ANTARCTIC

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Twenty-five years after. New Zealand's Prime Minister (Mr R. D. Muldoon) and official guests who celebrated on January 20 the establishment of Scott Base 25 years ago, and the completion of a quarter of a century of scientific research in Antarctica. Behind Mr Muldoon are the flags of the 13 other consultative members of the Antarctic Treaty. On the extreme left of the photograph is Sir Edmund Hillary, first leader at Scott Base. Mr L. P. B. Slattery, officer-in-charge this winter, is on the extreme right.

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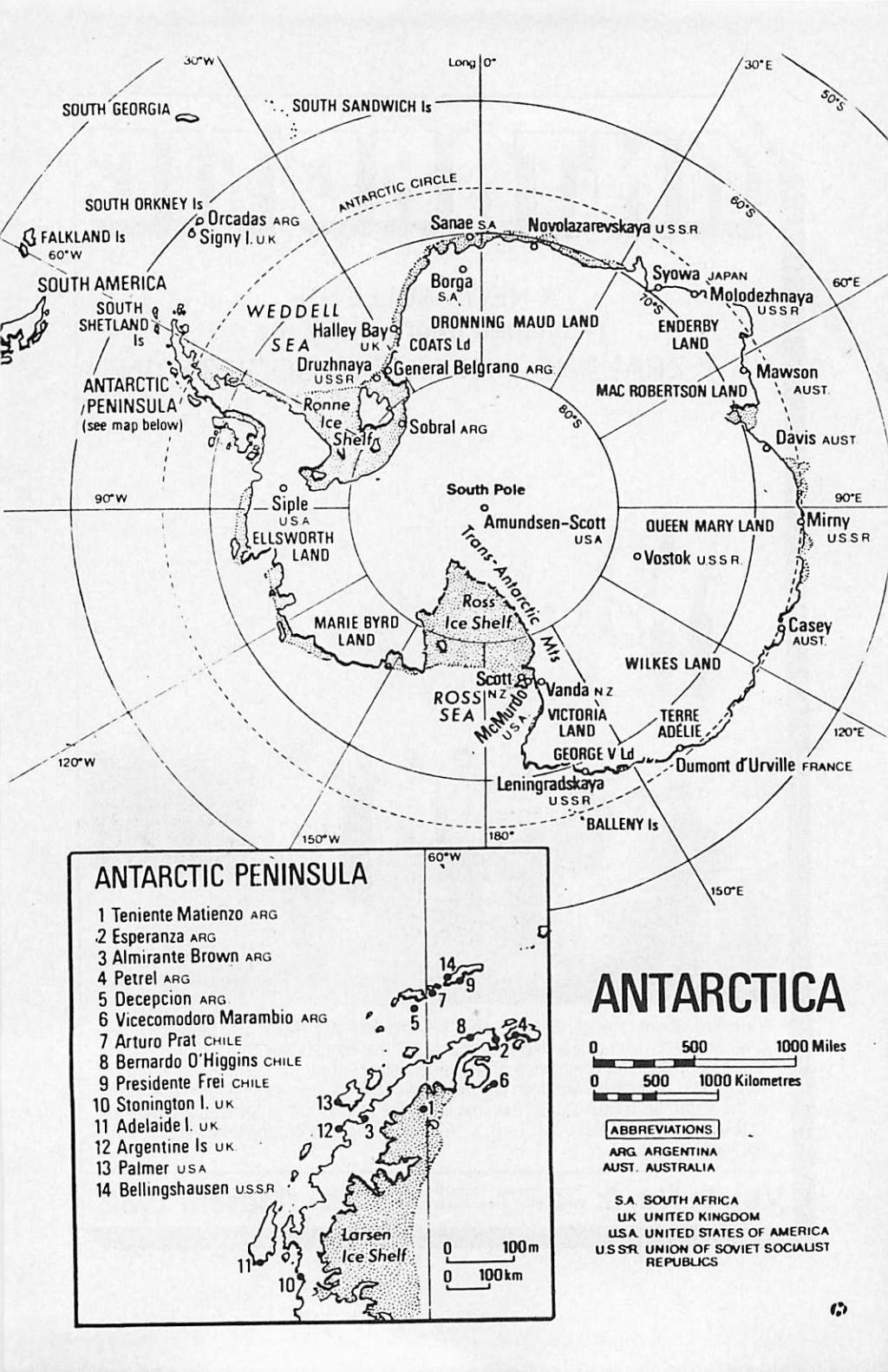
ANTARCTICA
0 500 1000 Miles
0 500 1000 Kilometres
ABBREVIATIONS
ARG. ARGENTINA
AUST. AUSTRALIA
S.A. SOUTH AFRICA
UK UNITED KINGDOM
USA UNITED STATES OF AMERICA
USSR UNION OF SOVIET SOCIALIST REPUBLICS
Long 0°
30°W
30°E
50°S
60°S
70°S
80°S
60°E
90°W
90°E
120°W
120°E
150°W
180°
150°E
60°W
ANTARCTIC CIRCLE
SOUTH GEORGIA
SOUTH SANDWICH Is
SOUTH ORKNEY Is
Orcadas ARG
Signy I. UK
FALKLAND Is
SOUTH AMERICA
SOUTH SHETLAND Is
ANTARCTIC PENINSULA
(see map below)
WEDDELL SEA
Halley Bay UK
Druzhnaya USSR
Ronne Ice Shelf
Sobral ARG
Siple USA
ELLSWORTH LAND
Sanae SA
Novolazarevskaya USSR
Borga SA
DRONNING MAUD LAND
COATS Ld
General Belgrano ARG
Syowa JAPAN
Molodezhnaya USSR
ENDERBY LAND
Mawson AUST.
MAC ROBERTSON LAND
Davis AUST.
South Pole
Amundsen-Scott USA
QUEEN MARY LAND
Mirny USSR
Vostok USSR
Trans-Antarctic Mts
Ross Ice Shelf
MARIE BYRD LAND
Casey AUST.
WILKES LAND
Scott NZ
Vanda NZ
ROSS SEA
McMurdo USA
VICTORIA LAND
TERRE ADÉLIE
GEORGE V Ld
Dumont d'Urville FRANCE
Leningradskaya USSR
BALLENY Is
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
Larsen Ice Shelf
0 100m
0 100km

ANTARCTIC

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N.Z. PROGRAMME

FROM CAPE ADARE TO SOUTH POLE

New Zealand's Antarctic research programme for the 1981—82 season, which ended last month, marked the completion of the first 25 years of scientific endeavour by New Zealanders, mainly in the Ross Dependency. The programme called on the services of more than 160 men and women during the summer. It included a major geological project in Northern Victoria Land with United States and Australian scientists, and vulcanological studies on Mt Erebus with Americans and Japanese, and ranged from Cape Adare to the South Pole.

A major event was the completion of the third stage in the rebuilding of Scott Base. The Prime Minister (Mr R. D. Muldoon) who flew south for the anniversary celebrations on January 20, officially opened an accommodation block for 42 people, and a kitchen and mess block. Both were completed ahead of schedule by New Zealand Army and Ministry of Works construction teams.

As in past seasons New Zealand scientists took part in other national programmes and shared field work with scientists from the United States, Japan, and Australia. Six guest scientists from these countries and two from the People's Republic of China worked with the New Zealand programme.

When the last members of the summer team left Scott Base on February 18 for New Zealand 10 men of the winter team officially began nearly seven months of isolation. The officer-in-charge for the summer, Mr A. Newton, handed over to the winter OIC, Mr L. P. B. Slattery, who is also the postmaster. Mr Slattery, the first postmaster to be appointed OIC, and his nine companions, will not see new faces again until the end of August when United States Navy Hercules aircraft will make spring flights. But they have 21 huskies for company, and will be linked with the outside world by radio-telephone and telegraph during the winter months.

Deputy officer-in-charge this winter is Mr K. J. Martin (base engineer, Hastings). His companions are Messrs C. J. Choros (senior technical officer, Wellington), G.O. Morgan (chef, Waiouru), R. B. Walshe (fitter-electrician, Wellington), P. R. Nelson (fitter-mechanic, Whangarei), R. S. Mason (technician, Wellington), P. R. Wheeler (technician, Thames), A. M. Babington (senior Post Office technician, Invercargill), and E. G. Bowcock (field assistant-dog handler, Northland).

FIELD PARTIES

New Zealand contributed 16 scientists and support staff to the major geological study of Northern Victoria Land, which began early in November. Five geological field parties were flown to a base camp on the Evans Neve. They remained in the field for extended periods until early in January, being supported by United States helicopters when necessary.

New data on the Bowers Supergroup geological sequence were obtained by the team led by Dr Malcolm Laird, of

the Geological Survey, which sledged into the Bowers Mountains to investigate the relationship and possible connection between the rock formations of Antarctica and Australia. In the team were Dr John Bradshaw, geology department, University of Canterbury, Dr Chris Adams, Institute of Nuclear Sciences, and Ken Sullivan (field leader).

Investigation by toboggan and helicopter between Frolov Ridge and the lower Mariner Glacier has confirmed that the Bowers Supergroup crops out along a 350km-long belt cutting across Northern Victoria Land from the Oates Coast to the Ross Sea. The sequence is faulted to the east against the Robertson Bay Group, and rests, at least locally, unformably on metamorphic rocks correlated with the Wilson Group in the west.

A threefold division of the Bowers Supergroup into Sledgers, Mariner, and Leap Year Groups is maintained. However, new data indicate that the previously uncategorised Husky Conglomerate forms a basal phase of Sledgers Group. The discovery of shelly fossils within the Sledgers Group, and close examination of contacts between this unit and the overlying Mariner Group now confirm that they have conformable relationships and are both Cambrian in age (600 to 500 million years).

