

ANTARCTIC

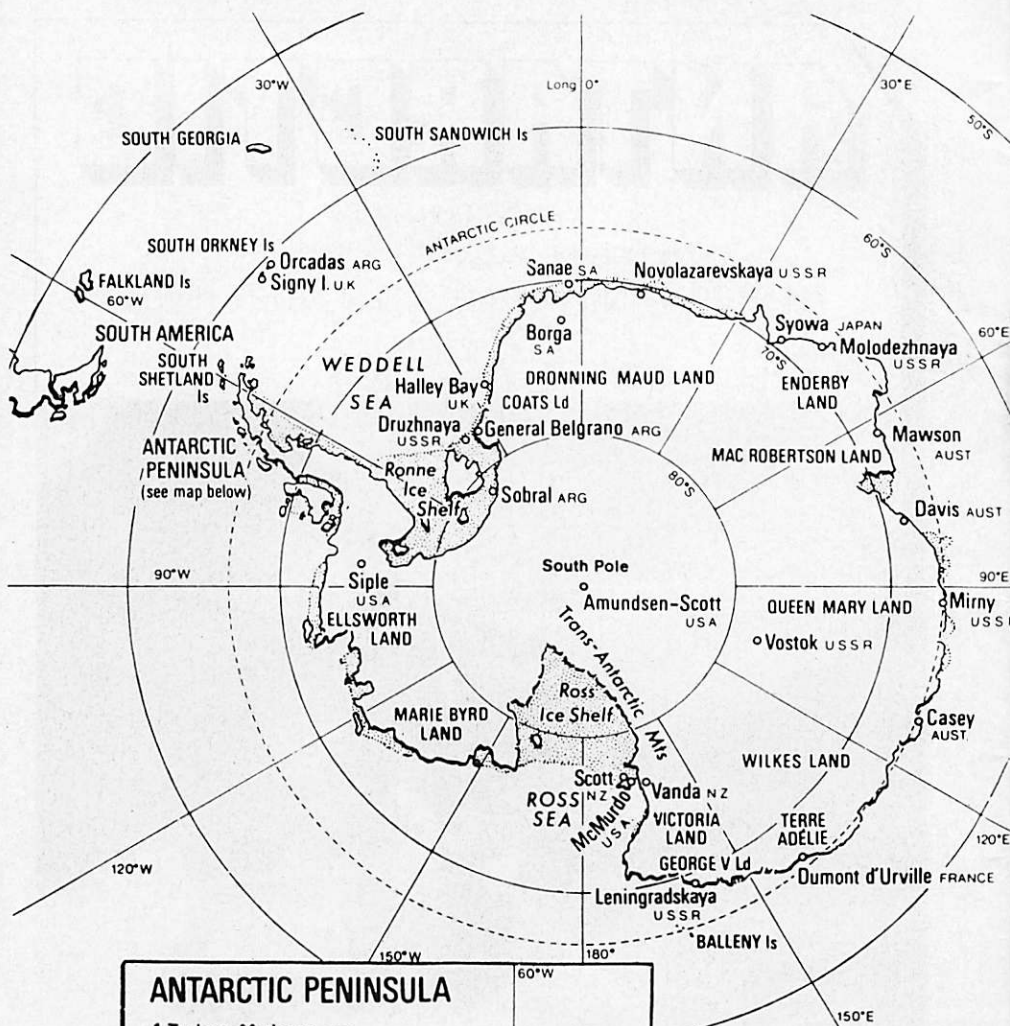
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A New Zealand geochemist, Dr W. F. Giggenbach, descends into the inner crater of Mt Erebus on December 23 last year in an unsuccessful attempt to take gas samples. Behind him in the lava lake of the volcano where the temperature is 1000deg Celsius. On his rucksack he carries titanium gas sampling rods.

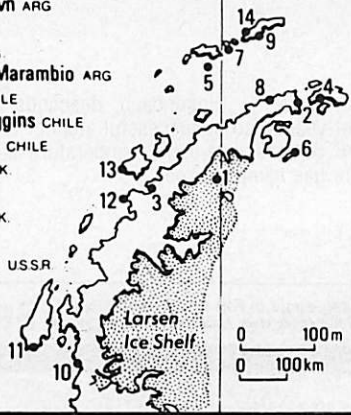
Photo by Colin Monteath

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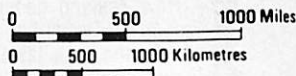


ANTARCTIC PENINSULA

- 1 Teniente Matienzo ARG
- 2 Esperanza ARG
- 3 Almirante Brown ARG
- 4 Petrel ARG
- 5 Decepcion ARG
- 6 Vicecomodoro Marambio ARG
- 7 Arturo Prat CHILE
- 8 Bernardo O'Higgins CHILE
- 9 Presidente Frei CHILE
- 10 Stonington I. UK
- 11 Adelaide I. UK
- 12 Argentine Is. UK
- 13 Palmer USA
- 14 Bellingshausen USSR



ANTARCTICA



ABBREVIATIONS

ARG ARGENTINA
AUST AUSTRALIA
NZ NEW ZEALAND
SA SOUTH AFRICA
UK UNITED KINGDOM
USA UNITED STATES OF AMERICA
USSR UNION OF SOVIET SOCIALIST
REPUBLICS

ANTARCTIC

(successor to 'Antarctic News Bulletin')

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Address all contributions, inquiries etc. to the Editor.

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NEW ZEALAND PLANS FOR SEASON

New Zealand's Antarctic research programme for 1979-80 includes the largest project undertaken so far—drilling two holes into the seafloor of McMurdo Sound to obtain core samples of the sediments which will provide a record of the early history of Antarctic glaciation. Nearly 40 scientists, drillers, and technicians will work on the project, among them guest scientists from Australia, the United States, Japan, and West Germany.

Known as the McMurdo Sound Sediment and Tectonic Study (MSSTS) the project was initiated by the Antarctic and Geophysics Divisions, Department of Scientific and Industrial Research, and Victoria University of Wellington. It is an extension of the Dry Valley Drilling Project, a programme developed between 1971 and 1975 by scientific organisations in the United States, New Zealand, and Japan to obtain a better understanding of the Cenozoic geological history of the McMurdo Sound area.

Publication of the September issue of "Antarctic" has been delayed because of the Editor's absence overseas. Readers will find that some reports refer to events in October and early November.

Cracks in the annual sea ice round the drilling rig, the presence of gas containing 38 per cent methane, and an increase in temperature, ended the first attempt to drill in McMurdo Sound in the 1975-76 season. Drilling stopped after two weeks when 65m of core had been recovered.

This season the New Zealand research programme is slightly smaller than last season's because of economic constraints. Twelve projects have been cancelled, and 145 men and women will work in the programme compared with 167 last year. But all the continuous scientific studies are being maintained, and the programme covers a wide range of disciplines, including glaciology, geology, vulcanology, hydrology, and

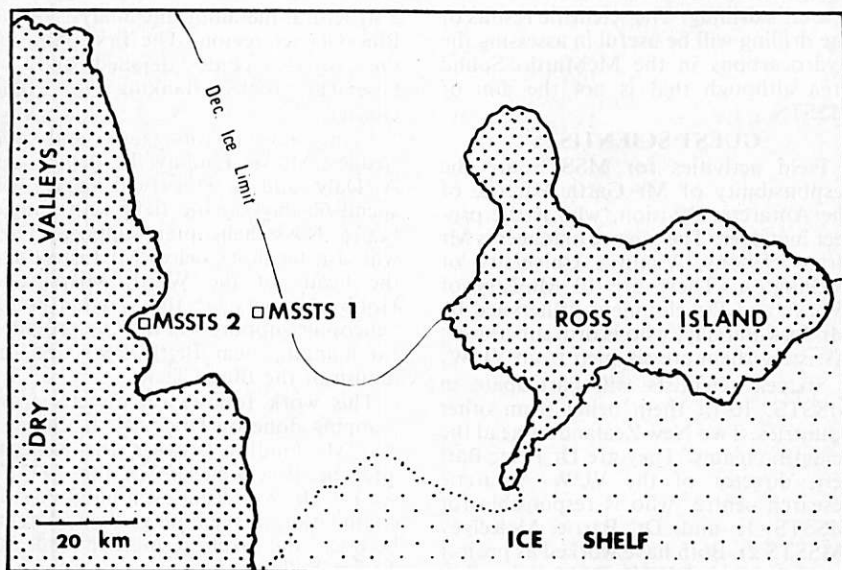
marine biology.

New Zealand will support or take part in other international projects this season besides MSSTS with the United States, Japan, and West Germany. A New Zealand geologist and a field coordinator will join the West German expedition to Northern Victoria Land, and New Zealanders will work in the Ellsworth Mountains and the Horlick Mountains with United States scientists. Japanese scientists will work with New Zealand support on Mt Erebus and in the dry valleys.

REMOTE PARTY

One of the most remote field parties in the New Zealand programme will be two scientists from the Soil Bureau, Dr G. G. Claridge and Mr I. B. Campbell. They will work with the major United States earth science project in the Ellsworth Mountains more than 2100km from Scott Base on the Weddell Sea side of the continent. Their investigations will cover the distribution and chemistry of salts with Ellsworth mountain soils, and the nature of the chemical weathering process.

Another remote project is the expedition to the Ohio Range of the Horlick Mountains 525km from the South Pole. Led by Mrs Margaret Bradshaw, the Canterbury Museum's geologist, the party will spend more than two months in the field to make a sedimentological and paleo-ecological examination of the Devonian Horlick Formation which outcrops only in the Ohio Range. With Mrs



Bradshaw will be Dr Lucy Force and Karl Kellog, of the United States Geological Survey, and Graeme Ayres, an Antarctic Division field leader.

The Ohio Range is at 84deg 45min S, between 111deg and 117deg W, and lies at the southern end of the Transantarctic Mountains. It is the only locality in Antarctica where abundantly fossiliferous marine sediments of Devonian age (345-395 million years) can be found. An American stratigrapher, Dr W. E. Long, was the first to discover marine Devonian fossils in the area in 1958.

Ohio State University parties worked in the Ohio Range during the summers of 1969-61 and 1961-62. In 1960-61 they discovered five coalbeds ranging in thickness from .9m to 3.6m, petrified tree stems up to 7.3m long, and .6m thick, plant fossils, and tillite, which is till, the unconsolidated material deposited by glaciers that has become rock.

DRILL SITE

After weeks of arduous work and five supply trips from Scott Base over 75km of rough sea ice in temperatures as low as minus 45deg Celsius, the first drill site for MSSTS was established 22km southeast of Marble Point. Drilling began on October 18 after the drillers had cut

through 2.2m of annual sea ice, and lowered the drill through 180m of water. The first core samples were recovered on October 22.

Both holes in MSSTS will be drilled to depths of 400m below the seafloor. MSSTS 1 is expected to pass through 280m of glacial sediment before reaching "pre-glacial" strata. MSSTS 2 which is 16km into New Harbour near the main supply depot at Rig Point on the mainland, will probably be entirely glacial. Both holes are expected to penetrate strata more than 10 million years old.

MSSTS has been planned to obtain a record of the early history of the East Antarctic ice sheet, and to date its initiation in the Ross Sea region. The other purpose is to relate the offshore sedimentary sequence in McMurdo Sound to the strata cored inland by DVDP, and obtain measurements of the rate of uplift of the Transantarctic Mountains.

Core samples from MSSTS should provide a link between the offshore sedimentary sequence in the Ross Sea drilled by the Glomar Challenger in 1973, and the strata cored by DVDP. Traces of natural gas were encountered in the Ross Sea drill holes, and small quantities are expected during this

season's drilling. The scientific results of the drilling will be useful in assessing the hydrocarbons in the McMurdo Sound area although that is not the aim of MSSTS.

GUEST SCIENTISTS

Field activities for MSSTS are the responsibility of Mr Garth Varcoe, of the Antarctic Division, who is the project manager. The science manager is Mr Brian Sissons, Victoria University of Wellington. There are 10 Ministry of Works and Development drillers led by Mr Jack Barclay, who is drill supervisor. Assisting them are six men from VUW.

Sixteen scientists will participate in MSSTS, 10 of them being from other countries. Two New Zealanders head the scientific teams. They are Dr Peter Barrett, director of the VUW Antarctic research centre, who is responsible for MSSTS 1, and Dr Barrie McKelvey (MSSTS 2). Both have worked as project geologists with DVDP. Dr McKelvey is a former VUW geologist, now with the University of New England, Armidale, New South Wales.

Specialist studies will include measurement of gas composition and the dating of core (Dr K. Komura, geochemist, Kanazawa University), diatoms (Dr H. Brady, Macquarie University), foraminifera (Barbara Ward and M. Leckie, paleontologists, Northern Illinois University), physical properties of the core (P. Froggatt, geophysicist, VUW), and paleontological measurements (Dr D. Elston, U.S. Geological Survey).

Other United States associated with the project are Dr Lyle McGinnis, a geophysicist from Northern Illinois University, who has been involved in the Dry Valley Drilling Project from the beginning, and Dr Hsin Yi Ling (paleontologist) also from Northern Illinois. Japanese guest scientists are Dr Y. Usa and Dr S. Nakaya, and the West Germans are Dr H. Miller and Professor A. Schmidt.

MAPPING WORK

New Zealand's programme of detailed geological mapping of the Ross Dependency will be continued this season by three geologists led by Mr R. H. Findlay, of the Antarctic Division, who will make

a structural-metamorphic analysis of the Blue Glacier region. The first phase of the project includes detailed study of basement rocks flanking the Blue Glacier.

