The recipient is normally associated with New Zealand activities.

The trophy, an Emperor Penguin, carved in walnut, was presented by Mr Kay Baraclough, Chairman of the Canterbury Branch of the Society, at a recent function.

Since 1975 Mr Harrowfield has made an outstanding contribution to all aspects of Antarctic conservation but particularly to the preservation of the historic huts on Ross Island and the relics associated with the Heroic Age of Antarctic exploration. His work, both as a former curator of the Canterbury Museum's Antarctic centre and in the Ross Dependency, has drawn public attention to the need to preserve all historic artefacts and buildings in Antarctica, and also to the part played by the New Zealand Antarctic Society in this regard for nearly 30 years.

Mr Harrowfield was a senior laboratory technician in the University of Canterbury Geography Department when he first went south in 1975 to spend ten days on Ross Island with Dr J. Kirk studying the beach formation and the recent glacial history of a small coastal landform at Cape Bird.



David Harrowfield

In the 1977-78 season Mr Harrowfield was selected by the New Zealand Antarctic Society as a hut caretaker. He and Mr Chris Buckley worked at Cape Royds, Cape Evans and Hut Point for four weeks during which they completed a detailed inventory and pictorial record of historic artefacts in and around the huts. The inventory has been used extensively by the Antarctic Division of DSIR, the Antarctic Society and the Canterbury Museum. Mr Harrowfield's field work included the use of archeological techniques for the recovery of artefacts about the historic huts. With Mr Buckley he

also spent much of the visit removing accumulated snow and ice from the interior of the huts and doing essential repairs and maintenance.

Appointed assistant curator of Antarctic collections at Canterbury Museum in 1975 Mr Harrowfield subsequently served as registrar of antiquities between 1976 and 1984. In 1979 he became curator of the Antarctic Centre and also worked as archivist at the museum between 1984 and 1986.

On behalf of Canterbury Museum Mr Harrowfield led an expedition to Cape Adare in Northern Victoria Land in the summer of 1981-2 to document the site and carry out essential maintenance on the living hut of the Southern Cross Expedition of 1899 and 1900 and the grave of the zoologist Nicolai Hanson, who died there late in the spring of 1899.

From 1975 to 1984 Mr Harrowfield was responsible for extensive additions to the museum's collection of Antarctic historic artefacts and manuscripts from both New Zealand and overseas sources. In 1985-6 he inspected the historic huts on Ross Island and was responsible for the collection of particularly significant historic artefacts needing to be returned to New Zealand for preservation treatment which he has subsequently arranged.

Management Committee

Since 1981 Mr Harrowfield has been a member of the Ross Dependency Research Committee's historic sites management committee which approved the return of the artefacts. He is currently assisting with the committee with the planning of this season's activities at the various historic sites in Antarctica.

An important part of his work has also been analysis of the problems of snow accumulation particularly on the south east wall of Cape Evans hut in preparation for wind tunnel experiments at Canterbury University. This work is an extension of his earlier studies relating to Cape Adare when he used wind tunnel at the university to confirm field observations of damage by wind.

A prolific writer Mr Harrowfield has contributed extensively to New Zealand and

overseas publications on the maintenance of the historic huts and historical archeology in Antarctica. He wrote the section on historic huts which appears in the Reader's Digest book on Antarctica and in his book "Sledging into History" deals with the explorers of the heroic age, the huts they built on Ross Island and the work being done today to restore and maintain the huts. An important paper on the artefacts of the historic sites in the Ross Dependency has also been completed and he has been engaged in research for a new study of the Ross Sea party, the last to use the historic huts on Ross Island.

Other recipients

The New Zealand Antarctic Society's conservation trophy has now been awarded 13 times since its inception in 1972. Previous recipients have included: 1972 John N. Foster (Christchurch) for his work on the historic huts; 1975 Les Quartermain (Wellington) huts; 1974 Baden Norris (Christchurch) huts; 1975 Eric Gibbs (Taihape) huts; 1976 Paul Sagar (Christchurch) zoological work; 1977 Project Jonah (New Zealand) whales; 1978 Alex Black (Dunedin) contribution to sub-Antarctic conservation particularly in the Snares; 1979 Dr Bernard Stonehouse (Cambridge, U.K.) zoological work; 1980 Dr George Knox (Christchurch) zoological work; 1981 Maurice Conly (formerly of Christchurch now Waikanae) awareness through art; 1983 Gavin Wilson (Christchurch) penguins; 1984 Martin Cawthorn (Wellington) Hookers' sea lions; 1985 Dr Laurence Greenfield (Christchurch) botanist.

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