FOSSIL EVIDENCE

Another Geological Survey party led by Dr Roger Cooper worked in the centre of the Bowers Mountains, the Leitch Massif, and the Mt McCarthy area to continue investigations of fossiliferous units begun in the 1974—75 season. The party included Dr Jim Jago, South Australian Institute of Technology, Professor Bert Rowell, University of Kansas, and Peter Braddock (field leader).

As a result of the new work done last season paleontological evidence for the age and relationships of units within the Bowers Supergroup will now be reviewed. The chief conclusion is that there is no reason, from the fossil evidence, to conclude that the Bowers Supergroup is older than Middle Cambrian in age. Previously the age was understood to range down into the late Precambrian (Vendian).

Later in the season the two Geological Survey parties amalgamated for scientific reasons. Also Dr Adams joined a United States project led by Dr Carlos Plummer in the Daniels Range of the USARP Mountains.

Another Geological Survey scientist, Dr George Grindley, also worked with Dr Plummer's party in the first three weeks of November. From his studies he prepared a provisional geological history of the area which will be checked by petrology, chemistry, and radiometric dating.

WANDER PATH

Towards the end of the month Dr Grindley was joined by Dr Peter Oliver (Geological Survey). With helicopter and motor toboggan support they carried out paleomagentic sampling of Paleozoic (600 — 224 million years) and Early Mesozoic (255 — 195 my) rocks from outcrops over a wide area of Northern Victoria Land.

Certain units were sampled in detail. From the samples collected at Gallipoli Heights, in the Salamander Range, Lawrence Peaks, and the Mariner Glacier region, Dr Grindley hopes to determine an apparent polar wander path for the volcanic and sedimentary rocks of Northern Victoria Land.

Volcanic complexes were studied at Gallipoli Heights, in the Salamander Range, and the Lawrence Peaks. Fossil hydrothermal alteration was evident at Lawrence Peaks, and plant fossils found in sedimentary interbeds at Gallipoli Heights may provide further age control. Volcanics there were dated as late Devonian (about 370my).

An Antarctic Division geologist, Dr Bob Findlay, led a sledging party which made structural and metamorphic observations in the Robertson Bay Group. With him were a Geological Survey geologist, Brad Field, Walter Fowlie (field

leader) and Bill Atkinson (field assistant).

Areas where the party worked were between the Admiralty Mountains and Jutland Glacier, and the Millen Range. Metamorphic minerals observed in the Robertson Bay Group rocks were chlorite, white mica, stilpnomelane and calcite.

RIVER DEPOSITS

A former New Zealand geologist, Dr Barrie McKelvey, now with the University of New England, Armidale, New South Wales, and a Victoria University of Wellington geologist Barrie Walker, investigated the Triassic (225 — 195my) paleohydrology of Southern Victoria Land, and the Triassic and Permian (280 — 225my) of Northern Victoria Land. In the latter area they examined sequences on Mt Moody, in the southern Freyberg Mountains, and the northern Morozumi Range.

Two facies were suggested for the Permian sediments of Northern Victoria Land. The first consisted of those outcrops south of the Evans Neve which were almost entirely trough-bedded sandstones. The second showed a greater variation in the type and scale of sedimentary structure. Paleocurrents, geometry of lithologies, and sedimentary structures indicated that both were low sinuosity "braided type" river deposits.

In Southern Victoria Land the Triassic sequence was formed from deposits of rivers that flowed north to north-west over a broad lowsloping alluvial flood plain. Last season's studies determined that three sections of the sequence were deposits of sandy, low sinuosity rivers with fluctuating depths of several centimetres to no more than one to two metres. The composition of a third represented deposits of a shallow lake environment.

A New Zealand guest scientist with the West German North Victoria Land expedition GANOVEX II was Tim Stern, of the Geophysics Division, D.S.I.R. Between the time the expediton ship Gotland II sank off the Pennell Coast and the evacuation of the expedition to McMurdo Station he was able to carry out a gravity traverse of the 22km-wide Rennick Glacier, aided by Gary Ball, one of three New Zealand field guides with the expedition.

Minimal residual gravity anomalies were observed in the centre of the glacier which could not be wholly explained by an ice thickness of 800m as determined by previous radio-echo sounding. The gravity data were interpreted to represent the mass deficiency, with respect to basement rocks, of 800m of ice underlain by a further 1km of low-density glacial sediments.

BIRD STUDIES

As part of New Zealand's contribution to the three-year International Survey of Antarctic Seabirds (ISAS) programme four New Zealand scientists made observations of seabirds and penguins in the Ross Sea, on islands off the Victoria Land coast, and on Ross Island. They worked from the United States Coast Guard icebreakers Glacier and Polar Sea, and the cargo ship Southern Cross, at Cape Adare, Cape Bird, and Cape Royds.

On December 6 Drs R. H. Taylor and P. R. Wilson, Ecology Division, D.S.I.R., made an aerial photographic survey and census of penguin colonies in the Ross Dependency. They surveyed about 1600km of coastline from Ross Island to Cape Adare during a flight between Christchurch and McMurdo Station in a Royal Australian Air Force Hercules aircraft.

Dr Peter Harper, of the University of Canterbury extension department, who is the New Zealand co-ordinator of ISAS, and Graham Wilson, of the zoology department, began their observations when the Coast Guard icebreaker Glacier sailed from Wellington on December 31. The ship called at Campbell Island on the way south, and 24 sub-species of marine birds were observed during the traverse of the Campbell Plateau.

Black-bellied storm petrels were observed near Perseverance Harbour during the Glacier's stay at Campbell Island. Also logged were southern Royal and Black-browed albatrosses.

When the Glacier reached 59deg 5min S/173deg 28min E on January 5 3 thin-billed prions were observed and photographed. The edge of the pack ice was reached the next day at 65 deg 18min S and the first snow petrel was sighted three minutes later. Snow and mottled petrels were observed foraging on organisms in the cakes of ice, and South Polar skuas were seen breaking newly-forming transparent ice for the food underneath.

No breeding penguins were seen by Dr Harper and Graham Wilson during the four hours they spent on Scott Island with other New Zealand and United States scientists, but petrels were recorded. The next day, January 8, Graham Wilson went ashore at Cape Adare to carry out a census of Antarctica's largest Adelie penguin rookery. Earlier in the season he and Dr Laurence Greenfield, of the botany department, University of Canterbury, had conducted the annual censuses of penguin rookeries at Cape Bird and Cape Royds.

When the observations of pelagic birds ended at Terra Nova Bay Dr Harper and Graham Wilson had logged 4756 individual birds and 41 sub-species. They did 51.5 hours of observations during the voyage south.

After the Glacier left Cape Adare Dr Harper made short landings on Possession and Foyn Islands, Coulman Island, and in Wood Bay, to make penguin counts and take photographs for ISAS. He also landed by helicopter on Inexpressible Island, and by Zodiac rubber boat on Franklin and Beaufort Islands.

Between January 17 and 27 Dr Harper took part in the Glacier's scientific cruise to the south-west sector of the Ross Sea. Very few birds were sighted, and there was almost a nil count of zooplankton.

Early in February Dr Harper transferred to the icebreaker Polar Sea for an eight-day science cruise in the western Ross Sea north to Cape Adare. Projects carried out by United States and New Zealand scientists included seal surveys, pollution studies, and ornithological observations.

South Polar skuas and snow petrels were observed during the first two days, and a pod of 24 minke whales was sighted broaching on February 6. Then for the next five days the Polar Sea was caught in a fierce storm which prevented her from picking up Graham Wilson and his colleagues, David Harrowfield and Dr Mark Mabin, from Cape Adare.

Winds from 60 to 80 knots with a peak gust of 82 knots were accompanied by 6m to 12m waves, and the barometer dropped sharply to 965 millibars. From the Glacier the occasional Antarctic or snow petrel was sighted actually flying backwards in the storm.

When the Polar Sea abandoned its mission and returned to McMurdo Station Dr Harper transferred to the Southern Cross and arrived in Lyttelton on February 19. Bird sightings on the voyage north were essentially the reverse of those made from the Glacier but valuable comparable data were obtained.

New Zealand scientists are expected to make a major contribution to the ISAS programme. Data obtained during the last two seasons will be presented by Dr Harper to the International Council for Bird Preservation and the ISAS conference at King's College, Cambridge, in August.

Dr Harper said on his return that last season's programme owed much of its success to the co-operation the New Zealanders received from United States helicopter pilots, ships' crews, and their American colleagues.

OIL SPILLS

Research to determine the sensitivity of the Northern Victoria Land coastline to oil spill was carried out by two other New Zealand scientists, Dr Murray Gregory and Dr Robert Kirk, during the Glacier's voyage into the Ross Sea. They also attempted to make an estimation of the level of pelagic plastics and tar in the surface waters of the Southern Ocean.

Dr Gregory, of the geology department, University of Auckland, studied sites along the coast and on islands in the

Ross Sea. He and Dr Kirk, of the geology department, University of Canterbury, worked together in an attempt to gauge an "oil spill vulnerability index."

Dr Kirk also continued his studies of the relationship of the Antarctic ice-cap to world sea levels by the analysis of beach ridges built up over thousands of years. A University of Auckland geography lecturer, Dr Mark Mabin, who studied glacial land forms at the University of Canterbury, was put ashore at Cape Adare from the Glacier, and made similar studies for the project initiated by Dr Kirk.