Using motor toboggans and dog sledges, Messrs Findlay, K. Brodie and A. Daly, and G. Hill (field leader) will spend 60 days in the field with United States Navy helicopter support. They will visit localities below Mt Lister, and the heads of the Ward, Miers, and Hobbs Glaciers. If the weather holds helicopter support will also be provided for mapping near Bettle Peak and the mouth of the Blue Glacier.

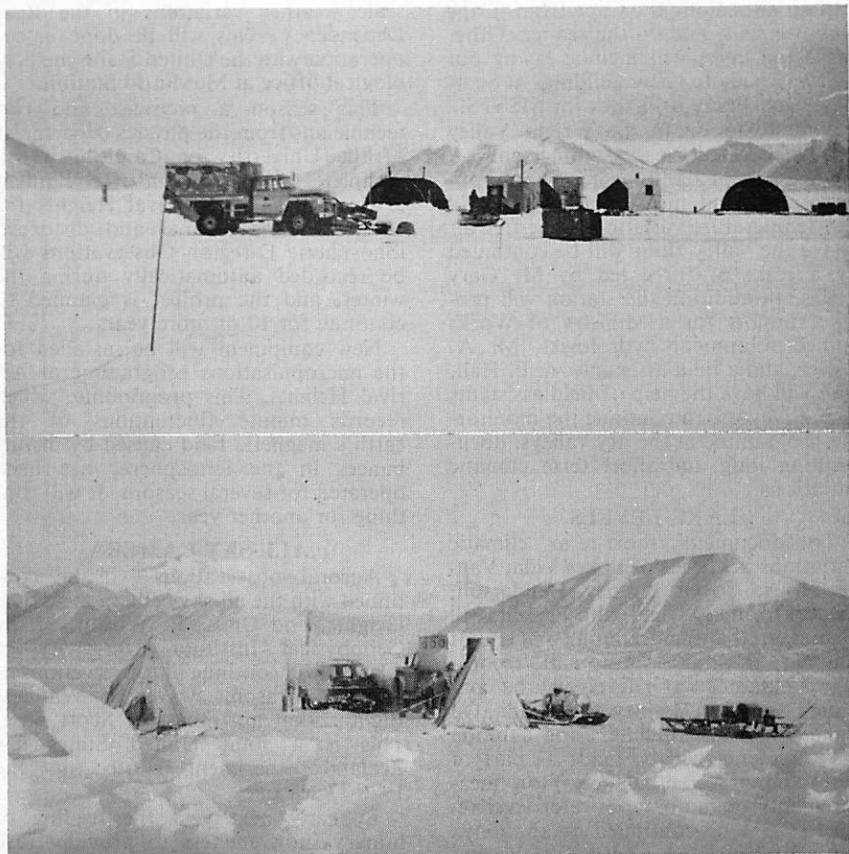
This work follows on directly from mapping done by Dr D. N. B. Skinner and Mr Findlay between the Renegar and the Blue Glaciers in the 1977-78 season. It will lead eventually to the compilation of regional geological maps between the Skelton Glacier and the Taylor Valley.

New Zealanders will return to work on Mt Erebus again this summer in an international project with a United States party, but no sampling of gases from the inner crater of the active volcano will be attempted. A small New Zealand group led by Mr Colin Monteath, field operations officer, Antarctic Division, will spend two weeks at the new summit camp hut after acclimatisation at the Fang Glacier.

SEISMIC STUDIES

Two Lands and Survey Department surveyors, Messrs C. Fink and M. Dunnett, will join the group to continue efforts to make a detailed map of the caldera at the summit of Erebus. Some ground markers were laid around the main caldera rim last season ready for aerial photography by a United States Navy Hercules aircraft. More markers will be laid this season in readiness for photographic runs expected to cover the whole Erebus-Cape Royds area.

A New Zealand geologist, Dr Philip Kyle, now at Ohio State University, who began his studies of Erebus several years ago, will lead the United States group. There is another New Zealander in the group—a geochemist, Mr J. R. (Harry) Keys who is on his sixth visit to Antarc-



MSSTS drill camp on the sea ice in McMurdo Sound 22km south-east of Marble Point. Below is one of the camps on the 75km journey from Scott Base to the drill site.

Antarctic Division photos.

tica. A Japanese member of the group, Dr Katsutada Kaminuma, will make a survey of small-scale seismic activity at the summit and base of Erebus.

Volcanic activity associated with the persistent anorthoclase lava lake will be monitored by the American group. It will also make audio-visual observations and temperature measurements of the lake, perform heat flow studies, and take samples of material ejected from the active inner crater of the volcano.

PRESSURE ROLLERS

Most of the work of the surveyors will

be in the McMurdo Sound area. They will monitor the McMurdo Ice Shelf movement poles again, using a dog team from Scott Base, and initiate the McMurdo Ice shelf pressure roller study. This is a detailed study of the geometry of the pressure rollers and associated fracture zones near Pram Point. A strain net will be established across the rollers to study localised deformation.

A mapping project for the Cape Evans-Cape Royds area, begun two years ago, will be finished off. This involves laying out ground markers at

various sites along the Cape Evans-Cape Royds coasts, and on the sea ice. Other surveying tasks will include laying out building pads for new buildings at Scott Base, and fixing drill sites for MSSTS.

Vanda Station in the Wright Valley will be operated for the summer only. A programme of daily meteorological observations, and measurements of wind and temperature variation in the free air above the valley floor will be continued by a team of three led by Mr Gary Lewis. In addition the station will provide support for a Ministry of Works and Development hydrologist, Mr A. Oliver, and a field assistant, Mr P. Hall, who will have the help of field assistants and surveyors, to continue the monitoring programme in the dry valleys, documenting long and short term climatic variations.

LAKE LEVELS

To document short-term climatic variations the levels of Lakes Vida, Vanda, House, Joyce, Bonney, Henderson, Hoare (formerly Chad) and Fryxell, will be measured at the beginning and end of summer. In addition automatic recording of summer water levels will be continued on Lakes Bonney and Vanda. On Lake Vanda ice thickness and ablation measurements will be made as part of the summer water balance. Flow measurements for automatic water level recorders will be continued on the Onyx River at both the Lower Wright and Vanda wet sites.

For the longer-term climatic variations glacial measurements will be made. These will include mass balance studies on the Heimdall Glacier, comparative ablation measurements on the Upper Wright, Clark, and Lower Wright Glaciers. Photo-theodolite surveys of 16 selected glacier margins will continue at five-yearly intervals.

Established laboratory research programmes in atmospheric physics and earth sciences will continue at Scott Base and Arrival Heights this season and next winter. During the summer a Meteorological Service technician will carry out a new programme of studies of weather variations in the New Zealand-McMurdo Sound region, and of smaller-

scale weather variations in the Ross Dependency. This will be done in co-operation with the United States meteorological office at McMurdo Station.

This season a physicist and two technicians from the physics department of the University of Canterbury will complete the installation of equipment at Scott Base and Arrival Heights for studies of the normal and disturbed ionospheric D-region. Observations will be recorded automatically during the winter, and the project is planned to continue for 10 or more years.

New equipment will be installed for the micropulsations programme at Arrival Heights. This programme, which records minute fluctuations of the earth's magnetic field caused by disturbances in the ionosphere, has been operated for several seasons. It will continue for another year.

ALL-SKY CAMERA

Auroral observations will be continued with the all-sky camera at Arrival Heights, and Dr C. R. Wilson, of the Geophysical Institute, University of Alaska, will continue his observations of auroral infrasonic waves at Windless Bight, 27km north-east of Scott Base. This is a joint United States-New Zealand experiment started in the 1976-77 season.

By early next year the feeding of hungry snow melters to provide fresh water for Scott Base, which has been a full-time job for two men every season in the last 23 years, should be a thing of the past. A team of six men from the Ministry of Works and Development will instal a reverse osmosis unit to distill fresh water from sea water. This filter plant will produce between 4000 and 6000 litres of fresh water daily. In reserve is a new ice melter unit installed last season and warmed by waste heat from the powerhouse, which can produce 2000 litres of water daily.

Preparations for the third stage of the base rebuilding programme—the construction of new sleeping quarters and ablation facilities for 40 people—will begin this season. Landscaping and preparation of building pads for new buildings will be carried out during the

summer, and materials for the new building will be shipped south by sea.

Courses in basic snowcraft and survival techniques will be provided as in past seasons for United States air crews, United States Coast Guard icebreaker crews, and American and New Zealand research staff. The courses will be conducted by an Antarctic Division field leader and two field assistants.

Two representatives of youth organisations will share in the summer team's duties around Scott Base for about a month. Mark Aldridge (Boys Brigade) and Lance Risk (Scout Association) will sail from Wellington to McMurdo Sound aboard the United States Coast Guard icebreaker *Northwind* about the middle of December.

Winter team at Scott Base

A former leader at Scott Base, Mr M. M. Prebble, of Nelson, who wintered in 1966, is the officer in charge of the New Zealand Antarctic research programme for the 1979-80 summer. When the season ends in February, Mr Prebble will hand over his responsibilities to the senior laboratory technician, Mr C. A. Roper, of Christchurch, who will be in charge for the winter of 1980.

Mr Roper, who is 49, is a senior technical officer with the Physics and Engineering Laboratory's Geophysical Observatory, Department of Scientific and Industrial Research. He has worked in the sub-Antarctic at the meteorological and ionosphere station on Campbell Island, and has made regular visits to Scott Base each summer in the course of his duties for several years.

Eight men have been selected to winter at Scott Base through 1980 under Mr Roper's leadership. Four are from the North Island, and four from the South Island. Their ages range from 24 to 28.

Members of the winter team are:

P. A. Turner (25), Tauranga. Laboratory technician. He is an electronics technician with the Ministry of Transport in Tauranga, and was an ionosphere observer on Campbell Island in 1976.

W. A. Bull (28), Temuka. Cook. He is a catering chef with the Royal New Zealand Air Force at Hobsonville.

P. Warren (28), Christchurch. Mechanic. He is a development engineer with a Christchurch firm.

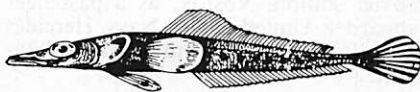
B. Hagan (24), Palmerston. Fitter-mechanic. He is an automotive engineer with a motor firm in Waikouaiti.

R. Hendry (24), Turangi. Fitter-electrician. He is a construction electrician at Turangi.

L. B. Slattery (26), Christchurch. He is a supervisor in one of the city post offices, and worked at Scott Base in the 1973-74 season.

A. Hayden (24), Invercargill. Senior Post Office technician. He is a radio technician at Invercargill.

C. Faber (24), Wellington. Assistant maintenance officer-carpenter and dog handler. He is a carpenter with a Wellington construction firm.



Ross Sea record

A new record low barometric reading for the Ross Sea of 939.61 millibars was recorded aboard the Antarctic cruise ship *Lindblad Explorer* just after she crossed the international dateline on her voyage from the Antarctic Peninsula to McMurdo Sound in January-February this year. The previous lowest reading of 942 millibars for the area was made in 1934 aboard the *Bear* of Oakland, one of the two ships of Byrd's second expedition in 1933-35.

SCOTT BASE LEADER RETURNS

A former Scott Base leader has been reappointed to the post he held 14 years ago. Mr Michael Prebble, who has spent four summers and one winter in Antarctica, will be officer-in-charge for the 1979-80 season.

Mr Prebble, who is 41, began his duties with the Antarctic Division last month, having been granted leave of absence from Nelson College where he is head of the geography department. He was born in Wellington, and is a graduate of Victoria University College of Wellington where he gained his B.A. with honours in geography in 1961, and his M.A. in 1965.

In the 1960-61 season Mr Prebble went south for the first time as one of the New Zealand Antarctic Society's volunteers in the party which restored the historic huts on Ross Island. He returned the next season as a member of the summer support party at Scott Base, and was the dog handler there.

Mr Prebble was appointed deputy leader at Scott Base for the 1964-65 season. He was leader for the 1965-66 season, and remained at Scott Base for the 1966 winter. Late in 1965 he became the second New Zealander to visit the Soviet station, Vostok, as a passenger aboard a United States Navy Hercules aircraft which flew from McMurdo Station.

After his winter at Scott Base Mr Prebble took up a Rotary Foundation fellowship awarded to him in 1965 to study polar research overseas for a year. He received the fellowship after the publication of his thesis on New Zealand field activities in Antarctica.

Mr Prebble spent the 1966-67 academic year at Darwin College, Cambridge, and studied Antarctic geography and glaciology at the Scott Polar Research Institute. His studies also included a comparison of New Zealand field work in the Ross Dependency with the British Antarctic Survey's work in Graham Land, and winter work at Scott Base.

Before he returned to New Zealand early in 1968 Mr Prebble was able to cross the Arctic Circle when he worked at the Tarfala glaciological station in Sweden which is at 67deg 55min N. He also lectured at Bristol and Birmingham Universities on New Zealand research in the Antarctic.

Mr Prebble is a long-serving member of the New Zealand Antarctic Society, the New Zealand Alpine Club, and the Tararua Tramping Club. In recent years he has been responsible for the outdoor education programme at Nelson College.

Another member of the Prebble family has also worked in the Antarctic. Michael Prebble's brother, Warwick, is a geologist who was a member of the Victoria University of Wellington expedition in the 1962-63 season, and leader of the 1963-64 and 1964-65 expeditions. He is now a lecturer in geology at the University of Auckland.



MIKE PREBBLE

SUMMER FIELD PROJECTS

New Zealand scientists will work in the Ellsworth Mountains on the Weddell Sea side of the Continent, and in the Horlick Mountains 525 km from the South Pole this season. Closer to Scott Base, others will work at the summit of Mt. Erebus, on the Ross Ice Shelf, and in the dry valleys of Victoria land. They are members of field parties in the Antarctic research programme for the 1979-80 summer which, including support and construction activities, will call on the services of up to 145 men and women.

Research will be conducted by scientists from four New Zealand universities, and the programme will draw on staff from the Antarctic Division, Geophysics Division, Physics and Engineering Laboratory, New Zealand Oceanographic Institute, Soil Bureau, Meteorological Service, Lands and Survey Department, Post Office, National Film Unit, Ministry of Works and Development, New Zealand Army, and the Royal New Zealand Air Force. The programme will also include guest scientists from Australia, United States, West Germany, Canada and Japan.

Men and women in the programme will work at or from Scott Base, on the Ross Ice Shelf, in Victoria Land, and in McMurdo Sound. New Zealanders will work with Americans in the Ellsworth Mountains, and in the Ohio Range of the Horlick Mountains. They will also work with Americans on Mt. Erebus, and with Japanese in the dry valleys.

Vanda Station in the Wright Valley, 130 km west of Scott Base, is basically a summer station, but winter parties have worked there in 1969, 1970 and 1974. This season it will be operated again for the summer only by a team of three men led by Mr Gary Lewis, who wintered at Vanda in 1970.

A major contribution to the main project in the New Zealand research programme—the McMurdo Sound Sediment and Tectonic Study—will be made this season by the Ministry of Works and Development. It has provided a team of 10 drillers who will drill two holes in the McMurdo Sound sediments, working from a drilling rig based on sea

ice.

There are eight women in the programme this season, two of them, Dr Lucy Force and Barbara Ward, from the United States. Dr Force will work with Margaret Bradshaw in the Ohio Range, and Barbara Ward, who is a paleontologist, will be one of the guest scientists with MSSTS.

Two of the eight women will be engaged in studies of the marine ecosystem under the permanent ice of the Ross Ice Shelf with the University of Canterbury party. One is Jane Fournier, who spent last summer on general duties at Scott Base; the other is Lynley Pierce.



GARY LEWIS

Members of the summer staff at Scott Base are Leigh Muggeridge and Greta Barnhardt. While the cook, Warwick Bull, is with the MSSTS team in McMurdo Sound, Leigh Muggeridge will include cooking for the Scott Base team in her general duties. Greta Barnhardt's general duties will include running the base canteen.

Mrs Thelma Rodgers of the Physics and Engineering Laboratory, who was the first New Zealand woman to winter in the Antarctic this year, will return to Scott Base later this season. She will continue the observations she made last summer and during the winter.

SCOTT BASE

M. M. Prebble, Nelson. Leader.

E. W. Robinson, Christchurch. Deputy-leader. He is 40 and has been in the Police Force since 1967. In Christchurch he is a search and rescue specialist.

D. Reese, Te Anau. Assistant maintenance officer.

R. J. Thompson, Nelson. Assistant maintenance officer.

R. Matheson, Tapanui. Assistant maintenance officer.

G. Keown, Palmerston North. Storekeeper.

M. R. Sinclair, Dunedin. Meteorological officer.

N. S. Roberts, Christchurch. Information officer.

Greta Barnhardt, Wanaka. General duties.

Leigh Mugeridge, Napier. Assistant cook.

W. Zwart, Wellington. Post Office technician.

J. Ross, Motueka. Post Office clerk.

VANDA STATION

G. H. Lewis, Christchurch. Leader. He is a 40-year-old senior technical officer with the Physics and Engineering Laboratory's Geophysical Observatory in Christchurch. His first summer at Vanda was in 1969-70, and he was senior technical officer there for the 1970 winter. He returned for six weeks in the 1973-74 season, and was at Scott Base in 1976-77.

G. P. Leech, Wellington. Meteorological observer.

J. Robinson, Dunedin. Meteorological technician.

University projects are outlined elsewhere. Other projects and the participants are: Ministry of Works and Devel-

opment. Glaciology and hydrology in the dry valley area. A. Oliver, P. Hall (field assistant).

Lands and Survey Department. Two surveyors will work on a variety of projects at Scott Base, Cape Evans and Cape Royds, on the McMurdo Ice Shelf, on Mt Erebus, and in the dry valleys. C. Fink, M. Dunnett.

NZ Oceanographic Institute. Study of super-cooled water through ice holes on Ross Ice Shelf. P. Wilson, R. Goldring (field assistant). Sampling of phytoplankton in McMurdo Sound either through ice or in waters off permanent ice edge. Dr D. Burns, J. Mitchell, J. McConchie and R. Goldring (field assistants).

Meteorological Service. Observation programmes at Scott Base and Vanda Station. Scott Base, M. Sinclair. Vanda Station, G. Leech.

National Film Unit. A team of four will visit Scott Base and field parties to produce three films: a general film for Antarctic Division, and a major two-part scientific documentary for worldwide television release. The documentary will be made with the Canadian Broadcasting Commission's co-operation. L. Diggle, M. Rathbone, B. Watson, G. Morris and an Antarctic Division field assistant.

Physics and Engineering Laboratory. Continuation of upper atmosphere studies at Scott Base and Arrival Heights. Seismic studies, and measurements of low frequency radio signals. C. A. Roper, P. Turner.

Antarctic Division. Structural-metamorphic analysis of the Blue Glacier region in continuance of New Zealand's programme of detailed geological mapping of the Ross Dependency. R. H. Findlay (leader), K. Brodie, A. Daly (geologists), G. Hill (field leader).

Adelie penguin census at Cape Royds rookery, a site of special scientific interest, by Scott Base staff for annual reports to Scientific Committee on Antarctic Research and Antarctic Treaty nations. Continuation of Weddell seal population census in Scott Base to Cape Royds region.

Snowcraft and survival training for United States and New Zealand staff. H. Logan (field leader), K. Woodford, D. Thomson (field assistants).

Scott Base staff will continue at the base and Arrival Heights the University of Canterbury mechanical engineering department project to determine the effect and degree of atmospheric corrosion on aluminium.

Antarctic Division, Victoria University of Wellington. Professor A. J. W. Taylor, professor of clinical psychology, will continue psychological testing of Scott Base winter teams (1979 and 1980).

International projects. A small New Zealand group will join a United States party led by Dr P. Kyle for two weeks for observations on Mt Erebus from the new summit camp hut. Two surveyors will continue efforts to make a detailed map of the summit caldera. Antarctic Division, C. Monteath (field leader), C. Fink, M. Dunnott (surveyors), H. Logan (field assistant).

McMurdo Sound Sediment and Tectonic Study. Two holes will be drilled in the McMurdo Sound sediments to obtain a record of the early history of the East Antarctic ice sheet. Scientific and

technical staff from Antarctic Division, Victoria University of Wellington, Geophysics Division, and drillers from Ministry of Works and Development. Guest scientists from Japan, West Germany, Australia and United States.

Geology of Ohio Range in Horlick Mountains. Canterbury Museum project to make a sedimentological and paleoecological examination of Devonian Horlick Formation of Ohio Range. Mrs Margaret Bradshaw (Canterbury museum geologist), Dr Lucy Force and K. Kellog (United States), G. Ayres (field leader).

Ellsworth Mountains project. Dr G. Claridge and Mr I. Campbell, Soil Bureau, D.S.I.R., will spend two weeks with the major United States earth science project to study distribution and chemistry of salts with Ellsworth mountain soils, and nature of chemical weathering process.

A Japanese Antarctic Research Expedition party will work in the dry valleys with New Zealand assistance. Dr T. Torii will continue geochemical studies, assisted by Mr S. Saito. Dr K. Komura is the third member of the party.

Four huskies die at Scott Base

Scott Base now has a husky population of 17, including three pups. This is two less than last season because of deaths during the winter. Three dogs, Huke, Hone, and Teia, died, and also Kate, a five-year-old bitch. Three pups from a litter of seven born on June 14 were retained.

Nimrod, Rehua, and Julik, the pups, have an Australian father. Their mother is Karen, and the father is Dick, one of two huskies from Mawson, which were flown south last season.

Maori and Antarctic-flavoured names have been given to the new arrivals. Rehua is named after the Maori god of kindness; Nimrod bears the name of Shackleton's first ship; and Julik carries on the name of one of the best dogs in Scott's last expedition.

In the winter of 1911 the original Julik disappeared from Cape Evans for a month. He came back late on the night of August 27, but where he had been since July 27 remained a mystery.

Julik was sighted by Gran and Ponting coming over an ice floe from the north. His ruff was coated with seal blood, he smelt strongly of blubber, and he had a full stomach. He greeted the two men with intense joy, and Scott therefore did not believe he had been a wilful absentee.

When Demetri Gerov, the Russian dog driver, and the cook, Tom Clissold, made a journey to Cape Royds later they found dog footprints, but did not consider they were Julik's. Demetri believed that the husky had been further west.

Universities' part in drilling project

Scientists from New Zealand, United States, Australian, Japanese, and West German universities will play a major part in one of the main projects in the New Zealand Antarctic research programme this summer—the drilling of two holes below the seafloor of McMurdo Sound to obtain a record of the early history of Antarctic glaciation. The Antarctic research centre of Victoria University of Wellington has provided scientific and technical staff for the joint effort with the Antarctic Division, Department of Scientific and Industrial Research, and the Ministry of Works and Development, and has been responsible for the co-ordination of scientific projects in the programme, which is called the McMurdo Sound Sediment and Tectonic Study.

Four universities—Auckland, Waikato, Victoria and Canterbury—have contributed teams to this season's programme. Field parties will study coal measures in south Victoria Land and the marine ecosystem under the permanent ice of the Ross Ice Shelf, and make a count of Adelie penguins and skuas at Cape Bird. Some scientists will conduct upper atmosphere research near Scott Base. Others will continue work done during past seasons in the dry valleys and their lakes west of Scott Base or study the adaptation to cold of fish in the waters of McMurdo Sound.

After the completion of the drilling programme members of the 24th VUW expedition and scientists from other nations will participate in a number of projects. VUW students Alex Pyne, Alan Ross, and Barry Walker, will continue the detailed study of the Weller Coal Measures at Mt Fleming which was started in the 1978-79 season. The purpose of the study is to determine a model for the deposition of Permian coal measures in southern Victoria Land. Mapping at Mt Fleming will be completed this season, and a comparison made with equivalent strata at Shapeless Mountain. Correlation between these areas will show the type, thickness, and extent of the coal seams within the

strata.

Dr B. McKelvey, University of New England, New South Wales and Dr Howard Brady, of Macquarie University, will investigate the fabric and petrology of scattered Cenozoic glacial deposits at Coombs Hills. These were deposited by temperate glaciers before the development of the East Antarctic ice sheet, and fabric data from them will indicate flow direction of the ancient glaciers while petrology will indicate the source of the debris. The scientists will have the support of Jack McConchie, an Antarctic Division field assistant.

In the Lower Wright and Taylor Valleys they will sample basement rocks for fission track dating to determine an uplift rate for the Transantarctic Mountains.

A study of mass movement processes (slope processes) will be made in the Pearce and Beacon Valleys by the VUW students, Ian Wright and David Waghorn. Aerial photographs show geomorphological features which may be related to earlier glaciers or present day slope processes. The study will involve field mapping to establish area, volume, and the character of the mass movement features.

Early in February next year three

VUW geophysicists, Brian Sissons, Paul White, and Colin Brown, will join with Dr David Bennett, Geophysics Division, DSIR, for a seismic study in the area of the MSSTS drill sites. They will work from the United States Coast Guard ice-breaker Glacier, and Dr Heinz Miller, a West German scientist, will also take part in the project. The purpose of the work is to determine the shallow structure in McMurdo Sound by seismic profiling of the sequence along the coast of southern Victoria Land, and the area bounded by Cape Bird, Franklin Island, Cape Roberts, and the Drygalski Ice Tongue.

A gravity and magnetic survey in McMurdo Sound and the Taylor Valley will be made by a VUW party, and scientists from the United States and West Germany. In the first stage gravity measurements combined with seabed sediment sampling will be carried out at one to two kilometre intervals between MSSTS 1 and Cape Royds, and Between MSSTS 2, and into the mouth of the Taylor Valley. This will be done by Brian Sissons, Dr Lyle McGinnis, of Northern Illinois University, and two of his students, and Dr Heinz Miller. The Antarctic Division field assistant will be Roy Arbon.

Gravity measurements will also be taken from Depot Nunatak on the Upper Taylor Glacier down to the snout of the Taylor Glacier at Lake Bonney. This will be followed by readings in the Lower Taylor Valley at Lake Fryxell to link up with readings taken during the first stage. Brian Sissons, Roy Arbon, and Tim Stern (VUW) will use a motor toboggan and two dog sledges in the project, and will have helicopter support.

MARINE ECOSYSTEM

Canterbury University's zoology department will continue studies of the marine ecosystem under the permanent ice cover of the Ross Ice Shelf. Professor George Knox will lead a team of six—Graham Wilson, Jane Fournier, Lynley Pierce, C. Kennedy, P. Bradfield, and an Antarctic Division field assistant,

Ray Goldring, which will monitor the primary productivity in the water column over the summer period and study the dynamics of the pelagic ecosystem at the edge of the Ross Ice Shelf.