To establish the oil spill sensitivity of the shoreline Drs Gregory and Kirk were flown by Coast Guard helicopters from the Glacier along sections of the coast, and paid particular attention to beaches near penguin colonies. They studied sediment types on the beaches, the slopes of beaches, and the proximity of penguin colonies to the water and their access to it. Other areas of study included current patterns, dispersal rates, and local eddying.

BEACH STUDIES

No detailed assessment was made of Possession and Foyn Islands on the voyage south but landings were made on Coulman Island, in Wood and Terra Nova Bays, at Cape Washington, and on Franklin Island. A flight was made also round Beaufort Island.

When the Glacier reached McMurdo Station Dr Kirk continued his beach studies on Ross Island and around McMurdo Sound. He spent two days at Cape Crozier, and also worked at Capes Bird, Royds, and Evans. Then he crossed McMurdo Sound and worked his way from the Strand Moraines to Cape Dunlop. He paid particular attention to New Harbour and Marble Point.

Plans to return to the Possession Islands and Inexpressible Island for a more detailed assessment, and to land at Cape Hallett during the Polar Sea's science cruise early last month were frustrated by the fierce storm which hit the icebreaker on her way to Cape Adare to pick up the New Zealand field party. But between McMurdo Station and Cape Adare Drs Gregory and Kirk were able to sample the surface waters for pollutants. In ice-free patches three trawls were made with a "neuston" net and barge beyond the icebreaker's bow wave.

EREBUS PROJECT

Six New Zealanders took part in Dr Philip Kyle's International Mt Erebus Science Study (IMESS), which is a joint three-year project of United States, New Zealand and Japanese scientists. They were Dr Ray Dibble (Victoria University of Wellington), Peter Otway (Geological Survey), Dr Keith Thompson, and Neville Rogers (Waikato University). Pat Tinnelly (Lands and Survey) and Nick Cradock (Antarctic Division field assistant) also worked on the volcano with IMESS.

Three telemetry stations installed in the 1980-81 season to provide a long-term record of seismic activity transmitted signals to recorders at Scott Base 30km away until the middle of June last winter. Two resumed transmissions when the sun returned in spring, but wind and condensation on equipment buried in warm ground damaged the station at the summit.

Dr Dibble, who is a seismologist, continued the seismic audio and magnetic studies he made on Erebus in the 1980-81 season. He installed a new microphone on the main crater floor, repaired several breaks in the induction loop, and reburied it. Also he successfully tested equipment to make deep electro-magnetic surveys of magma under the summit plateau.

American scientists installed two extra telemtry stations on the volcano, and the Japanese installed five temporary seismographs on the lower slopes. They also prepared visual records of more than 500 earthquakes from the telemtry net during December.

In the 1980-81 season Peter Otway established a volcanic deformation monitoring programme around the summit caldera of Erebus. Last season he observed the survey network again to

determine the nature of earth deformation associated with observed variations in the level of volcanic activity. Pat Tinnelly worked with him in the summit caldera area.

Dr Thompson, who began botanical research at the summit area in the 1977-78 season and Neville Rogers, spent two weeks on the volcano. They collected algae and fungi from the hot ground and fumaroles of the summit area.

DRY VALLEYS

Waikato University's 12th expedition also continued botanical and microbiological research in the dry valleys. Dr Thompson, Neville Rogers, and two technicians, Dudley Bell and Sue Green, worked first at Lake Fryxell in the Taylor Valley. A laboratory was established to make a chemical analysis of the Canada Glacier meltwater stream, and 13 ions were determined. Diurnal and seasonal changes in ionic composition were monitored in relation to plant growth in the stream.

Some comparisons were done with streams in the Miers and Wright Valleys and at Cape Bird on Ross Island. Stream flow rates were monitored using a V-notch weir constructed at the start of the season.

Investigations of the ecology of sublithic, chasmolithic, and endolithic algae were also made. The team worked in the Miers, Marshall, Upper and Middle Wright and Lower Taylor Valleys, and in the Asgard and Beacon Ranges.

A major part of the Victoria University of Wellington 26th expedition was sea floor sediment sampling and bathymetric measurements in McMurdo Sound as part of a long-term programme to understand sediment transport. The two main areas investigated were just east of the Strand Moraines and Granite Harbour.

Four members of VUWAE-26 took part in the survey of the floor of McMurdo Sound, assisted by Mike Cattley, an Antarctic Division field assistant. They were Alex Pyne (field leader), Dr Peter Barrett, director of the university's Antarctic research centre, Barbara Ward and Brent Alloway.

SEABED SURVEY

This is the second year of the sea floor study. Seventeen samples were taken from the floor along 100km of coast, and measurements were made of salinity, temperatures, currents, and tides. Barbara Ward continued her work on modern micro-organisms, notably the foraminifera population, and Brent Alloway studied radiolaria in the bottom sediments.

Dr Barrett collected data for a study of sediment transport paths in the sound. Oceanographic data was also collected near Granite Harbour to help assess potential drill sites for further scientific drilling offshore

Bathymetric measurements at Granite Harbour showed it to be a broad basin more then 800m deep, presumably the result of scouring by ice during the last glaciation. The former ice level could be seen clearly on the south shore of the harbour 35m above sea level.

The Strand Moraines appear to be the remnant of more extensive glacier ice that flowed from the south. They are ice-cored with a thin (0.3m) layer of debris with boulders of granites, dolerite, basalt, and marble. Their seaward margin is a submarine ice cliff in places more than 160m "high". Sandstone and conglomerate boulders, probably post-Beacon, but pre-glacial in age, were found on the southernmost moraine ridges.

COAL MEASURES

Before he joined Dr Barrie McKelvey in Northern Victoria Land, Barry Walker began his two-year study of Triassic alluvial plain strata in Victoria Land. Assisted by Paul Fitzgerald he worked at Horseshoe Mountain and Mt Bastion at the head of the Barwick Valley.

After the completion of the McMurdo Sound survey Paul Fitzgerald joined Alex Pyne and Brent Alloway to do more work on the Weller coal measures and the Feather conglomerates. They

visited Mt Feather and Tabular Mountain at the head of the Taylor Valley.

An Australian guest scientist with VUWAE-26, Dr Andrew Gleadow, of the University of Melbourne worked in the Wright Valley and along the coast between Gneiss Point and Dunlop Island. Assisted by Paul Fitzgerald, he completed a collection of granite rocks to determine from fission-track dating the rate of uplift of the Transantarctic Mountains in Victoria Land.

Across McMurdo Sound on Ross Island two scientists from the Soil Bureau, Dr Tom Speir and Mrs Jan Heine, worked at Cape Bird, concentrating on the Adelie penguin rookery. The aims of their project were to study biochemical markers of penguin guano by incubation studies on the spot and analysis in the laboratory. They examined in detail a variety of "soil" profiles inside and outside the rookery, and also carried out an extensive soil survey of the ice-free area of Cape Bird.

CATCHING FISH

Catching fish for study through three holes in the sea ice of McMurdo Sound near Scott Base was once again the basic operation of five physiologists from the University of Auckland during the season. Dr John MacDonald (leader), Dr John Montgomery, and Messrs D. McCarthy, A. Stephenson, and M. Taler, were on the ice and in the laboratory to continue their research into the neuro-muscular physiology, parasitology, and demography of Ross Sea fishes.

Siple Station, 2250km by air from Scott Base, had two New Zealand visitors during the season. Cass Roper and Ian Minchington, of the Physics and Engineering Laboratory, flew to the United States station in Ellsworth Land by way of the Byrd Station surface camp to make measurements of the propagation of VLF radio signals. Cass Roper also carried out similar observations at the Amundsen-Scott South Pole Station.

Two parties in last season's programme were concerned with the preservation and future management of historic sites and buildings in the Ross Dependency. Mr G. Turner, senior planning surveyor of the Lands and Survey Department, and Mr J. Fry, a National Museum conservator, made an evaluation of historic sites at Hut Point, Cape Evans, and Cape Royds.

A party led by David Harrowfield, of the Canterbury Museum, which spent five weeks at Cape Adare, assessed the condition of three buildings on Ridley Beach so that a management plan can be formulated for possible future restoration and conservation. The buildings are a hut and storeroom built in 1899 by C. E. Borchgrevink's Southern Cross expedition, and the hut built by the six men of Scott's Northern Party in 1911.

This party was landed at Ridley Beach from the icebreaker Glacier on January 8. With David Harrowfield were Dr Mark Mabin and Graham Wilson, who were at Cape Adare to study beach levels and carry out a census of the Adelie penguins rookery. The three were to have been picked up by the icebreaker Polar Sea on February 8, but they did not leave Cape Adare until February 15. An attempt to take them off on the first day had to be abandoned because of a storm which lasted several days.

Onyx River flow

Antarctica's only river entitled to the name — the Onyx — flows a distance of 30km each summer from the coastal end of the Wright Valley into Lake Vanda. New Zealand hydrologists measure and record its flow every season as part of a monitoring programme in the dry valleys to document climatic conditions.

Last season the waters of the Onyx, one of the few rivers in the world that flows inland, reached the Lake Vanda weir earlier than in the 1980-81 season. New Zealanders working from Vanda Station recorded that water flowed over the weir at 11.15 a.m. on December 9.

A cold spell slowed the river's progress in the 1980-81 season and it did not flow over the weir until 2.52 p.m. on December 14.

Scott Base celebration of 25th year

Flags of 13 Antarctic Treaty nations flew in front of Scott Base on January 20 when New Zealand, one of the 14 consultative members, celebrated a quarter of a century of scientific research in Antarctica. The occasion was marked by a simple flag-raising ceremony almost indentical with that which marked the establishment of New Zealand's presence in Antarctica on January 20, 1957.