A field station will be established in the centre of McMurdo Sound at the edge of the permanent ice over about 300m of water. This will be at approximately the same site as was occupied in the 1971-72 season, and will provide a comparison of the work carried out at White Island. It will also enable an estimate to be made of the transport of detritus, phytoplankton, and zooplankton under the Ross Ice Shelf.

Before the shelf ice station is set up two members of the party will be flown to Cape Bird by helicopter. There they will make the annual Adelie penguin and skua census, and complete the compilation of rookery maps.

Dr Andrew von Biel, and two technicians from the physics department, Graham Lees and Ray Borrell, will complete the installation of all transmitting and receiving equipment needed for studies of the normal and disturbed ionospheric D-region at Scott Base. Antennae for this study were erected at Arrival Heights last season.

MAGNETIC STORMS

Predominant among several different areas of investigation in the project are: (1) determination of D-region electron density profiles on a diurnal as well as seasonal basis; (2) investigation of the anomalies of the Antarctic ionosphere, particularly of polar cap absorption, low-altitude ionisation, and magnetic storms; (3) study of ionospheric winds and the effects on wave motion.

Observations will be recorded automatically next winter and retrieved during the summer for analysis. The station, which will be the only one of its kind in Antarctica, will be linked with the physics department's station near Christchurch, and an Australian station.

Geochemical studies of lakes in the dry valleys will be continued by scientists from the University of Waikato. Dr C

Hendy, M. Lawrence, and C. Rickard, will work in the Lake Fryxell area of the Taylor Valley. They will use the Antarctic Division's drill to drill a series of holes at intervals of one kilometre between the Dry Valley Drilling Project Site 11 (Commonwealth Glacier) and DVDP Site 12 (Lake Hoare). This will be done in an attempt to trace the sub-surface stratigraphy of the glacio-marine tills recovered from DVDP12. A short excursion will also be made to the Miers and Marshall Valleys to evaluate the future study of dating glacial events in the Koettlitz Glacier area.

Another Waikato team will study the ecology and in situ physiology of bacteria, algae, fungi, lichens, and minute animals such as protozoans and collobolans in and around Lakes Fryxell and Vanda. Drs A. Green and C. Harfoot, and N. Rogers, will be joined by W. Vincent, of the Ecology Division, DSIR. They will use the hut at Lake Fryzell where a temporary greenhouse will be erected to aid their physiological studies of algae.

BUSY FISHERMEN

Two members of the team, Dr Green and Mr Rogers, will join the New Zealand and United States groups at the new summit camp hut on Mt Erebus. They will do more work on a green algae which inhabits some of the warm soil areas on the volcano.

Fishermen will be busy again in McMurdo Sound this season. They are New Zealanders who fish through holes in the sea ice in the cause of science. A team of four from the zoology department of the University of Auckland will continue work on Antarctic fishes and invertebrates which began in the 1977-78 season. Dr J. McDonald and Dr J. Montgomery will make experiments related to the neuro-physical adaptation of the fish and invertebrates to constant low temperatures, and Dr R. Wells and D. Hayman will seek more information about the oxygen affinity of haemoglobin at low temperatures in the blood of Antarctic fish. They will also look at haemoglobin cells from the Weddell seal.

Support by air forces

United States, New Zealand and Australian aircraft will provide logistic support again for their respective research programmes this season. In late November and early December Hercules aircraft of the Royal New Zealand Air Force and the Royal Australian Air Force will share in the airlift of men and materials from Christchurch to McMurdo Station which United States Air Force Starlifters began early in October.

New Zealand's contribution to the United States-New Zealand logistic pool has been reduced this year. No. 40 Squadron will make nine flights in Operation Ice Cube, three less than last season. Australian aircraft will operate through Christchurch and contribute to the pool under a tripartite agreement which provides for Australian scientists to be flown from McMurdo Station to Casey Station.

This season the RAAF will make four flights from Christchurch to McMurdo Station, using its C130H Hercules aircraft for what it calls Operation Snowflake. In return the United States naval support force will make two flights to Casey Station with Australian National Antarctic Research Expeditions scientists.

These flights of 2200km by United States Navy ski-equipped Hercules aircraft of VXE-6 Squadron will use an ice runway about 12km inland from Casey Station on the Polar Plateau. Two more flights will be made to Casey Station early next year to bring back Australian scientists.

As in past seasons two RNZAF helicopter crews will be attached to the United States Navy's VXE-6 Squadron and fly on support missions. New Zealand will also supply loading crews during the airlift, and Army cargo handlers will work at Williams Field near McMurdo Station.



Mushrooms, melons, and mail on ice

A winter mail and supply drop — the first for five years — was made to the 72 men wintering at McMurdo Station on July 14. In the cargo of fresh fruit and vegetables, mail, medical supplies, and essential equipment, carried by a United States Air Force Starlifter, there were also between 90kg and 136kg of mail for the 11 men and one woman at Scott Base.

Just over two tonnes of the Starlifter's load of 4.2 tonnes were fresh fruit and vegetables which the 71 Americans and one Soviet exchange scientist at McMurdo Station had not tasted for more than four months. There were mushrooms and rock melons, tomatoes, lettuce, cucumbers, spring onions, oranges, bananas, apples, pears, lemons, and kiwifruit. Staple foods such as cabbage, potatoes, onions, and carrots, made up 906kg of the cargo.

All the cargo, which included 537kg of mail and 665kg of essential spare parts, was packed into 24 containers at Christchurch by United States and New Zealand Army cargo handlers. Chemical lights were attached to the containers to make them easier to retrieve in the winter darkness of Williams Field on the Ross Ice Shelf.

In preparation for the drop 914m of the left-hand side of the skiway was lit by flares every 76m. The lights of McMurdo Station and Scott Base were switched on before the Starlifter's arrival, and buildings at the American base were illuminated by two outside flood lights.

With five cargo handlers aboard — two from the United States Army and three from the New Zealand Army — the Starlifter left Christchurch at 7 a.m. and arrived over the drop zone shortly after 11.30 a.m. The drop began at 11.50 a.m. and was completed at 12.18 p.m., the Starlifter making five passes over the target before it headed back to Christchurch where it landed at 6.15 p.m.

When the Starlifter arrived over the skiway the temperature on the ice was

minus 55deg Celsius. There was no wind at ground level but there was some fog. The drop was made from a height of 304m to give the parachutes on the containers more time to open.

Because of the intense cold the chemical lights on the containers failed to function, although they worked when they were retrieved and taken inside at McMurdo Station. Another effect of the cold was that about five per cent of the fresh food froze by the time the containers were retrieved. But 90kg of precious tomatoes arrived on the ice undamaged, winning one the American cargo handlers a bet of six cans of beer.

Both the Americans and the New Zealanders received other reading matter besides their letters from home. Packed in one container dropped from the Starlifter were recent copies of the Christchurch morning and evening newspapers, and specially for Mrs Thelma Rodgers, the first New Zealand woman to winter at Scott Base, the latest copies of a New Zealand women's magazine.

A Royal New Zealand Air Force Orion of No. 5 (Maritime) Squadron made the first winter mail delivery to Antarctica on August 1, 1973. It flew from Dunedin to McMurdo Station and back. Six mail bags attached to small parachutes were dropped on the ice runway of Williams Field. The Orion carried 381kg of personal mail, a container of special medicine, and a plastic part to repair one of McMurdo Station's four washing machines.

On August 8, 1974, another R.N.Z.A.F. Orion flew from Dunedin and delivered 498kg of mail and some scientific equipment to McMurdo Station. Nine canvas mail bags were dropped by parachute. Inside were letters, newspapers, and cassettes with personal messages for the winter teams at McMurdo Station and Scott Base.



ANARE'S FUTURE

Study for fourth base on continent

Any substantial increase in Australia's scientific research programme in Antarctica is opposed by the Australian Science and Technology Council. The council has made a recommendation to this effect in its annual report which was tabled in the House of Representatives on September 20 by the Prime Minister (Mr Malcolm Fraser).

In an appendix to its report the council notes that the bulk of expenditure on Australia's Antarctic programme is devoted simply to maintaining a presence in the territory to which it lays claim. However, the council offers no objection to a feasibility study for a fourth Australian station on the continent as put forward by the Minister for Science (Senator James Webster).

Because the Australian Government has not yet decided on the future role of the Antarctic Division of the Department of Science and the Environment, it has deferred the calling of tenders for the construction of two laboratory blocks in the new headquarters at Kingston 10km south of Hobart. Work on the construction of the headquarters began early this year. Present plans call for the division to be fully operational at Kingston in time for the 1981-82 season.

A contract for \$6,918,451 has been let to a Hobart firm which will construct three separate, but linked, low-rise buildings. These will house offices, display and conference areas, workshops and stores for the Antarctic Division, and a fourth building will house the Tasmanian regional office of the Australian Government Analytical Laboratories.

When hearings were held in 1977 by the Parliamentary Public Works Committee on the merits and demerits of moving the division from Melbourne suggestions were made that three of the four scientific disciplines allotted space in the preliminary plans for the laboratory blocks (glaciology, cosmic ray physics and upper atmosphere physics) could be located at universities

in Melbourne and Hobart. Until the Government decides final planning of the laboratories cannot begin.

This winter Australia has 87 men wintering at the three stations on the Antarctic Continent — Mawson, Casey, and Davis — and on sub-Antarctic Macquary Island. An auroral physicist, N. N. Voloshinov, who is the Soviet exchange scientist at Mawson, brings the total to 88, the largest number for the last 10 years. The original number of 89 was reduced when the deputy officer-in-charge at Casey died of exposure early in August after being caught in a blizzard.

There are 30 men at Mawson, 24 at Casey, 15 at Davis, and 19 on Macquarie Island. Of the 88 men 29 have had one year or more in the Antarctic before. Sixty-eight are employed by the Antarctic Division, 15 by the Bureau of Meteorology, one by the Bureau of Mineral Resources, Geology and Geophysics, and one each by the Division of National Mapping, Ionospheric Prediction Service, and the Tasmanian National Parks and Wildlife Service.

A major effort last season was a spring traverse from Casey which successfully extended the International Glaciological Project network to 74deg 13min South some 1000km inland. During the traverse new satellite positioned markers were established and old ones remeasured. Strain grids were set up, an almost continuous recording of ice thickness was made, ice cores were obtained from depths up to 10m, and part of the old IAGP line was resurveyed.

Early in September the seven members of the traverse party left Casey. They

used three D5 prime movers to haul a variety of sledges, and operated as two units for much of the trip to speed up the work of establishing new movement markers. The two tractor trains met at 74deg 13min S on November 20, and began the return journey the next day. On December 23 the traverse party arrived at Casey after having travelled some 2000km and spent 18 weeks in the field.

FIRST NETWORK

Australia's IAGP network was first established in 1973. Satellite positioning equipment was used to locate the positions of numerous poles to within one or two metres of the earth's surface. Other markers were then tied to these points and each other, using tellurometer and theodolite survey equipment. After parties from the 1975 and 1976 Casey expeditions added to the network it stretched to 69deg S from the summit of Law Dome.

Observations made by the 1975 and 1976 parties enables rates of ice movement (up to 150m a year), snow accumulation (more than two metres a year in some places), ice thickness, and other information, to be obtained. This contributed significantly to scientific knowledge of the East Antarctic ice sheet.

The main objective of last season's traverse programme was to extend the network to about 74deg S/112deg E, crossing the Soviet Mirny-Dome C traverse route. Ice movement markers had been set up along the latter route by an Antarctic Division geologist Neal Young, who spent the 1976-77 and 1977-78 summers with the Soviet Antarctic expeditions.

Before the two tractor trains met at 74deg 13min S one travelled to GM13, a station set up along the Mirny-Dome C traverse line. There the party found a cache left by Neal Young, which contained sweets, Russian food, a bottle of whisky and a cassette tape made on the Nella Dan a year earlier. Neal Young's observations made there indicate that the surface ice in the region is moving at around seven metres a year.

When the two tractor trains reached their furthest south position the seven

men celebrated the occasion with a barbecue high on the Polar Plateau. The day was perfect, but the beer had to be heated on the barbecue with the steaks and sausages.

On the 1976-77 traverse along the line Mirny-Pioneerskaya-Dome C the Soviet team reached a point about 500km from the Dome C camp. Last season the traverse was able to extend the line of glaciological ice movement markers to Dome C. Neal Young reports that when the party reached the vicinity of the camp at dusk almost everything was obscured by the huge spreading cloud of exhaust from the tractors.

An astro-fix on three stars faintly visible in the twilight gave an accurate longitude. After a chilly night with a temperature of minus 60deg Celsius, the party found the camp exactly where it was expected the next day when the breeze was from a different direction.

When the Soviet party arrived the camp had been deserted for three weeks, but the French and American parties who worked there last season had left a welcome bundle in the French "restaurant" — cognac, chocolate, cigarettes, and a case of whisky. There was also a letter from Dr Richard Cameron, glaciology programme manager for the United States National Science Foundation.

Retirement of director

After six years as director of the Antarctic Division of the Australian Department of Science and the Environment Dr R. I. Garrod has retired on medical grounds. He began sick leave on April 2 this year. Mr C. McCue, head of the department's Ionospheric Prediction Service, has been appointed acting director.

Dr Garrod became director on May 8, 1972. Since then he has visited each Australian station by sea, and returned to Casey by air last January on the first flight from McMurdo Station by a United States Navy Hercules aircraft. He also visited McMurdo Station and the Amundsen-Scott South Pole Station twice, flying south from New Zealand.