Watched by more than 200 guests and visitors headed by the Prime Minister (Mr R. D. Muldoon), the first leader at Scott Base (Sir Edmund Hillary) lowered the old flag of one of the 12 original signatories of the Antarctic Treaty. The new flag was raised by an 18-year-old student, Kathleen Smith, of Wanganui. Like 20-year-old Able Seaman Ramon Tito, of H.M.N.Z.S. Endeavour, 25 years ago she was given the honour as the youngest person at the base.

New Zealand established Scott Base to support its contribution to the International Geophysical Year (1957-58) and also to provide a staging point for the New Zealand section of the Commonwealth Trans-Antarctic Expedition (TAE) led by Sir Vivian Fuchs. The them of internationa co-operation in Antarctic was emphasised again when Mr Muldoon, the first New Zealand Prime Minister to visit Antarctic while in office, addressed the guests and visitors. His audience included representatives of five countries — the United States, the Soviet Union, Japan, the People's Republic of China, and Uruguay.

An official party of 11 flew from New Zealand to attend the celebrations as guests of the Antarctic Division, Department of Scientific and Industrial Research. Their host was the division's superintendent, Mr R. B. Thomson, who was on his 60th visit to Antarctica.

Headed by the Prime Minister the guests included Mr B. C. Beetham, M.P., leader of the Social Credit Party, the Minister of Science and Technology (Dr I. J. Shearer) and his private secretary, Mr G. Wallace. Five of the guests helped to built the first Scott Base and also wintered there in 1957.

They were Sir Edmund Hillary, leader of the New Zealand section of TAE, Sir J. Holmes Miller, chairman of the Ross Dependency Research Committee, and deputy-leder, Dr T. Hatherton, director, Geophysics Division, D.S.I.R., leader of the IGY winter party, Wing Commander W. J. Cranfield, second pilot of the first Royal New Zealand Air Force Antarctic Flight, and Mr Harry Ayres, dog expert and mountaineer with TAE. The other two guests were Dr E. I. Robertson, former Director-General of the D.S.I.R., who played a leading part in the preparations for New Zealand's first summer of science, and his successor, Dr D. Kear.

Representatives of the United States research programme invited to the ceremony included Dr E. P. Todd, director, Division of Polar Programmes, National Science Foundation, Captain J. M. Pearigen, Naval Support Force commander, and Mr D. Bresnahan, N.S.F. representative in Antarctica. The seven guest scientists present were Dr Y. Lotov (Soviet Union) who is now wintering at the Amundsen-Scott South Pole Station, Drs T. Torii, Y. Yusa, G. Matsumoto and Mr H. Murayama (Japan), and Drs Wang and D. Ye (People's Republic of China). The last six were guest scientists with the New Zealand research programme.

Scott Base representatives for the occasion were Mr A. Newton, officer-in-charge for the summer, Mr L. P. B. Slattery, who is in charge of this winter's

team, and Lieutenant N. Gattsche. He was in charge of the New Zealand Army construction team which worked on the rebuilding project last summer.

Scott Base had a fine summer day for the occasion; the temperature was 6deg Celsius. As a result the New Zealand Army cargo handling detachment of 22 men and two women was able to parade in short sleeves. Some of the base huskies about 300m from the building probably did not appreciate the warmer weather; they played their part in the ceremony, providing their applause after it was over.

When Mr Thomas asked Sir Edmund Hillary to start the ceremony he said that the lowering of the old flag arked the end of an era. After Sir Edmund had lowered the flag Mr Thomson handed it to him as a memento of the occasion, Then Kathleen Smith marked the beginning of a new era by raising the new flag.

We have witnessed the successes of 25 years of international science and co-operation in Antarctica Mr Muldoon told his audience, which included men and women from McMurdo Station who had been invited to join their nextdoor neighbours 4km away. Today we seem poised on the threshold of a new era which will see the development of new activities, and no doubt will include exploration and exploitation for resources to meet man's increasing needs.

"It will be important to ensure that such developments are conducted wisely and that Antarctica remains a continent of peace where people from all nations may work together for the common cause," said Mr Muldoon. "As a main gateway to Antarctica New Zealand has an important role to play in its future. I am certain that New Zealanders will continue to accept their increasing responsibilities in shaping this future.

U.S. PRAISE

New Zealand, through its research programme, has an outstanding record of leadership in fulfilling the requirement of the Antarctic Treaty calling for a continuation of international co-operation in scientific investigations in Antarctica Dr Todd said when he spoke on behalf of the guests from other nations . . . The United States, more than any other nation, has benefited from the co-operation and hospitality of New Zealand.

If all countries could exercise the statemanship and co-operation that have characterised New Zealand's participation in Antarctic Treaty affairs the treaty group may prove capable of striking a reasonable balance between scientific and resource problems, and, we hope, prove equal to the problems of the next few decades.

A New Zealand chaplain, Father Gerard Creagh, who has assisted United States Navy chaplains at McMurdo Station for several seasons, gave a prayer of thanksgiving. He said Antarctica was a continent which had not seen the horror and bloodshed of war, and he prayed that the spirit of co-operation would be an example to other nations.

Later Mr Muldoon officially opened the third stage of the base rebuilding programme — an accommodation block for 42 people, and a new kitchen and mess block. Before he cut a white ribbon he said that the old mess hut built 25 years ago would be presented to the Ferrymead Trust in Christchurch.

GIFTS TO BASE

In the early evening a social function was held in the new mess block where the 25th birthday was celebrated more informally. Mr Muldoon cut a birthday cake made by the chef, Mr Graeme Morgan, and later presented to the base a large photograph of the first flag-raising ceremony. It was accepted by Mr Slattery.

More than 30 years ago the New Zealand Antarctic Society was one of the leaders in the move for the establishment of a New Zealand scientific station in the Ross Dependency. To mark the 25th anniversary a past president, Sir Holmes Miller, presented to the base a book which records the names of 357 men and one woman who have wintered at New Zealand bases and at the South

Pole since 1957. Another member, Dr Hatherton, presented society ties to Mr Muldoon, Mr Beetham and Dr Shearer.

While he was at Scott Base Mr Muldoon sent a message of greetings to be passed to all permanent stations maintained by 11 other Antarctic Treaty nations. In it he paid special tribute to the international co-operation which has become "so much part of living and working in Antarctica in the true spirit of the Antarctic Treaty".

Bad weather prevented Mr Muldoon and other guests from visiting Vanda Station and the dry valleys but they did make a brief visit to the historic huts at Cape Evans and Cape Royds. Before they left for Christchurch on January 21 the official guests also inspected McMurdo Station and were briefed on the United States research programme.

SLEDGE RIDE

Scott Base huskies gave Mr Muldoon his final Antarctic experience. Nine of them took him for a three-minute sledge ride to his aircraft. The base dog handler, Gary Bowcock of North Auckland, ran the team, and Peter Breen, of the summer support staff, acted as brakeman.

Footnote: January was a month of 26th anniversaries for other Antarctic bases. Davis, the Australian base 650km east of Mawson, in the Vestfold Hills, celebrated its birthday on January 13. The Amundsen-Scott South Pole Station was dedicated by proxy at McMurdo Station on January 23, 1957, and Syowa Station, the Japanese base on East Ongul Island in Lutzow-Holm Bay, dates its establishment from January 29 of the same year.

Behind the Prime Minister in the cover photograph are (left to right):
Sir Edmund Hillary; Messrs A. Newton (summer OIC); Keith Clegg (information officer) and R. B. Thomson (superintendent), Antarctic Division; Dr E. P. Todd (U.S. National Science Foundation); Dr I. J. Shearer (Minister of Science and Technology); Mr B. C. Beetham, M.P. (Social Credit Party leader); Mr Harry Ayres (TAE dog expert); Dr E. I. Robertson (former Director-General, D.S.I.R.); Dr D. Kear (present Director-General); Sir Holmes Miller and Wing Commander W. J. Cranfield (obscured); Dr T. Hatherton (IGY winter party); Mr G. Wallace (ministerial secretary); Captain J. M. Pearigen (Naval Support Force commander); Father G. Creagh; Lieutenant N. Gattsche (N.Z. Army); Mr L. P. B. Slattery (winter OIC).

Survival course at Pole

Nearly 400 men and women took part in the Antarctic Division's basic snowcraft and survival courses last season. The courses were run from Scott Base by three New Zealand mountaineers, John Prosser (field leader), Lindsay Main and Nick Cradock (field assistants).

Last season's courses for 380 people included American and New Zealand research and support staff, guest scientists from the People's Republic of China and Japan, and Australian scientists who worked in Northern Victoria Land. Others in the courses were United States air crews, and the crews of Royal New Zealand Air Force and Royal Australian Air Force aircraft, and of two United States Coast Guard icebreakers.

Later in the season a survival course was conducted at the Amundsen-Scott South Pole station for the 15 men and two women of the winter party. John Prosser and Lindsay Main ran the course and were assisted by Rick Walshe, one of the Scott Base winter team, who is also a mountaineer This was the third season that New Zealand instructors had run a course at the Pole.

U.S. spending in Antarctica not reduced

United States expenditure on research in Antarctica next season and in the future will not be affected by budgetary restraints. President Reagan has decided that the research programme shall be maintained at a level to provide an active and influential United States presence in Antarctica. As a result of this directive the National Science Foundation's budget for the 1982-83 season has been increased by 7.3 per cent to $73.3 million. Last season's budget was cut from $71 million to $66 million.

President Reagan's memorandum on Antarctic policy and programmes sent to several government agencies last month confirms that scientific research in major disciplines will be continues. The Amundsen-Scott South Pole Station, McMurdo Station on Ross Island, and Palmer Station on Anvers Island off the Antarctic Peninsula will continue to be occupied all the year round.

Siple Station in Ellsworth Land, which was closed last winter because of economic restraints, will be closed at the end of its useful life but will not necessarily be replaced by another inland station unless required by research priorities at that time. It will be closed at the end of next season, reopened in 1984 and 1985 and then closed permanently.

In his memorandum, based on a comprehensive review of United States interests in Antarctica by the Antarctic Policy Group President Reagan has decided that the National Science Foundation shall continue to finance and manage the research programme and logistic support activities. He has decided that every effort shall be made to manage the programme in a manner that increases to the utmost cost effectiveness and return on investment.

Although there were some restraints on last season's programme more than 270 scientists, including 21 women, and representatives of nine countries, took part in 81 projects. ("Antarctica," December, 1981). Their activities were supported by Hercules aircraft and helicopters of the Navy's VXE-6 Squadron, United States Air Force Starlifters, the United States Coast Guard's icebreakers Polar Sea and Glacier, and the National Science Foundation's research vessel Hero.

GEOLOGICAL WORK

Among the projects were evaluations of Antarctica's resources, including studies of the hydrocarbon potential of a portion of the continental margin in the Northern Weddell Sea and Bransfield Strait. An assessment of potential resources of uranium and thorium in the exposed rocks of Northern Victoria Land was made by airborne gamma-ray spectometry.

A major project was the international geological study of Northern Victoria land by United States, New Zealand, and Australian scientists who worked from a base camp on the Evans Neve 700km from McMurdo Station with aircraft and helicopter support. Knowledge gained in the survey is expected to provide a basis for possible resource evaluation in future seasons.

Bad weather early in the season, and communication blackouts then and in the first week of February caused some delay in support operations but did not affect science projects unduly or the relief and supply of inland stations. Both the icebreaker Polar Sea and the

tanker Yukon were damaged in the Ross Sea. The Yukon rammed the Polar Sea when being escorted south, and then suffered damage in heavy ice after leaving McMurdo Sound.

Logistic support in the second half of the season suffered as the result of a fire which destroyed the transportation building at McMurdo Station on December 1. The building, 14,000 square feet in area, housed steelwork, machinery repair, tyre and battery shops, heavy wheeled equipment, and spare parts.

HELICOPTER CRACKS

Five vehicles were destroyed in the fire, the cause of which is unknown. Demolition of wreckage, replacement of vehicles and equipment, and the construction of a new building by the 1983-84 season, are expected to cost more than 2 million U.S. dollars.

Field support of scientific parties by VXE-6 Squadron helicopters was suspended for five days early in December. The helicopters were grounded on December 5 because of structural cracks. Operations were resumed after detailed checks by United States Navy and Air New Zealand engineers.

One of the early marine science projects in last season's programme was a joint United States-Soviet Union oceanographic expedition into the Weddell Sea. Twenty-six scientists, 13 from each country, made a seven weeks' cruise in October and November aboard the Mikhail Somov, flagship of the Soviet Antarctic fleet. Studies were planned of the Weddell Sea Polynya, an area of about 3km by 10km in the Southern Ocean. Satellite images of the sea ice during the 1970s revealed near the Greenwich meridian and 65deg S in the South Atlantic sector that the winter sea ice there was incomplete, perhaps absent.

Daily satellite photgraphs received by the Mikhail Somov during the cruise showed that the polynya was not present last year. But the photographs did suggest an area of ice weakness with expanding and contracting leads in the general area of where the polynya might have been.

United States scientists, two of them women, from the Lamont-Doherty Geological Observatory, Oregan State University, and the Cold Regions Research and Engineering Laboratory, took part in the co-operative programme. It included physical oceanography, air-sea-ice interaction, sea ice dynamics, marine biology, and marine chemistry.

ULF WAVES

A previously unknown source of ultra-low frequency (ULF) waves in the upper atmosphere was discovered by three scientists who worked at Siple Station last summer. They were Dr Theodore J. Rosenberg, University of Maryland Institute for Physical Science and Technology, Peter B. Morris, a University of Maryland physics graduate student, and Dr Louis J. Lanzerotti, Bell Laboratories, Murray Hill, New Jersey.

Basically the scientists found that ULF waves are generated in the ionosphere when the conductivity of that region increases significantly because of increased ionisation caused by ultraviolet light and x-rays from solar flares. Previously atmospheric physicists believed that the only naturally occurring ULF waves were generated when streams of electrons and protons flowing from the sun — the so-called solar wind — interacted with the earth's magnetic field or during magnetic storms.

Fluctuations in the earth's magnetic field and the intensity of cosmic radio noise passing through the ionosphere have been measured at Siple Station for the last three seasons. By correlating these measurements, those made at four conjugate stations in the Northern Hemisphere, and data on solar flares from satellites the scientists were able to make their discovery.

ICE CORING

A 203m ice core was obtained by drilling at the South Pole Station last season. Annual and seasonal snow layering were readily decipherable at 154m, and the scientists estimated that this length of core represented 1600 years of snow accumulation.

A team of four led by Karl Kuivinen,

of the Polar Coring Office, University of Nebraska-Lincoln, carried out the drilling project. It included a New Zealander, Dr Gerald Holdsworth, now of Environment Canada, who designed the drill, Bruce Koci (University of Nebraska-Lincoln) and another New Zealander, Dr Anthony Gow, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire.

Drilling began on December 17 and reached a depth of 62m by December 21 when the drill lost anti-torque during a run. After the fault was remedied drilling continued through hard ice until the middle of January.

By the end of December the drill was down to 154m. Stratigraphic logging indicated that the firn-ice transition occurred at 115m to 120m. This is possibly the deepest transition anywhere in Antarctica.

AIR OPERATIONS

Two major operations in support of the research programme were airlifts from McMurdo Station to the base camp in Northern Victoria Land, and to Siple Station. These were carried out by VXE-6 Squadron Hercules aircraft which flew 2250km to Siple, and 700km to the Evans Neve base camp at the head of the Canham Glacier.

Everything needed for the Northern Victoria Land programme in which up to 60 scientists were engaged was transported to the base camp by air, including three helicopters which transferred field parties to remote areas. VXE-6 Squadron aircraft not only carried scientists and camp support staff; they also flew in tonnes of supplies and thousands of gallons of fuel for the helicopters, and the motor toboggans used by the scientists.

From late October to the third week of January up to 50 Hercules flights were made to Northern Victoria Land. When the Evans Neve camp closed on January 21 aircraft flew 51 tonnes of equipment back to McMurdo Station.

Helicopters flew several hundred hours in support of the field parties. There was only one mishap; a helicopter rolled over on takeoff at Mt Jackman (72deg 23min S/164deg 14min E) 15 nautical miles from the Evans Neve camp on November 25. Three men abroad were not injured, and the helicopter was not damaged beyond repair. Later it was flown back to McMurdo Station.

SIPLE FLIGHTS

Another logistic effort greater in terms of weight carried and distance flown was made to support the reopening and summer operations of Siple Station. The station was opened on November 6, and on their flights into Ellsworth Land by way of the Byrd Station surface camp Hercules aircraft carried tonnes of cargo and thousands of gallons of diesel fuel to support scientists and technicians who worked at the summer camp, and this winter's team of eight.

A major short-haul effort was the resupply and refuelling of the Pole Station for summer operations and the winter. Ninety-two flights were made from McMurdo Station, the first on November 5. By the time of the last flight on February 10 the squadron had flown many tonnes of cargo and more than 220,000 gallons of diesel fuel south.

Apart from its major logistic efforts VXE-6 Squadron also provided support for scientific projects in other remote areas of Antarctica. Its aircraft flew to Dome C in Wilkes Land 1150km from McMurdo Station, once to Vostok, and twice to Casey Station. Helicopters also provided support for opertions on Mt Erebus and in the dry valleys.

One aircraft flew from McMurdo Station to the Pennell Coast of Oates Land in response to a call for assistacne from GANOVEX II, the west German expedition to Northern Victoria Land. On December 18 it dropped two pumps by parachute near the Gotland II which was trapped in the ice and sinking.

When the ionospheric disturbance caused a complete blackout of communications from January 31 to February 3 VXE-6 Squadron was given an

unusual mission. Its aircraft were called on to fly messages to Pole Station, helping to clear a backlog after the blackout ended.

In support of the United States, New Zealand, and Australian summer programmes, and to maintain the American inland stations, aircraft of the United States Navy and Air Force, Royal New Zealand Air Force, and Royal Australian Air Force carried 1029 tonnes of cargo and 1558 passengers to Antarctica during the fourth month of the season. Starting early in October aircraft made 105 round trips from Christchurch to McMurdo Station. In the 1980-81 season 782 tonnes of cargo and 1635 passengers were carried.

Tonnage by sea was more than in the prevous season. The tanker Yukon, which replaced the Maumee, took 5,155,184 U.S. gallons of aviation and diesel fuels for McMurdo Station and the Coast Guard icebreakers Polar Sea and Glacier, compared with 5.5 million gallons in the 1980-81 season. But on her sole voyage from Lyttelton the U.S.N.S. Southern Cross took 10,019 measurements tonnes of cargo south. In the 1980-81 season she carried 5000 measurement tonnes.