Deaths of two ANARE members

Two members of Australian National Antarctic Research Expeditions have died this year, one last summer after being seriously injured in a fall on Macquarie Island, and the other near the Antarctic station, Casey. They were Roger Barker, aged 29, of Adelaide, and Geoffrey Basil Reeve, aged 40, of Blackhurst, New South Wales.

Mr Barker, an Antarctic Division biologist, was seriously injured when he fell 15m from a cliff on Macquarie Island while studying albatrosses on January 3. ("Antarctic, March, 1979, Page 331). He was transferred by helicopter to the guided-missile destroyer Hobart which brought him to Hobart on January 10. After a series of operations there and in Melbourne he died on February 8.

After a year as a teacher Roger Barker, who held a B.Sc. honours degree in zoology, joined the Antarctic Division in 1974 as a biologist. He went south to Davis in the summer of 1974-75 and remained there for the winter. At the end of 1976 he returned to Davis for the summer and continued his studies of water chemistry.

During the return voyage from Davis early in 1977 the Nella Dan called at the Bunger Hills, a coastal "oasis" roughly halfway between Mirny and Casey. Roger Barker was one of four expedition members who went ashore by helicopter and spent five hours in the "oasis". He collected lake water, soil, algae, moss, and lichens, and visited the then unmanned Polish station in the area. Originally called Oasis it was renamed Dobrowolski and occupied last summer. During 1977 Roger Barker produced an illustrated account of the visit, including some of the biological results.

Geoffrey Reeve died of exposure after he became lost in a blizzard 10km from Casey. He was the senior electrical fitter-mechanic at the station, and deputy officer-in-charge.

Early in August Mr Reeve was one of six members of the winter party who camped at Robinson Ridge, a rock out-

crop about 10km from Casey, to undertake maintenance and biological observations. On August 5 he was moving in the camp precincts when he was caught in a sudden blizzard which reached a speed of 96 knots.

Other members of the party found Geoffrey Reeve unconscious less than a kilometre from the camp. A search and rescue team, including the medical officer, Dr K. de Jonge, was sent from Casey by tractor, and brought Mr Reeve back to the station. Further resuscitation attempts were unsuccessful.

Mr Reeve's family asked that his body be returned to Australia for burial. It will be flown out from Casey on one of the two flights which a United States Navy Hercules will make from McMurdo Station in the first week of November.

Longer Australian season

Nine members of the Australian National Antarctic Research Expeditions (ANARE) have arrived at Casey Station nearly three months earlier than usual, and by air instead of ship. The six members of the building crew and three scientists are the first ANARE men to be transported to Antarctica under the tripartite agreement with the United States and New Zealand.

A United States Air Force Starlifter flew the nine men from Christchurch to McMurdo Station where they transferred to a United States Navy ski-equipped Hercules for the flight to Casey Station. Previously all Australian Antarctic staff were transported to their stations by ship near the end of January each year. Under the new arrangement base staff and scientists will benefit from an extended summer season by almost three months.

Proving flights to Casey Station were made from McMurdo Station last January. A second flight is planned for the middle of January next year.

West German expeditions to Antarctic

West Germany will send expeditions to the Weddell Sea and Northern Victoria Land this season. One will make preliminary investigations of the site for the German Federal Republic's first permanent research station on the Ronne Ice Shelf near Berkner Island; the other will spend more than two months on a geological and geophysical survey in Northern Victoria Land, supported by New Zealand helicopters. In addition West German scientists from Hanover and Munster will work with the United States research programme in the Ellsworth Mountains.

GANOVEX 79, the expedition to Northern Victoria Land, has been planned by the Federal Institute of Geosciences and Resources (BGR), and has been organised by Dr Franz Tessensohn. It will use the chartered ice-strengthened ship Schepelstrum as a floating base from which a field camp for geological and geophysical studies will be established on the Lillie Glacier this summer.

To support eight geologists in the field the BGR has chartered two Hughes 500D helicopters from a New Zealand commercial firm, Helicopters (N.Z.) Ltd. In addition New Zealand has provided an experienced field guide for the expedition, and one of three guest scientists in the field party is Dr D. N. B. Skinner, of the New Zealand Geological Survey, who has spent three summers in Antarctica.

Before the Schepelstrum arrives at Timaru early in December from Japan where some reconstruction has been done to accommodate her three helicopters, all members of the expedition will spend about 10 days at Mt Cook where they will take part in a snowcraft and survival course. The course, which will be held in late November, has been organised by the expedition's field guide, Mr Gary Ball. He is a highly experienced mountaineer and alpine guide, and was field leader of the snowcraft and survival course conducted by the Antarctic Division at Scott Base in the 1976-77 season.

Ice conditions off the Pennell Coast will determine the progress of the Schepelstrum, which is expected to sail from Timaru for the Antarctic in the first week of December. She will work first off the Tapsell Foreland of the Pennell Coast, and then, provided there is open water, will move in to Cape Moore, and then to Smith Inlet where she will remain as the expedition's floating base until last in February next year.

Fuel, supplies, and equipment for the field camp will be transported 150km inland from Cape Moore by the BGR Sikorsky helicopter, which can carry 16 passengers or 2.5 tonnes of cargo on each trip. A small permanent hut about 6m by 3.6m will be erected on the lower part of the Lillie Glacier close to Mt Mulock in the Posey Range.

In the latter part of the season the geological party, which includes an Australian guest scientist, Mr D. Wyborn, of the Commonwealth Bureau of Mineral Resources, and a United States geologist, Dr T. Wright, of Allegheny College, will work within a radius of 180km from the field camp in largely unexplored country. Tent camps will be established, and will be supported by the two New Zealand helicopters.

GANOVEX 79 has been planned to continue for two more seasons. The BGR contract with Helicopters (N.Z.) Ltd, is for the provision of helicopter support for three years, and is reported

to be worth about \$1 million a year to the New Zealand company. In the 1981-82 season the West German programme is expected to tie in with the New Zealand-Australian-United States expedition to Northern Victoria Land.

To provide weather forecasts for the field party, and exchange meteorological information with McMurdo Station and Scott Base the West German expedition will have a weather station on board the Schepelstrum, which has been equipped with facsimile equipment, and a receiver for satellite transmissions. Forecasts and daily observations will be made by a meteorologist from the West German Marine Weather Service.

Eight scientists and 12 technical staff will take part in the expedition. There are three BGR geologists, two from West German universities, and the three guest scientists. The West German technical staff includes a pilot and a mechanic for the BGR helicopter, a field assistant, a doctor, meteorologist, radio operator, and a logistics expert.

Helicopters (N.Z.) Ltd will have a team of four with the expedition. It will be led by the company's chief pilot, Mr J. Wilson, who has had a season's experience flying helicopters in the Canadian Arctic. The other pilots are Messrs A. Buckingham and K. Claydon, and the engineer is Mr P. Copp. Mr Buckingham spent a season in the Antarctic when he was a Royal New Zealand Air Force helicopter pilot attached to the United States Navy's VXE-6 Squadron.

Preparations for the establishment of West Germany's first permanent Antarctic research station on the Ronne Ice Shelf early in 1981 will begin this season. The Norwegian polar research vessel Polarsirkel has been chartered for an advance party of scientists and engineers which will study the hydrographic conditions, the edge of the Ronne Ice Shelf, and site of the station 20km inland.

Because the new station will be located on ice that gradually moves out to sea at the rate of one to 1½ kilometres a year, the advance party will

have to study the structure and movement of the ice shelf, bearing in mind that the estimated life of the base will be eight years. The edge of the shelf where the station will be built also presents special problems. It is between 10 and 30 metres above sea level, and plunges steeply into the sea.

Attempts will be made this season to develop methods of blasting an approach ramp on to which cargo can be unloaded. An ice-going cargo ship will take all the materials and equipment for the base to the Antarctic in the 1980-81 summer, and the construction time-table is limited to 45 days so the base will be ready before the approach of winter.

Air support for field work from the new station will be provided by two Twin Otter aircraft. The Federal Ministry of Research and Technology, which is responsible for the construction of the station, and the development of logistic capabilities has considered the conversion of a Transall turbo-prop transport into a ski-equipped aircraft for future Antarctic operations.

With a crew of four the Transall, as a wheeled aircraft, has a range of 1700km with its maximum payload of 16,000kg. Its range is increased to 4800km with a payload of 8000kg. The maximum ferry range of the aircraft is 6300km.

In the spring of 1980 West Germany will send another krill and food fish resources expedition to Antarctica. The Meteor, flagship of the GFR marine research fleet, will begin a seven-month cruise to the Southern Ocean, and will be followed a few months later by the fisheries research vessel Walther Herwig, which was used on similar expeditions in the 1975-76 and 1977-78 seasons.

This krill expedition will also be part of the international marine resources programme initiated by BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks) which will begin in 1981. Eleven research ships will take part in the programme and scientists will attempt to assess the size of krill stocks, and the movements of schools of krill in the Atlantic sector of the Southern Ocean.

Japanese plans for oil exploration

A three-year oil survey in three seas of Antarctica is planned by the Japanese Agency of Natural Resources and Energy. The survey will be organised by the Japan National Oil Corporation, and will be made in the Bellingshausen Sea (1980), the Weddell Sea (1981), and the Ross Sea (1982). Data from the survey will be released to other governments.

According to a report in the "Japan Economic Journal" on October 2, the agency will ask the Ministry of Finance for a budgetary appropriation of 530 million yen for the 1980 financial year which begins on April 1. If approved, the money will be used by the Japan National Oil Corporation so it can organise survey efforts.

A geological survey ship, the 1800-tonne *Hakurei Maru*, will leave Japan this season on a four-month cruise, including one month for a study of sedimentary formations in Antarctic waters. The Ministry of International Trade and Industry has indicated that if geological signs of oil are found further exploration will be considered.

Although there has been no indication of where the *Hakurei Maru* will work in the Antarctic, the "Japan Economic Journal" says that the Bellingshausen

Sea in particular is believed to be promising. The geological structure of the area is similar to one in oilfields.

"The huge oil reservoir there has already prompted some in the United States to plan prospecting and test well drilling," says the journal. "The ANARE plan, however, is the first such attempt by any Japanese organisation."

No single country can develop oil in the Antarctic seas because of an international pact, according to the "Japan Economic Journal". [This is a reference to the agreement by the 13 Antarctic Treaty nations, one of which is Japan, to continue the moratorium on mineral exploration and exploitation in Antarctica.] But the journal says that the United States is readying itself for such an effort, leading the Japanese Agency for Natural Resources and Energy to draft the survey plan.

Siberian clues to oil and gas

Any search for oil in Antarctica should be concentrated on the continental shelf and the shores of the continent, according to Soviet scientists who have completed a series of geophysical investigations in Siberia which have suggested the existence of oil and gas deposits in Antarctica and their most probable location.

These studies have been made by scientists from the Institute of Physical Engineering Problems for the North in Yakutsk, capital of Yakutskaya, the Soviet Union's largest autonomous republic, which occupies a vast expanse of Siberia. Their work has shown that the formation and accumulation of

hydro-carbons in the earth's crust are closely associated with frozen ground, the ice cover, and volcanic activity.

In the course of their research the Soviet scientists established that chemical reactions of hydro-carbon formation accelerate by hundreds of times if acted upon by heat and vibration, that is, seismic processes in the depths of the earth. According to the scientists' estimates, as a result of the physico-geological processes related to the function of permafrost and ice cover in Antarctica around 25 million years ago, it is now preferable to search for Antarctic oil on the continental shelf and the shores of the continent.

BAS NEWS

Advanced equipment for Halley

An advanced ionospheric sounder (AIS) has been acquired by the British Antarctic Survey. It will probably be installed at Halley in the 1980-81 summer, and will enable a wide range of research projects to be carried out there. A committee set up to advise on the use of the AIS equipment has recommended that the first Antarctic project should be concerned with the dynamics of the ionosphere.

Now at BAS headquarters in Cambridge, the equipment was originally designed by the Space Environment Laboratory (SEL) of the United States National Oceanic and Atmospheric Administration (NOAA) to provide means whereby geophysicists could continue to make worthwhile experiments at reasonable cost when rockets and satellites could no longer be financed. An opportunity for BAS to obtain an AIS at very low cost arose when SEL-NOAA decided to develop second-generation equipment and build several sounders.

Two BAS men spent two months in the United States earlier this year, carrying out acceptance tests and helping to solve some outstanding problems. Additional software is now being written by five computer programmers at Boulder, Colorado, including one at World Data Centre A, and arrangements have been made internationally for all AIS groups to exchange additional programmes written for their own particular applications.

The BAS equipment has been mounted on specially designed shock absorbers inside a transportable insulated caboose which can be moved either on wheels or skis. It will be run experimentally in Britain for at least a year before being transferred to Halley.

A British committee has been set up to advise on its use as its capacities are too great to be exploited fully by BAS alone. The committee includes representatives of university groups and Government research establishments.

There is much interest among the

university groups in a new project for an interactive satellite link with the AIS. The transmission of large quantities of numerical data by satellite is now well-developed, and it is technically possible to arrange a system whereby experiments could be carried out in real time in Antarctica or elsewhere by staff in Britain.

The powerful computer facilities in the AIS allow not only raw data to be transmitted in economic form but also flexible changes amongst existing programmes of operation or even acceptance of new programmes from Britain in real time. Since Britain is not well-placed for fundamental geophysical research, a system of this type would enable British geophysicists to operate in zones where critical experiments are possible without them necessarily going there.

Operating costs of such a system are now dropping rapidly, and will soon reach levels where it is cheaper to use such a system than to pay for visits of senior staff to the operating zone. Although primarily designed for AIS purposes, this idea could be applied effectively to a wide range of disciplines, particularly where it is not possible for senior scientists to be based at remote stations.

This year outside activities at all BAS stations have been continued into the winter on a restricted scale, but ceased at Halley after a final trip in May to erect a refuge hut 4.8km from the base.

Parties from Rothera visited various

parts of Adelaide Island — including the old Adelaide station — in April, May and June. The Rothera "air terminal", 4.8km inland on the ice piedmont, was visited in June so that the two huts could be jacked up to keep pace with snow accumulation. Several adjacent islands and the mainland of the Antarctic Peninsula were visited in July. At Rothera itself, the new laboratory — office building was fitted out and brought into use, and the contents of the earlier huts re-organised to provide improved facilities for the transient summer field workers.

Further north at Faraday (Argentine Islands) short journeys continued over mid-winter, and longer journeys became possible again with the consolidation of sea ice in July. Several climbing parties visited the mainland, chiefly for recreation.

At Signy in the South Orkney Islands, most outside projects ceased with the onset of unusually low temperatures in May, but in June the marine biologists resumed diving through holes cut in the sea ice. By July the ice was solid enough for four parties to travel over Normanna Strait to Coronation Island.

On South Georgia, localities around Cumberland East Bay were visited from Grytviken.

As usual, the scientific routines have been interspersed with maintenance tasks. At Halley, where the huts are inside steel tubes, ice from condensation had accumulated below the main living hut and had tilted the floor. This had to be laboriously chipped away before the hut could be re-levelled.

All stations celebrated mid-winter in appropriate style. A "mid-winter" party was also held at the BAS Cambridge headquarters. This was followed at the end of June by a BAS reunion in Cambridge, which was attended by about 130 past and present members. As is now customary, the Fuchs Medal for outstanding service to the Survey was presented at the re-union by Sir Vibian Fuchs.

This year's recipient was Kenn Back, a veteran of nine Antarctic winters spent at six different stations (he was base commander at four of them), who was

described in the citation as "a classic Fid of unrivalled experience". (The term "Fid", by which BAS men are known, is a legacy from the days when the British Antarctic Survey was named the Falkland Islands Dependencies Survey — FIDS.)

After 23 seasons in the Antarctic the Royal Research Ship John Biscoe is expected to return this season after her refit. The refit should be completed in time for the new season, although it is not yet known when the ship will be ready to sail. The refit is being done specifically to adapt the John Biscoe for the BAS offshore biological programme. It is expected to extend her Antarctic service for another 10 years.

Trawlers off South Georgia

Two areas in the Southern Ocean have been the target of intensive fishing during the last 10 years. They are around the South Georgia and Iles Kerguelen.

Soviet fishing fleets have been the chief exploiters of the fish stocks, and large catches have been reported, except in the 1977-78 season. The Soviet fleets have now been joined by trawlers from Poland and East Germany.

In the 1977-78 season large numbers of Soviet, Polish, and East German trawlers operated around South Georgia and the South Orkney Islands. One Soviet fleet moved to the South Orkneys when it failed to find good concentrations of fish or krill near South Georgia.

Forty-nine Soviet vessels were reported to be at work in the South Orkneys. The fleet was made up of 32 trawlers, 11 mother ships, four tankers, a research ship, and a tug.

There was no reduction in activity last season. Seventy-one trawlers were reported to be fishing around South Georgia. The Soviet Union had 60 trawlers engaged, Poland six, East Germany four, and Argentina one.

NARE REPORT

Summer station placed on Bouvet Island

Establishment of a summer station on isolated Bouvet Island in the South Atlantic, and the operation of an upper air station for two months and a half, were two of the main projects carried out by the Norwegian Antarctic Research Expedition last season. The expedition, which went south in the 500-tonne sealer-icebreaker *Polarsirkel*, also worked for two months in western Queen Maud Land, and the Weddell Sea, and one field party spent most of February on the ice in Vestfjella.

Some of the marine programmes on the *Polarsirkel*'s first cruise from Cape Town to Bouvet Island suffered when a krill trawl caught in the ship's propeller on December 27. She anchored immediately, and after a while it was decided to return her to Cape Town by tug. A South African tug arrived on January 5, and by that time the work ashore, which was most important, had been completed.

Equipped with two Bell 206B Jetranger helicopters the *Polarsirkel*, which also took the 1976-77 expedition south, sailed from Bergen on November 19 to conduct two cruises, starting from Cape Town. She left Cape Town on December 16 and arrived off Bouvet Island on December 21.

After delay caused by bad weather establishment of the land station on the island began on December 24. By December 26 the scientists on shore were able to begin their meteorological, biological, geological, geophysical, and surveying programmes. The first cruise ended on January 13 when the *Polarsirkel* reached Cape Town under tow.

NO MISHAPS

On her second cruise the *Polarsirkel* sailed again on schedule on January 16. There were no mishaps on the cruise to Queen Maud Land and the Weddell Sea, and the expedition's scientists carried out a wide range of projects both on the

ice and at sea. The *Polarsirkel* made a second call at Bouvet Island to pick up the five men of the upper air station team and their equipment, and arrived at Cape Town on March 13. She returned to Bergen on April 7.

A complete report of the results achieved by the 1978-79 expedition, the second independent Norwegian scientific expedition to Antarctica since 1960, is still in preparation. The following summary has been provided by the Norwegian Polar Research Institute.

Cruise I to Bouvetoya (Bouvet Island)

Meteorology: An upper air station using the NAVAID system was operated by five men at Bouvetoya from late December, 1978, to early March, 1979. Two automatic weather stations, with battery capacities for one and two years, were established.

Terrestrial biology: Four biologists investigated botany, the invertebrate fauna, the birds and the seals, and the fauna in the beach zone.

VOLCANIC ROCKS

Terrestrial geology: Two geologists studied volcanic rocks of the island.

Terrestrial geophysics: Four seismic stations were operated ashore for recording microseismic activity.

Topography: Aerial photography and surveying were done of the island, and several absolute positions were establish-



On her second cruise for the Norwegian Antarctic Research Expedition last season the Polarsirkel breaks fast ice off Queen Maud Land.

Norsk Polarinstitutt Photo.

ed by mobile two-channel satellite receiver systems.

Oceanography: Tidal measurements and a wave-rider system and current meter recordings were conducted for two months in the off-shore waters.

Marine biology: Three scientists conducted various scientific krill studies, and investigated the benthic biology.

Marine geophysics: Magnetometric registrations were done at profiles up to 150 km from the island.

Hydrography: The near shore waters were charted by small boat with echosounder and Motorola mini-range positioning system.

SECOND CRUISE

Cruise II to Queen Maud Land and the Weddell Sea.

Meteorology: Air temperature, humidity and wind recorded continuously on the ship at several levels from one to 15m. Temperature structures of ocean surface and of icebergs were studied by infra-red radiometer. Detailed investigations were done on the heat flow through the ocean/air interface.

Terrestrial geology: Two geologists worked in Vestfjella for part of the time, to complete investigations done during the Norwegian 1968-69 and 1976-77 expeditions.

Glaciology: Stakes emplaced during the 1976-77 expeditions on the Riiser-Larsen ice shelf were resurveyed. Elevation and position of ice shelf fronts were measured throughout the cruise. Thickness of ice shelves and icebergs were measured by the Scott Polar Research Institute Mark IV radio-echo sounding systems flown by helicopters together with Motorola positioning system. Internal structures and temperatures of numerous icebergs were investigated.

Terrestrial geophysics: Airborne magnetometry was done over Jutulstraumen, and the Riiser-Larsen and Filchner Ice Shelves. A number of gravimetric stations were occupied at Jutulstraumen and Riiser-Larsen. Seismic reflection studies were done at Riiser-Larsen.

ICEBERG STUDIES

Oceanography: Three scientists conducted CTD soundings with a Neil-Brown Mark IV sonde. Current measurements were done in the Weddell Sea with deployed current meters. Eight current meters and two tide gages left in the south-central Weddell Sea during the 1976-77 expedition were retrieved. X-BT soundings were done between Bouvetoya and Cape Town. The motion of icebergs in response to wind and currents was studied in two experiments.

Marine geophysics: Six scientists conducted a series of programmes, including deep seismic reflection and refraction studies using 18 channel streamer and sonobuoys. Shallow seismic reflection studies were done by sparker system, and the scientists conducted side scan sonar and magnetometric registrations.

Marine geology: Two scientists sampled the sea bed. Suspended material was studied by filtered water samples.

As part of the first GARP global experiment (FGGE) — Global Atmospheric Research Programme (GARP) upper air soundings were done from the Polarsirkel on both cruises, and also on the crossings in the Atlantic Ocean south of the Equator. Bathymetric recordings down to 6,000m water depth were done continuously. During the crossing of the South Atlantic Ocean 31 FGGE drifting buoys were deployed, mostly at sea, but some also at icebergs.



Norwegian visit

We regret that, because of the misinterpretation of information received from the British base Halley, it was erroneously reported on Page 170 of the March, 1978 issue of "Antarctic" that a Norwegian expedition had revisited the area. The information given related to the 1976-77 expedition which had been fully reported in the March, 1977, issue.

SOVIET NEWS

Possible change in plan for Russkaya

Russkaya, the seventh Soviet research station in the antarctic, and the first to be established on the coast of West Antarctica between the Ross Sea and the Antarctic Peninsula, was to have been opened by the 24th Soviet Antarctic Expedition late last season. Later reports suggest, however, that the station, first occupied for only two weeks in 1973, may not have been manned this winter because Soviet plans were changed after the crash of an Ilyushin-14 aircraft at Molodezhnaya on January 2.

Three men were killed in the crash, and one of the 11 injured was the leader of the expedition, Dr Y. S. Korotkevich, who is deputy director of the Arctic and Antarctic Research Institute in Leningrad. Dr Korotkevich, who has fully recovered from his injuries, remained at Molodezhnaya when the five most seriously injured survivors of the crash were flown to New Zealand by a United States Navy Hercules aircraft.

Russkaya, which is at Cape Burks (74deg 42min S/136 deg 51min W) was occupied from February 17 to March 2, 1973. Because of extremely difficult ice conditions in the area, it was not occupied in later seasons. When the Mikhail Somov, flagship of the Soviet Antarctic fleet, left Leningrad on November 7, she took the first team of nine men who were to winter at Russkaya under the leadership of V. Stepanov, but later movements of the ship suggest that re-establishment of the station was deferred again.

Eight ships and 560 men and women took part in last season's expedition. Newcomers to Antarctic operations were the freighter Vasya Alekseyev and the tanker BAM which took supplies and fuel south to the five coastal stations. Most of the winter parties, which totalled 250 under the leadership of A.N. Artem'yev, went south in the passenger ship Estoniya.

First of the expedition's ships to leave

Soviet ports was the Kapitán Markov, which sailed from Leningrad on October 26. She reached the Weddell Sea in mid-December and reopened the summer station, Druzhnaya, on the Filchner Ice Shelf, for the 1978-79 field season, which lasted two months. After operations in the Weddell Sea the Kapitán Markov visited the Falkland Island (Islas Malvinas), and then resupplied Novolazarevskaya.

Next to leave were the passenger ship Bashkiriya, which sailed from Odessa on October 27, and the research vessel Professor Zubov from Leningrad on November 5. The Professor Zubov was joined later by the Professor Vize in investigations of the international Poley-South programme. Because the Bashkiriya is not equipped to work in Antarctic ice she remained outside the pack ice during relief operations and transferred her passengers to the Kapitán Markov and the Mikhail Somov for delivery to stations.

Early in November the Mikhail Somov sailed from Leningrad. She resupplied the main Soviet station, Molodezhnaya, on the Prince Olav Coast of Enderby Land, and picked up the last winter party in late December.

In late January the Baskiriya reached Mirny with help from the Mikhail Somov and relieved the station's crews before leaving for her home port of Odessa. Before she arrived a tractor train of 14 vehicles had made the

1400km journey to the inland station, Vostok, with 370 tonnes of fuel and supplies.

Last of the passenger ships to carry new staff to the Antarctic was the *Estoniya*. She sailed from Riga on January 28 with 80 members of the winter teams for the three major coastal stations, Molodezhnaya, Novolazarevskaya, and Mirny.

One of the major projects last season was the completion of the permanent airfield for heavy aircraft at Molodezhnaya. New methods were developed by Soviet engineers to produce a snow-ice field with a strength similar to concrete, which could be used by wheeled aircraft between December and February.

Aeroflot, which operates aircraft and helicopters for Soviet Antarctic expeditions was expected to operate Ilyushin-18 aircraft from the new airfield, and later, use heavier aircraft, possibly the four-engine jet Ilyushin-76 on a new air route

from the Soviet Union. Now, however, the plan to operate the Ilyushin-76 is reported to have been abandoned because it has not been possible to harden the surface of the new airfield sufficiently to take heavy aircraft.

As in previous seasons Druzhnya was the base for geological and geophysical studies, and geodetic and topographic work on the coast of the Weddell Sea, and in the Shackleton Range, Pensacola Mountains, and the Ellsworth Mountains. "Soviet News" reports that Soviet scientists made more than 500 landings by helicopter and aircraft in the execution of this programme.

Detailed studies were made of the Shackleton Range, the Pensacola Mountains, and the Dufek Massif last season. Aerial photographs were taken for the first time of the Ellsworth Mountains, and the paltuxent Range, which lies south of the Pensacola Mountains about 595km from the South Pole.