On her second voyage to Antarctic waters to Polar Sea had no trouble like her sister ship Polar Star in 1978-79 when she began her primary task of cutting a channel through the sea ice in McMurdo Sound for the Yukon and the Southern Cross. Trouble came later when she escorted the Yukon through the pack ice.

After relieving Palmer Station where she arrived on January 3 the Polar Sea departed for McMurdo Station. She reached the edge of the fast ice just south of Cape Royds and 20 nautical miles from Hut Point on January 14. Then she took only nine hours to cut a channel for the supply ships from the ice edge to the turn-around point 1097m from Hut Point, completing the task on January 16.

On January 23 the Polar Sea left McMurdo Station to rendezvous with the Yukon at the northern edge of the pack ice and escort her into McMurdo Sound. The ships met on January 26, and began the voyage through the pack ice from 67deg S/175deg E.

When the Polar Sea reached 77deg 11min S/166deg 22min E she was rammed from astern by the Yukon on the morning of January 28. The icebreaker was proceeding through a stretch of open water with the 25,000 tonne Yukon about 1097m astern. She entered an ice floe, gradually slowed to a stop, and was unable to regain headway with full power.

Although the fuel-laden Yukon was notified of the Polar Sea's decreasing speed and attempted to turn to starboard her port bow hit the icebreaker on the starboard quarter, sliding forward to a point just aft of the bridge.

Five minutes after the collision the Yukon backed clear of the Polar Sea. There were no casualties but the tanker's hull was penetrated on the port bow above the main deckline. The main damage to the Polar Sea was a gash in her hull about 6m long above the waterline. Equipment and fittings above deck were either destroyed or damaged.

But the Polar Sea was still able to complete her escort of the Yukon into Winter Quarters Bay. After the Yukon had discharged her cargo on January 31 the Polar Sea escorted her to the fast ice edge about 10 nautical miles north of Hut Point, and then returned to McMurdo Station for cargo operations and temporary repairs to her hull.

HOLE IN BOW

Then the Yukon ran into trouble between Cape Bird and Beaufort Island. She reported that she was stopped in heavy ice at 77deg 04min S/167deg 12min E with a hole in her bow 6m by 3m. She was escorted to the ice-free area of the Ross Sea, and then proceeded to Sydney instead of Lyttelton for repairs, arriving on February 10.

Back in Winter Quarters Bay on February 2 to complete operations and repairs the Polar Sea sailed again at midnight on February 3 to rendezvous with the Southern Cross near Beaufort

Island. She returned with the Southern Cross on February 5 and departed on a science cruise in the Ross Sea with United States and New Zealand scientists. The Southern Cross completed her discharge and loading, and sailed on February 14 for Lyttelton where she arrived on February 19 on her way home.

When the Polar Sea left on her science cruise the intention was to pick up a New Zealand science party at Cape Adare, and then continue science operations. But a storm which lasted several days forced the icebreaker to abandon the operation and return to McMurdo Station without the party.

She arrived back on the evening of February 12, escorted the Southern Cross to the ice edge, and then resumed her science cruise. The New Zealand party was picked up at Cape Adare on February 15, and the ship then sailed for home, making calls at Campbell Island and Wellington.

SCIENCE SUPPORT

Last Season the veteran icebreaker Glacier operated mainly in support of science activities in the Ross Sea and the Weddell Sea. She left Wellington on December 31 with a party of United States and New Zealand scientists for a science cruise in the Ross Sea area between January 8 and 16.

When she was off Scott Island on January 7 eight scientists were put ashore by helicopter for four hours. This was the third landing on the island in 80 years, and the second by helicopter since 1961. The next day the Glacier landed a New Zealand party at Cape Adare. Soon after she arrived in Winter Quarters Bay on January 16 she sailed on a second scientific cruise in the south-west sector of the Ross Sea.

Later the Glacier kept the channel to Hut Point clear of ice, and broke ice out of Winter Quarters Bay. She sailed for Palmer Station on January 29 and - arrived there on February 8. Then she proceeded to Punta Areanas, Chile, to pick up scientific parties which were to work on geological and marine projects in the Weddell Sea and on James Ross Island and other islands in the group.

On the way to Vice-Comodoro Marambio (Seymour Island) where the geological shore parties were landed first, the Glacier supported science operations near King George Island in the South Shetlands., A courtesy visit was also made on Febraury 16 to the Polish station, Arctowski, on the island.

PISTON CORING

From February 20 to early March the Glacier was in the Weddell Sea to support geological work ashore, and piston coring by a party from Rice University, Houston, Texas, engaged in a marine geological survey of the continental margin. She sailed for Punta Arenas on March 10.

During the season the National Science Foundation research vessel Hero made four round trips between Ushaia and Palmer Station. The first was to relieve the station; the others were to support scientists investigating birds, seals, fish, and krill in the Antarctuc Peninsula area.

All stations were prepared for winter by February 19. Amundsen-Scott South Pole Station, Siple Station, and the Byrd surface camp were all closed on February 10. The temperature at the pole on the day of the last flight from McMurdo Station was minus 47deg Celsius, and the next day it dropped to minus 48.1deg. On February 6 the maximum temperature was minus 25.9deg; on February 17 it was minus 34.5deg.

The summer season ended with the last flights out to Christchurch from McMurdo Station on February 20.

Two women winter at South Pole

Four American women will winter in Antarctica this year, two at Amundsen-Scott South Pole Station, and two at McMurdo Station. Kathy Covert and Marrianne Bell are the fourth and fifth of their sex to winter at the South Pole. The other two women 1327km to the north are Grace Brewer and Evelyn Yohe.

Last winter there was one women at Pole Station. She was a scientist, Cynthia McFee, who made long-term measurements of trace atmospheric elements that may influence climate. Her successor, Kathy Covert, is one of two United States Geological Survey scientists who will record the doppler effect of passing satellites, and operate a seismometer for the worldwide seismology network.

For the first time since 1957 the 16 men at the Pole will have a woman cook. She is Marrianne Bell, who works for ITT Antarctic Services, the civilian contractors who run Pole Station for the National Science Foundation.

Women have spent the winter at McMurdo Station since 1974. This winter Grace Brewer and Evelyn Yohe, who work for ITT Antarctic Services, will manage the Berg Field Centre and the Eklund Biological Laboratory respectively.

U.S. support force command

After two seasons in Antarctica Captain J. M. Pearigen will relinquish command of the United States Navy Support Force officially in June. His successor is Captain Brian H. Shoemaker, who served in the helicopter section of the United States Navy's VXE-6 Squadron in Antarctica during the 1966-67 season and wintered at McMurdo Station in 1967.

Captain Pearigen will retain his association with Antarctic affairs in his new post. He will serve as a liaison officer with the Division of Polar Programmes, National Science Foundation.

More Americans are wintering in Antarctica this year because Siple Station in Ellsworth Land has been opened again. It has a population of eight — three scientists, four support staff, and a U.S. Navy medical orderly.

There are 90 men and two women at McMurdo Station. Seventeen are scientists and support staff, and 75 are naval officers and men. Pole Station has 16 men, one of them a Soviet exchange scientist, and two women. Palmer Station, on Anvers Island off the Antarctic Peninsula, has 10 scientists and support staff.

Last year 113 men and one woman wintered at three stations. This winter there are 124 men and four women at four stations.

Two men die in Antarctica

A United States Navy petty officer was killed in a cargo handling accident at McMurdo Station on February 6. He was Ray Thomas Smith, aged 38, of Lee Hall, Virginia, who was a member of the naval cargo handling and port group.

Petty Officer Smith was assisting to unload the cargo ship Southern Cross which was moored at the ice wharf in Winter Quarters Bay. He was struck by a deck pad-eye which broke, knocked overboard, and fell several metres to the ice wharf.

Aboard the tanker Yukon a cook, Julio Flores, died of a heart attack on the morning of February 3. The Yukon had discharged her fuel cargo at McMurdo Station and was on her way north to Sydney.

ANARE REPORTS

Relief voyages slowed by heavy ice

Difficult ice conditions off the coast between Mawson and Davis slowed the progress of the Nella Dan on her voyage to relieve and re-supply the two continental stations for the 35th season of Australian National Antarctic Research Expeditions (ANARE). But the operation was completed successfully in late November and early December by the use of three helicopters to fly men, stores, and equipment from the edge of the fast ice. The Nanok S also encountered bad weather and thicker ice than normal on her voyage to Casey, Davis and Mawson, in December-January.

ANARE's 1981-82 season was opened by the Nella Dan, which carried out the change-over on sub-Antarctic Macquarie Island in October. She also conducted marine geoscience equipment trials at the edge of the pack ice south of the island.

When she left Hobart for Macquarie Island on October 17 the Nella Dan's passengers included 17 members of the 1982 winter party, four members of the 1981-82 summer party, a marine geoscience group of 10 and six scientists under the auspices of the Macquarie Island Advisory Committee. In addition there was an Army amphibious vehicle detachment of nine men, and three men to operate the two helicopters on charter to the Antarctic Division.

After a four-day voyage from Hobart the Nella Dan arrived off the island late on the evening of October 20. Cargo discharge by amphibious vehicles began on Octobr 21, and the ship left the island on October 24 with most members of the 1981 winter party.

Travelling south the Nella Dan reached the pack ice at 64deg S/156deg E some 540 nautical miles south-southwest of Macquarie Island. During this part of the voyage tests were made of the marine geoscience equipment to prepare for the main geoscience programme in Prydz Bay from January to March. ("Antarctic," September, 1981). Because of equipment failures further trials were conducted off southern Tasmania after the ship returned to Hobart.

An ice reconnaissance conducted by the helicopters near 64dg S/156deg E showed there was new sea ice to a distance of at least 32nm south of the ship. Bad weather, however prevented further flights. The Nella Dan then turned north for Macquarie Island where she arrived on October 30. After a brief stop she reached Hobart on November 3.

Helicopters were carried on the Nella Dan on her first continental voyage to ferry men and equipment ashore across the ice. It was expected that she might be barred from reaching Davis and Mawson by pack ice still present from the winter freeze.

On November 8 the Nella Dan sailed from Hobart with 54 passengers. Among them were two groups from the 1982 Davis and Mawson winter parties, who were joined by their colleagues later in the season, and members of the Davis and Mawson summer parties who were to remain until early March.

During the first week out of Hobart the Nella Dan was able to maintain her maximum speed of 12 knots in good weather and sea conditions. But on November 15 when she was at 56deg S a storm brought winds in excess of 50 knots.

SECOND STORM

Satellite information on sea ice conditions off Davis and Mawson indicated that heavy ice extended to 57deg S north of the Amery Ice Shelf between the two stations. Therefore, when she reached 58deg S the Nella Dan changed course and headed westward along the parallel to round the "tongue" of pack, and approach Mawson from the north-east.

When the ship reached 101deg E the first pack ice was encountered and she skirted about it as she continued west. On November 18 another storm developed but wind speeds reached only 45 knots.

Near 80deg E (some 377nm almost due north of Davis) the Nella Dan had to turn northwards as the way westward was barred by large rafts of pack ice. Course was resumed westward as soon as this area was rounded.

On November 21 the Nella Dan passed some 377nm due north of Mawson and soon after turned south-south-east towards the station. But it took more than three days of difficult manoeuvring, often at very low speed, to reach the edge of the fast ice some 30km from Mawson.

FIRST VISITORS

Helicopters flew mail and fresh food to Mawson shortly after the ship arrived. The pilots were the winter party's first visitors since April last year when a Soviet vessel called to pick up an exchange scientist. During the next two days men, stores, and equipment were flown ashore.

When the Nella Dan left the ice edge on the morning of November 27 she carried seven pasengers, mail, personal gear, and 52 crates of Soviet auroral radar equipment. The equipment was for a Soviet exchange scientist who is wintering at Davis this year to continue studies started at Mawson in 1979.

Difficult ice conditions again slowed the ship's progress towards Davis. However, she was able to get within 2km of the station by December 2. Men, mail, equipment, and stores were flown ashore, and the ship left the ice edge late on the evening of December 3. Two helicopters were left at Davis to support the summer scientific programme in the Vestfold Hills area.

After the Nella Dan returned to Hobart on December 18 preparations began for her third voyage of the season — the marine geoscience cruise to the Prydz Bay region and the undersea Gaussberg-Kerguelen Ridge north-east of Davis. Difficulties with the installation and preparation of research equipment delayed her departure until December 31.

More than 100 men and one woman will winter this year at the four Australian National Antarctic Research Expeditions bases in Antarctica and the sub-Antarctic. Among them are scientists from the People's Republic of China at the three continental bases, Casey, Davis, and Mawson, and also a Soviet exchange scientist at Davis.

Mawson has a winter team of 34 and the officer-in-charge is Mr G. R. Copson. The Davis team, which numbers 26, has Mr K. Beinssen as officer-in-charge. There are 35 men at Casey and the officer-in-charge is Mr J. A. Munroe.

One member of the winter team of 19 at the sub-Antarctic station on Macquarie Island is a woman radio opertor. The officer-in-charge is Mr E. J. Upton.

LATER VOYAGES

On the third voyage of the ANARE season the Nanok S sailed from Hobart on December 18 for Casey, Davis, and Mawson. Because of ice and weather conditions she did not reach Casey until 11.55 p.m. on December 28. Unloading began the next morning and continued until mid-afternoon on January 1.

In January and February three ships sailed south from Hobart, two to Antarctica, and one to the sub-Antarctic. The Thala Dan, sub-chartered from Expeditions Polaires Francaises, which had relieved the French team at Dumont d'Urville in December, completed the

change-over at Casey late in January, and then called at Macquarie Island to pick up the summer party early in February on her way back to Hobart.

ANARE's last voyage of the season was made by the Nanok S. She sailed for Davis and Mawson in the second week of February.

In the second week of January the Cape Pillar left Hobart with an expedition organised by the Division of National Mapping, Department of National Development and Energy, to survey the seabed around the Maquarie Island. The mapping group of seven was led by a surveyor, John Corcoran. After 10 days near the island the expedition returned to Hobart in the middle of February.

Census of seals and penguins in Commonwealth Bay

After nearly a month in the Commonwealth Bay area the Antarctic research expedition organised by the Oceanic Research Foundation, and led by Dr David Lewis, reached the French station, Dumont d'Urville, towards the middle of last month, but by accident, not design. The expedition's 21m converted trawler, Dick Smith Explorer, developed engine trouble because of an oil leak and had to make for Dumont d'Urville.

An oil pipe cracked while the vessel was under power trying to keep in the lee of an iceberg during a gale. Temporary repairs were made but the Dick Smith Explorer lost most of her oil. She remained at Dumont d'Urville for about 10 days so that the expedition could continue the iceberg study cut short by the oil leak.

Dr Lewis, the New Zealand-born navigator and ocean voyager, and his team of six men and five women, including six other New Zealanders, sailed from Sydney for Hobart on December 12. The expedition arrived on the evening of December 19, and headed south on December 23.

Twenty-nine days out of Sydney the Dick Smith Explorer reached Australian Antarctic territory early in January, having weathered two severe storms with winds gusting up to 43 knots when she reached 60deg S. She was edging slowly into Commonwealth Bay towards the boat harbour under power on January 10 when she ran aground on rocks.

For an hour all 12 members of the expedition struggled in a temperature of minus 7deg Celsius to free the vessel, using the engine and ropes from the dinghies. There was a risk of the vessel being caught between ice floes two to three metres thick, but she finally broke free, undamaged, and was moored safely.

On March 1 the Dick Smith Explorer was reported to have left Dumont d'Urville on her way back to Sydney. She was 600 nautical miles north of the base at 10 p.m. on that date, and her position was 56deg 14min S/147deg 47min E.

On the voyage south the two New Zealand biologists, Jeni Bassett and Paul Ensor, of Christchurch, kept a log of bird and whale sightings. Two other New Zealanders, Dr Harry Keys, and his assistant, Karen Williams, of Auckland, made iceberg studies and maintained a weather reporting schedule four times a day.

With three calm days after their arrival in normally gale-swept Commonwealth Bay the scientists in the expedition were able to make an early start on seal, penguin, and geological studies. Jeni Bassett and Paul Ensor, helped by Karen Williams and Margaret Huenerbein, began a three-day census of the penguin and seal populations of some of the 30 Mackellar Islands in the bay.

But less than a fortnight after their arrival four members of the expedition were flung into the icy waters of the bay when 40 knot winds and crashing waves sank their tiny boat. Harry Keyes, Jeni Bassett, Karen Williams, and Margaret Huenerbein were making their way to the boat harbour about 50m from the Dick Smith Explorer when the accident happened.

Luckily, those onboard the Dick Smith Explorer had been observing the party's progress. David Lewis and Dick Heffernan launched a rubber dinghy and quickly rescued the four. Jeni Bassett was pulled into the dinghy first, and then up on to deck where she collapsed from cold and exhaustion.

When David Lewis and Dick Heffernan reached the other three Margaret Huenerbein was floating high in the water because she was wearing a special flotation suit like Jeni Bassett. Harry Keys and Karen Williams, who were wearing ordinary wet-weather gear over their woollen clothing, were low in the water. They were hauled into the dinghy and brought back to the Dick Smith Explorer as quickly as possible.

Because of their flotation suits Jeni Bassett and Margaret Huenerbein recovered from their immersion in minutes. But Karen Williams took half an hour, and Harry Keys about an hour because he had beem immersed longer in the chilly water. Both were suffering from hypothermia when rescued.

Before the Dick Smith Explorer left Commonwealth Bay for the iceberg study Paul Ensor and Jeni Bassett made a census of penguins on Stillwell Island, the largest of more than 120 small islands and rocks in the Way Archipelago east of the bay. They also made a count on some of the smaller islands.

Earlier last month members made a journey to Cape Denison to visit the hut built in 1912 by Mawson's Australasian Antarctic Expedition of 1911-14. They spent nine hours over two days digging a 5m tunnel into the living area of the hut, much of which is filled with snow that has drifted in through the holes in the roof and cracks in the walls.

New Zealand and Australian airlift

More than 210 tonnes of cargo and 289 passengers were carried between Christchurch and McMurdo Station last season by Hercules aircraft of the Royal New Zealand Air Force and the Royal Australian Air Force. Fifteen flights were made between November and December to provide logistic support for the New Zealand, United States, and Australian research programmes in Antarctica, and share in the airlift of men and materials by United States Air Force Starlifters and United States Navy Hercules aircraft.

New Zealand's contribution to the logistic pool last season was 10 flights between November 17 and December 4, two less than in the previous season. The Hercules aircraft of No. 40 Squadron carried 121.3 tonnes of cargo and 102 passengers before the sea ice runway in McMurdo Sound became unusable for wheeled aircraft. On return flights they carried 22.5 tonnes of cargo and 72 passengers.

Australian Hercules aircraft operated through Christchurch for the third time last season and contributed to the United States — New Zealand pool under a tripartite agreement to enable Australian scientists and support staff to be flown from McMurdo Station to Casey Station. The first flight on November 27 took RAAF crews who attended one of the New Zealand snowcraft and survival courses.