Work on three historic huts

A wildlife officer and a scientist from the New Zealand Antarctic Society will take part in the New Zealand Antarctic research programme this summer as caretakers of the three historic huts on Ross Island. They are Mr Alan Wright, of Broad Bay, Otago, who is a member of the Canterbury branch of the society, and Mr Gavin Dougherty, of Wellington, who belongs to the Wellington branch.

Messrs Wright and Dougherty will fly south in December. They will spend three weeks on Ross Island, and will continue for the Antarctic Division the restoration and maintenance work at Scott's huts at Cape Evans and Hut Point, and Shackleton's hut at Cape Royds. Caretakers nominated by the society have worked at the huts every summer since 1969 except for a break in the 1975-76 season.

Mr Wright, who is 51, was born in England and has been a member of the Antarctic Society for 16 years. After service in the Royal Navy and the Royal New Zealand Navy, he was a light-house

keeper, and in 1962-63 was officer-in-charge at Campbell Island.

For the last 10 years Mr Wright has been engaged in research on the northern Royal Albatross and yellow-eyed penguins. In his studies of seabirds he has worked on New Zealand offshore islands, Stewart Island, and the Chatham Islands, and in Milford Sound and the Haast district. He is a member of the Otago Tramping and Mountaineering Club.

Mr Dougherty, who is 32, works for the Chemistry Division, Department of Scientific and Industrial Research, and has been a member of the Antarctic Society for five years. He has had previous experience with the Building Research Association, and his present work is concerned with building materials.

Recently Mr Dougherty has been called on to advise on aspects of the new powerhouse at Scott Base, and the restoration of the Pencarrow light-house by the Historic Places Trust.

Polar circumnavigation expedition

After more than six years of planning and training the British Transglobe Expedition sailed from Greenwich on September 2 to begin the first polar circumnavigation of the world. This 88,000km journey, using the Greenwich meridian as a basic route, is expected to take more than three years and end in the northern autumn of 1982. In the 1980-81 southern summer the Transglobe Expedition will begin the crossing of Antarctica from a base in the Borga Massif of Queen Maud Land to Scott Base by way of the South Pole, the Robert Scott Glacier, and the Ross Ice Shelf. The journey will end with an Arctic crossing of 2896km to the North Pole, and then to Spitsbergen where the expedition will be picked up by ship and return to Greenwich.

Leader and organiser of the expedition is 35-year-old explorer, writer and lecturer, Sir Ranulph Twistleton-Wykeham-Fiennes, who has led four major expeditions since 1969. The first was to the White Nile, the second to the Jostedal Glacier in Norway, the largest glacier in Europe, and the third to Headless Valley, British Columbia. In 1977, as part of the preparations for the Transglobe Expedition he led the British North Pole Expedition to 87deg 11.5min N, about 250km from the Pole.

Only three men will take part in the polar sectors of the expedition and complete the whole journey. Sir Ranulph Fiennes will have with him two men, Charles Burton, aged 38, and Oliver Shepard, aged 32. These three will form the ice group of the expedition. Lady Virginia Fiennes, who is responsible for communications and administration, and will run the base camps, will be the only other member of the expedition to winter in the Antarctic and the Arctic with the ice group.

For logistic support by sea and air the Transglobe Expedition has the 1250-tonne ice-strengthened ship Benjamin Bowring, which, as the Kista Dan, began its Arctic and Antarctic service in 1952, and a de Havilland Twin Otter aircraft. Aviation co-ordinator for the expedition, and pilot of the Twin Otter is

Gile Kershaw, who has had several years of Antarctic flying with the British Antarctic Survey.

Designed specially to operate in Arctic and Antarctic conditions, the Kista Dan was the first in the line of Dan ships owned by J. Lauritzen and Company. Her first Antarctic charter was to help make the film "Hell Below Zero" (based on the novel "The White South" by Hammond Innes). From then until 1965-66 season she was chartered first to Australian National Antarctic Research Expeditions, and then for several seasons to the British Antarctic Survey. Later she was sold to Karlsen Shipping, renamed the Martin Karlsen, and used for survey work in the Canadian Arctic by the Bedford Institute of Oceanography, and in trading to north-east Canadian ports.

LINK WITH SCOTT

A leading British insurance broking company, C. T. Bowring and Company Ltd, and an American associate, Marsh and McLennan Companies, have purchased the Kista Dan for the Transglobe Expedition. She has been named Benjamin Bowring after the founder of the firm. This is the second time the Bowring organisation has provided a ship for polar work. In 1910 it lent its most famous ship, the Terra Nova, to the Ad-

miralty for Scott's last expedition.

During her service with the Trans-globe Expedition the Benjamin Bowring will sail under the firm's house flag. She will have a crew of 11, one member being Antony Bowring, son of the head of the firm, who is also the expedition's marine co-ordinator.

One object of the expedition is to promote export sales of the sponsored equipment it will use, which has come from 330 companies, of which 80 percent are British. Eight trade expeditions have been planned during the expedition for this purpose.

After trade shows in September at Paris and Barcelona, the expedition embarked on the Benjamin Bowring for Algiers. From there it will make a 7081km journey across the Sahara in four-wheel drive vehicles to Abidjan on the Ivory Coast. Deviations from the route closest to the Greenwich meridian will be made to do scientific work. From Abidjan the Benjamin Bowring will sail to Cape Town for another trade show in December.

Present plans are to leave Cape Town between December 21 and January 3 to begin the Antarctic stage of the journey. The Benjamin Bowring is expected to reach the South African base, Sanae, between January 10 and 23.

SECOND BASE

A base will be established near Sanae, and the expedition will be joined by the ski-equipped Twin Otter, which will be flown in from South America. It will be used to ferry supplies and equipment to the second base in the Borge Massif about 289km south of Sanae, and at an elevation of about 2438m.

This base will be built at 73deg S/5deg W. The ice group, which will use 650cc skidoos drawing specially-designed stainless steel sledges, plans to reach the Borge base by February 28 next year.

Sir Ranulph Fiennes, his wife, Burton, and Shepard, will winter at their Borge base, living in a pre-fabricated insulated hut made of heavy corrugated cardboard. During the winter they will make regular meteorological observations, and use mobile equipment to identify

and record extra low frequency and very low frequency radio signals.

About October 5, depending on temperatures, the ice group will begin the first stage of the 4224km Antarctic crossing. For some 1126km between the Borge Massif and the South Pole the three men will be travelling over terrain not previously traversed on the surface. They expect to reach the Amundsen-Scott South Pole Station late in January, 1981.

FINAL STAGE

From the South Pole the ice group will follow Amundsen's route, and then travel down the Robert Scott Glacier to the Ross Ice Shelf. The final stage to Scott Base is expected to be completed in the first week of March at the latest.

During the polar crossing Lady Fiennes will remain at the Borge base camp. With her will be Simon Grimes, cook and mechanic, and the crew of the Twin Otter, Giles Kershaw and Gerry Nicholson. The Twin Otter will support the ice group by flying out fuel, food supplies, and spares.

After a radio base has been set up in the Ross Dependency area, Lady Fiennes will help to strike the Borge base camp before she flies to Scott Base in the Twin Otter to wait for the arrival of the ice group. The Benjamin Bowring will be in McMurdo Sound to pick up the group for the next stage of the expedition.

From Scott Base the Benjamin Bowring will visit Auckland, Los Angeles, and Vancouver for trade shows, and then proceed to the mouth of the Yukon River for the next overland stage. The plan is to navigate the Yukon in inflatable boats, cross the watershed to the Mackenzie River by road, and continue by boat to Tuktoyaktuk, the Canadian Polar Continental Shelf Project base at the mouth of the river.

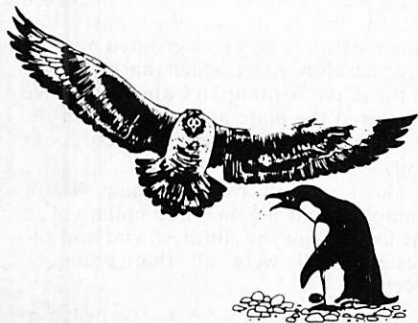
In July, 1981, the expedition will leave Tuktoyaktuk for a 4828km sea journey through the North-West Passage to the Polar Continental Shelf Project station at Alert, arriving in October. After wintering there, the ice group will set out at the end of the first week in February,

1982 for the northern polar crossing. The group hopes to reach the North Pole in early April, and to arrive in the Spitsbergen area where it will be picked up by the Benjamin Bowring towards the end of July.

Both in the Antarctic and the Arctic members of the Transglobe Expedition will carry out a scientific programme covering a wide field. They will make continuous meteorological and glaciological investigations during both polar crossings. The chairman of the expedition's scientific advisory committee is Sir Vivian Fuchs, and the glaciological programme has been drawn up with the aid of Dr Gordon Robin, director of the Scott Polar Research Institute.

Recordings of low frequency radio signals in Antarctica are expected to add to knowledge of the movement of electrons in the magnetosphere. Winter meteorological observations at the Borga base may help to throw more light on the origin and flow of katabatic winds. Some members of the expedition will contribute to British research in cardiology by recording the effects of stress caused by cold and altitude, potential danger, and extreme weather conditions.

In the Arctic the expedition will make regular collections of sea ice samples during the navigation of the North-West Passage, and on the journey across the North Pole to Spitsbergen. It will also collect data on pressure ridges, and measure oscillations in the ice caused by movements of under-ice waves. Meteorological observations will be made on behalf of the British Meteorological Office.



Taiwan krill research

Taiwan, which entered the field of krill research in the 1976-77 season, did not send the Taiwan Fisheries Research Institute's deep-sea trawler Hai Kung south again last season. Reports from Keelung, Taiwan, suggest that a new and larger vessel may work in the Weddell Sea this season.

In the 1976-77 season the Hai Kung spent six weeks in Antarctic waters to study the possibility of large-scale harvesting of krill. She sailed to the Weddell Sea from Cape Town, and, working in the Enderby Land area for 18 days early in 1977, she caught 135 tonnes of krill.



Winter team plaque

New Zealanders who winter at Scott Base will now be able to obtain a tangible reminder of their year in Antarctica. It is a plaque mounted on a wooden shield, which will be sold at the base this summer. The proceeds from sales will be towards amenities at the base.

On the plaque is the New Zealand Antarctic Research Programme badge — the five stars of the Southern Cross in red superimposed on a representation of Mt Erebus in blue and white. Around the badge are the words New Zealand Antarctic Research Programme, and above it Antarctic Division, D.S.I.R. The shield is completed with a scroll bearing the words winter over, and the year.

Second visit to desolate Ridley Beach

by
Baden Norris

Desolate Ridley Beach at Cape Adare where 10 men were the first in Antarctic history to winter on the mainland has had few visitors in the last 80 years because of the difficulty of access — landings can be made there only from a ship. One of the first visitors to the area after the departure of C. E. Borchgrevink's Southern Cross Expedition early in 1900 was a young New Zealander, Clarence Hare, of Christchurch, who was a steward aboard the *Discovery* on Scott's first expedition in 1901-04.

In the last 20 years only a few other New Zealanders have seen the two huts built by Borchgrevink's party and named Camp Ridley. One of them is Baden Norris, who went to Cape Adare first in 1974 as a ranger and guide aboard the Antarctic cruise ship *Lindblad Explorer*. He returned in the same capacity early this year, and in the following article he describes the changes on Ridley Beach in the last five years.

Borchgrevink and his men landed on Ridley Beach on February 18, 1899, and the two huts they built are the oldest buildings in Antarctica. Of interest too in the historic Cape Adare region are the remains of the hut built in 1911 by the six men of Scott's Northern Party who spent 10 stormy months on the beach until they were picked up by the *Terra Nova* early in 1912, and the grave of the first man to be buried on the continent, Nicolai Hanson, senior zoologist of the Southern Cross Expedition.

I first visited the area on January 1, 1974 and recorded the condition of buildings, and Hanson's grave. Also I made a general survey of the vast Adelie penguin colony which is a feature of the cape and the pebble beach.

The Borchgrevink main hut then was in very sound condition and free of ice. The store hut had lost its roof long ago

in a storm but nevertheless was in good shape. Both buildings were constructed in the Norwegian style with metal used very rarely.

A photograph taken in 1902 shows the store hut minus its roof so it can be assumed that a high wind took it off during the winter of 1900. The main hut originally had ship's wire runners shackled to very heavy anchors stretched taut across the roof. The store hut was not treated similarly. These wires have now rusted away completely, and only the head of the stock of the anchors can be seen because of the build up of penguin guano.

Hanson's grave was free of snow in 1974 but even then Keith Shackleton and I took several hours to find it. The small brass plate with the details of his death left by the Southern Cross party had blown off the iron cross grouted into the large basalt boulder which marks the site of the grave 304m up in Cape Adare. We recovered the plate and placed it on the grave itself with a note to record our visit.

The hut built by Lieutenant Victor Campbell and his men had collapsed to the extent that the southern end and the western wall were all that remained erect.

Adelie penguins were on the beach in

their thousands, mostly with chicks, and the noise and the smell were almost overpowering. Several leopard seals patrolled the edge of the beach taking as many penguins as they desired.

What a different picture was presented on February 12, 1979. The northern party's hut had been flattened, and only the small entrance porch remained upright to give shelter to a dozen or so immature Adélie chicks.

The doors of the Borchgrevink hut were open, and snow had drifted into the porch entrance making entry impossible. Some unrecorded visitor may have been careless or as is more likely the hasps on the latches had rusted through. Cape Adare is in the "Banana Belt" of Antarctica, and rusting is very common.

The hut's contents were not damaged as far as I could see. The firmly packed snow had done no harm, and now serves as an effective barrier against the weather. The state of the roofless hut was unchanged, but several items of historic interest that had been recorded as lying around the buildings could not be located. One that I had hoped to find again was the box of heavy calibre rifle cartridges left by the Southern Cross party, who had feared the presence of predators such as polar bears.

A hard climb up the cliffs to the area of Hanson's grave went unrewarded. After two hours of fruitless searching a party of four, from the Lindblad Explorer failed to locate it although both Keith Shackleton and I had visited the grave before. We had intended to rewire the brass plate back on the cross.

The Adélie penguin colony showed the most change since my last visit. Except for a few widely-scattered immature birds and a very occasional adult the beach and the cliffs were deserted. The breeding season having ended, these birds were the late breeders abandoned by their parents. They will have a very modest chance of survival.

Scores of giant petrels lined the upper slopes of the shore. Many were in the white or part-white phase so common among the southern race. Half-devoured penguin chicks lay everywhere, and the

petrels had little trouble in taking a meal at will. A few small skua chicks were noted on the slopes. With winter so close they faced a very short life.

By 11p.m. the sun had set behind the distant mountains, and the temperature had fallen steeply. With the change came a very strong wind which demanded that we leave quickly, but not before we shored up the doors of Borchgrevink's hut as best as we could.

We had a wet departure by Zodiac rubber boat from the beach into a rising sea. This served to accentuate a feeling of depression for most of us because this might be our last sight of the Antarctic, and we took our leave reluctantly.

A splendid full moon shining over a dark brooding Cape Adare as we weighted anchor, a penguin chick's lonely pathetic call from the darkened shore, the pungent yet not unpleasant smell from the now silent rookery. These are memories I shall never forget.

Pole anniversary flight

This season marks the 50th anniversary of Rear-Admiral Richard E. Byrd's historic flight over the South Pole. The 2574km flight in a three-engined Ford monoplane was completed on November 29, 1929, and took 18hrs 37mins.

To mark the flight's anniversary a United States Navy Hercules aircraft will fly to the South Pole on November 29 this year over essentially the same route taken by Byrd and his crew, Bernt Balchen (pilot), Harold Gurn (co-pilot and radio operator), and Ashley McKinley (aerial photographer). One of the passengers on the anniversary flight will be Dr Laurence Gould, second-in-command of Byrd's first expedition, and leader of the geological party which provided weather information for Byrd when it was at the foot of the Queen Maud Mountains.



ANTARCTIC BOOKSHELF



Last of Lands . . . Antarctica

By

J. F. Lovering and J. R. V. Prescott

Melbourne University Press, 1979. 201PP and appendices. Fourteen black and white illustrations, drawings and tables.

Professor Lovering is perhaps best known in scientific circles for his studies of moon rocks, but now that the source of that material has at least temporarily dried up, it is gratifying to find that he and his colleague, Mr Prescott, have examined another frontier with similar interest and enthusiasm.

The addition of this paperback book to the growing literature on Antarctica is most timely. It leans heavily towards discussion of resources of the southern continent and the prospect of using them for the benefit of mankind — a subject which is becoming increasingly a world focus of attention.

The opening chapter, which deals with the physical characteristics of Antarctica, is well-documented, with clear and informative illustrations and a wealth of information, much of which may be new to the layman. Almost as large a section as that given to the land itself is reserved for discussion of the Southern Ocean. The basis for the immense biological activity of this water mass, and the reasons for its richness in life in comparison with other ocean areas of the world, are lucidly explained.

This chapter leads naturally to one of the resources of Antarctica and its surrounding ocean. The authors open it by commenting that "although the Antarctic has been protected up to the present from exploitation by its isolation and by physical and political problems, a resource-hungry world is increasingly turning its eyes on an area which represents 9 per cent of the land surface of the earth and has so far not been systematically prospected for its resources". They point out that by analogy with geologically similar continents Antarctica must contain many

mineral deposits of world economic importance, and emphasise their comment with a series of diagrams, including a reconstruction of the old supercontinent of Gondwanaland showing Antarctica as the keystone with the mineral belts of the surrounding continents passing onto it.

The main known reserves are of iron ore and coal but the writers are careful to say that both these commodities are not economic in the foreseeable future because of the remoteness from markets, and the difficulty of mining these relatively low-grade deposits. Exploitation of other minerals faces similar problems.

The prospect for oil and gas is a different matter, and the authors recall that drilling in the Ross Sea in 1973 by the research vessel *Glomar Challenger* resulted in gas shows in three of the four holes drilled although they were sited away from known potentially favourable structures. Although the authors say that it is premature to attach any economic significance to the Ross Sea hydrocarbons at this stage, "to a world in which the hydrocarbon reserves are being depleted at a rapid rate, the exciting implication of the Ross Sea gas shows has not passed unnoticed by the major oil exploration companies."

Exploitation of the biota of the Southern Ocean is given considerable space, particularly the shrimp-like krill. It has been estimated that a sustainable harvest on a continuing basis could be between 70 and 150 million tonnes a year, which is comparable with the present total world catch of fish and crustaceans. Krill is a particularly rich source of food, since it contains about two to three times the amount by weight of high

quality protein in other foods.

Antarctica is extremely rich in another natural resource which is likely to become increasingly important — ice. Professor Lovering and Mr Prescott say that the ice of the Antarctic ice cap makes up about 90 per cent of the usable fresh water on earth, so it is not surprising that countries with severe fresh water deficiencies should look to the antarctic for a solution to their problems.

Surveys published in 1973 show that the technology is already with us to tow tabular icebergs from Antarctic sites like the Amery and Ross Ice Shelves to parched areas of Australia and Chile at a considerable saving over the costs of desalination. More recent references to the growing literature on the subject would have been helpful, and lack of reference to the first international conference on iceberg utilisation held in 1977 at Iowa State University is a surprising omission.

The placing of the chapter on discovery and exploration towards the centre of the book at first seems strange, but is likely to be justified on the grounds that it is naturally associated

with the following one on political geography, because much of that is historically based. These well-written and up-to-date chapters lead on to the final one entitled "The Prospects for Antarctica".

Here all the possibilities for exploitation of Antarctica's resources are examined again, together with possible pollution and political problems. The authors reach no definite conclusions on whether or not Antarctica will be widely exploited for its resources (apart from krill, which is already being exploited), but suggest that it is likely that at least the developed Antarctic Treaty nations will opt for the closely-controlled development of resources as they become economically practicable.

The layman will find in this book the answers to many questions stimulated by the recent upsurge of interest in Antarctica. Other more familiar with Antarctic matters will find it a useful reference.

[J. F. Lovering is professor of geology at the University of Melbourne. J. R. V. Prescott is reader in geography at the same university.]

M. G. LAIRD

New berth for Discovery

By 1981 H.M.S. Discovery, the little barque-rigged wooden ship which took Scott's first expedition to the Antarctic in 1901, will be moored permanently on the South Bank of the Thames at St Mary Overy Dock, a few yards from Southwark Cathedral. She is now berthed alongside the Thames Embankment near Waterloo Bridge where she has been for more than 30 years.

Visitors have not been allowed on board the Discovery since it was found that her inner hull had deteriorated because of a fungus growth. Sir Patrick Bailey, director of the Maritime Trust to which ownership of the Discovery was transferred from the Ministry of Defence in April this year, says the ship is basically sound, and the trust's original fears that she might be riddled with dry rot have proved unfounded.

But more than \$800,000 will still have to be spent to preserve the 78-year-old ship. When she goes to her final resting place the National Maritime Museum at Greenwich plans to establish a museum of exploration and discovery in the Discovery, and she will be open to visitors again.

Originally it was expected that the Discovery would be repaired and preserved in a collection of historic ships which the Maritime Trust planned to assemble in the east basin of St Katherine Dock in the heart of London. ("Antarctic," March, 1979). Now, however, the trust has chosen a berth on the South Bank, and the Discovery will be included in a plan to transform part of Southwark into a big tourist attraction.

Antarctic cruises this season

Two cruise ships, the World Discoverer, operated by a West German travel firm, and the veteran Lindblad Explorer, will be back in the Antarctic this season, and one international airline, Air New Zealand, will provide day trips to the Ross Dependency for tourists. Each ship is expected to make two cruises, and DC-10 aircraft of Air New Zealand will make four flights south, depending on fuel allocations.

Last season the Lindblad Explorer made three cruises, two in the Antarctic Peninsula area, and one to the Ross Dependency, which ended at Lyttelton. This season two cruises have been planned. Between January 1 and 18 the Lindblad Explorer will make calls at Antarctic Peninsula bases. The second cruise between January 19 and February 27 will continue from the Antarctic Peninsula to McMurdo Station and Scott Base.

When the Lindblad Explorer is in McMurdo Sound she is expected to make calls at Cape Royds and Cape Evans to enable tourists to visit the historic huts. Then she will sail for Lyttelton, and, depending on the weather and ice conditions, will call at Cape Hallett, Cape Adare, Macquarie Island, Campbell Island, and the Auckland Islands.

In the 1977-78 season two Antarctic cruises were included in the World Discoverer's adventure cruise programme, and the ship made one cruise last season with 140 passengers. This season it will make two 24-day cruises, the first in December, and the second in January. Both cruises are being advertised in the United States to attract American tourists.

These cruises have been arranged by an American organisation, Society Expeditions, based in Seattle, which arranges world travel for the Society for the Preservation of Archaeological Monuments. Both cruises will begin and end in Punta Arenas, Chile.

Traditional sailing and whaling routes will be followed by the World

Discoverer on its cruises, and passengers will be able to study Antarctic wildlife both at sea and ashore. Naturalists and lecturers will accompany the cruises, and will lecture on Antarctic history and the natural sciences under the direction of Dr George A. Llano, an authority on polar science, who worked formerly for the United States National Science Foundation.

On the way to the Falkland Islands the World Discoverer will cruise through the Strait of Magellan. From the Falkland Islands she will proceed to South Georgia, and in a swing westward will call at Coronation Island in the South Orkneys.

Provision has been made for the World Discoverer to spend some days cruising down the west coast of the Antarctic Peninsula, and in the Weddell Sea. Before sailing northward on the return to Punta Arenas both cruises will attempt to cross the Antarctic Circle, depending on the ice and weather conditions.

Air New Zealand's four flights are planned for November 7, 14, 21, and 28. To remain within its fuel allocation the airline will make savings by rationalisation of international flights. Provision has been made for the cancellation of one flight if necessary.

Last November 200 Japanese and Americans travelled in groups on the flights to McMurdo Sound. One attraction for the Japanese tourists was the presence of Sir Edmund Hillary as commentator on a flight. He will be a commentator again this year. The others will be Mr Peter Mulgrew, who was in the New Zealand party which reached the South Pole in 1958, Sir Holmes Miller, chairman of the Ross Dependency Research Committee, and deputy-leader to Sir Edmund Hillary, and Mr R. B. Thomson, superintendent of the Antarctic Division, who has made more than 50 flights south since 1959.

ANTARCTIC

is published quarterly in March, June, September, and December. It is the only periodical in the world which gives regular up-to-date news of the Antarctic activities of all the nations at work in the far south. It has a worldwide circulation.

Yearly subscription NZ\$6.00, Overseas NZ\$7.00, includes postage (air mail postage extra), single copies \$2.00. Details of back issues available, may be obtained from the Secretary, New Zealand Antarctic Society (Inc.), P.O. Box 1223, Christchurch, New Zealand. Back issues more than five years old are available on request.

Overseas subscribers are asked to ensure that their remittances are converted to New Zealand currency.

NEW ZEALAND ANTARCTIC SOCIETY (INC.)

The New Zealand Antarctic Society was formed in 1933. It comprises New Zealanders and overseas friends, many of whom have seen Antarctica for themselves, and all of whom are vitally interested in some phase of Antarctic exploration, development, or research.

The society has taken an active part in restoring and maintaining the historic huts in the Ross Dependency and has been involved in the establishment of a national Antarctic centre at the Canterbury Museum, Christchurch.

There are two branches of the society and functions are arranged throughout the year.

You are invited to become a member, South Island residents should write to the Canterbury secretary, North Islanders should write to the Wellington secretary, and overseas residents to the secretary of the New Zealand Society. For addresses, see below. The yearly membership fee is NZ\$4.00 (or equivalent local currency). Membership fee, overseas and local, including "Antarctic", NZ\$10.00.

New Zealand Secretary

P.O. Box 1223, Christchurch

Branch Secretaries

Canterbury: P.O. Box 404, Christchurch.

Wellington: P.O. Box 2110, Wellington.

REVIEWS

The first of these is a collection of essays by the author, which are arranged in two parts. The first part contains three essays, and the second part contains two. The essays are written in a clear and concise style, and are well organized. The author's arguments are well supported by evidence, and the essays are well written. The second part of the book contains two essays, which are also well written and well supported by evidence. The book is a good read, and is well organized. The author's arguments are well supported by evidence, and the essays are well written.

NEW ZEALAND ANTHROPOLOGICAL SOCIETY

The New Zealand Anthropological Society is a non-profit organization that is dedicated to the study of the human past. The society was founded in 1962, and has since then been active in promoting the study of the human past. The society has a number of members, and is active in a number of areas. The society is active in the study of the human past, and is active in a number of areas. The society is active in the study of the human past, and is active in a number of areas. The society is active in the study of the human past, and is active in a number of areas.

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