Four regular flights, two less than in 1981, began on December 5 and ended on December 11. On the five flights the RAAF C-130H Hercules aircraft carried 67.8 tonnes of cargo and 115 passengers.

Royal New Zealand Air Force pilots, crewmen, and maintenance technicians, took part in Iroquois helicopter and Hercules aircraft operations with the United States Navy's VXE-6 Squadron last season.

GANOVEX II

Expedition ship sinks off Pennell Coast

West Germany's second scientific expedition to Northern Victoria Land — Ganovex II — ended abruptly on December 18 when the Gotland II sank near Yule Bay off the Pennell Coast of Oates Land. There was no loss of life, and the members of the expedition were safely evacuated by three Hughes 500 helicopters used in the West German programme.

When the Gotland II became beset on the morning of December 17 she was close to the permanent ice edge at 70deg 21min S/167 deg 31min E. Heavy pressure from drifting ice pushed her against the permanent ice edge, causing frames to break, and leaks to develop. These could not be controlled eventually by the ship's pumps. By 5.45 p.m. on December 18 when water had reached the main deck, and the ship had listed 25 degrees, she was abandoned, and sank several hours later.

On the night of December 17 the flow of water into the hold could not be controlled, and 26 members of the expedition were flown by three helicopters first to the Birthday Ridge field camp, and then to Surgeon Island, largest of the Lyall Islands, which is about 26 nautical miles to the south-south-west of the Gotland II. Visibility was less than 1km, and the pilots had to fly about 35m above the ice.

Two of the expedition's five helicopters chartered from a Canadian firm, Liftair, of Calgary, were grounded by poor weather at Birthday Ridge, the field camp and fuel depot established by the Ganovex I expedition in the 1979 — 80 season. The spare helicopter in the hold was pressed into service, and was flown by a New Zealand pilot, Alister Buckingham, who had worked with the first expedition.

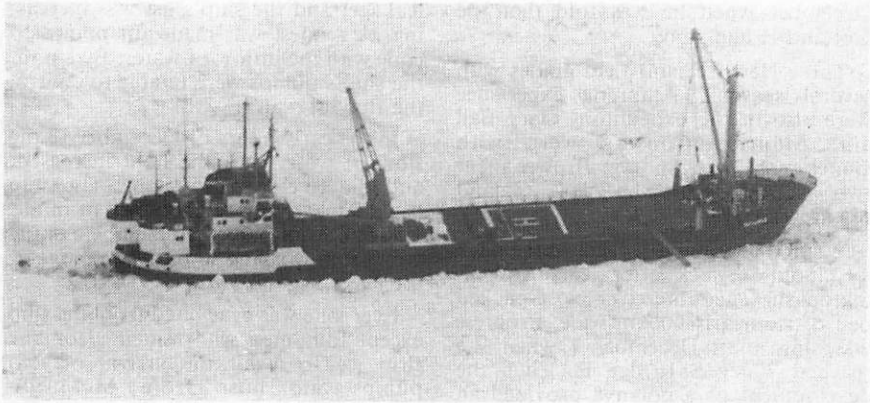
Before the Gotland II was beset scientific parties had been put ashore when she was near Cape Adare on December 12. They were flown first to Birthday Ridge, and then to the Lillie Marleen Hut, near the Lillie Glacier, established as a summer camp at 71deg 12min S/164deg 31min E by Ganovex I early in 1980. Two New Zealanders, Tim Stern, a geophysicist, and Gary Ball, a field guide, were camped at Litell Rocks at the edge of the Rennick Glacier about 100km from the Lillie Marleen Hut.

FLIGHT SOUTH

After the Gotland II was abandoned the crew and scientists were flown first to Birthday Ridge and then to the Lillie Marleen Hut, a distance of about 50 nautical miles. The next stage of 70km was to the United States-New Zealand major geological base camp in Northern Victoria Land on the Evans Neve.

In the last days of December all members of the expedition were flown to McMurdo Station by ski-equipped Hercules aircraft of the United States Navy's VX-E6 Squadron. The helicopters were flown in stages from the Lillie Marleen Hut where the pilots and some scientists spent Christmas.

From McMurdo Station members of the expedition were flown to Christchurch and then returned home. The leader of the Canadian helicopter team, Edmund Taylor, who is an engineer, and one of the pilots, Terry Thomson, remained at McMurdo Station to prepare the helicopters for



Last hours of the Gotland II before she sank off the Pennell Coast of Oates Land. The photograph was taken from a United States Navy Hercules.

shipment by the United States Military Sealift command cargo ship Southern Cross, which reached New Zealand about the middle of last month.

Ganovex II, which was financed by the West German Institute of Geosciences and Resources (BRG), suffered substantial losses when the Gotland II sank. The major loss was 18 tonnes of the 19 tonnes of scientific equipment taken south. This included $50,000 worth of satellite tracking equipment, and most of the electronic geophysical gear. Also lost were 120 tonnes of helicopter fuel.

DOLOMITE LOST

Before the Gotland II left New Zealand in November last year she picked up 1400 tonnes of partly processed dolomite chip for use as ballast. Arrangements were made with the producers for it to be delivered to Auckland after the expedition ended in February. The dolomite was valued at $40,000 but was insured.

Members of the expedition also lost clothing and personal effects. One tonne of scientific equipment was salvaged, and with camping gear, radios, and food, was left behind for future research. Philatelic mail did not go down with the ship. It was brought to the Lillie Marleen Hut, flown to McMurdo Station and then sent from the Scott Base post office.

Like the Canadian helicopters the 3890-tonne Gotland II was chartered for Ganovex II. In the 1979-80 season she was one of three ships used to establish West Germany's first permanent station on the Ekstrom Ice Shelf in Atka Bay on the Princess Martha Coast of Queen Maud Land.

Commanded by Captain Ewald Brune the Gotland II sailed from Wellington on November 14 with a crew of 16, 16 scientists, six helicopter pilots and engineers, and three field guides. The crew of West Germans and two Austrians was joined at Wellington by two stewardesses, Lee Ryan, a 20-year-old New Zealander from Stoke, near Nelson, and a 20-year-old Scot from Aberdeen, Heather Duncan. Another New Zealander, Alister Buckingham, was listed as an ordinary seaman, and later acted as a helicopter flight coordinator when the ship reached Antarctic waters.

Leader of the expedition was Dr Franz Tessensohn, of the BGR, who also led Ganovex I in the 1979 — 80 summer. His scientific team included two guest scientists from New Zealand and Australia, Tim Stern, of the Geophysics Division, D.S.I.R., and Dr Chris Wilson, a structural geologist from the University of Melbourne. A United States guest scientist, Dr Tom Wright, who took part in Ganovex I, was about to leave Washington to join the expedition in

December when he was told that the Gotland II had sunk.

Three New Zealand field guides with several seasons' Antarctic experience were also in the expediiton. Gary Ball and Maurice Conway were with Ganovex I, and Andrew Brown spent two summers with the New Zealand research programme.

When the Gotland II reached the pack ice about a week after leaving Wellington she encountered a close-packed belt of ice nearly 600km wide. Progress was slow until December 7 when she reached 70deg S/167deg E. Then the development of a polynya provided an ice-free passage of an average width of 5.5km.

From December 12 to December 16 the Gotland II was near Cape Adare and the expedition's scientists started their field work. They were flown first to the Birthday Ridge camp where the fuel supplies were checked, and then to the Lillie Marleen Hut.

ICE PRESSURE

On the morning of December 17 the Gotland II moved close to the permanent ice edge so that helicopters could fly equipment to Birthday Ridge. But loose sea ice started to close the polnya, and by the afternoon pressure from more ice pushed the ship against the permanent ice edge.

By 4 p.m. the Gotland II was surrounded by accumulated ice. Heavy ice pressure pushed her starboard side harder against the permanent ice edge, causing frames to break. The crew found the first leak which was controlled easily by the ship's pumps.

A distress call from the ship was received at McMurdo Station early in the evening, by way of the Evans Neve field camp. No request was made for assistance as at that stage the ship's pumps were coping with the leaks. Non-essential crew and passengers had been flown to Birthday Ridge, and 14 crew members remained aboard.

Later the Gotland II reported that the pumps were not keeping up with the leakage, and the ship's list was increasing. A request was made for pumps to cope with the inflow of water. By 8 p.m. the ship's pumps were unable to control the flow of water.

In the early hours of December 18 the flow of water into the hold increased, and the level rose to 2.4m. The ship listed 9deg, and a temperature of minus 1.9deg Celsius prevented members of the crew from working to find the source of the leaks.

Everyone was evacuated from the ship except four men who remained on the firm ice to await the arrival of two pumps and hose from McMurdo Station. These were parachuted to the ice from a Hercules aircraft about 7.15 a.m. but were too heavy to be flown by helicopter to the ship, and first had to be dismantled.

By the time the first pump had been dismantled — about 12.45 p.m. — the ship was taking more water and listing severely. The remaining four members of the crew were reported to be abandoning ship, but a later message to McMurdo Station said that several men had returned to continue damage control operations.

When the water level had reached the main deck, and the ship had listed 25 deg Captain Brune ordered that she be abandoned again as there was no way to control flooding. That was at 5.45 p.m. The Gotland II disappeared beneath the ice late in the evening.

Kilt goes to sea

A kilt in the McHardy tartan, several New Zealand Christmas trees, and a first edition of "Scott's Last Expedition" are now somewhere at the bottom of the Southern Ocean. They were lost when the Gotland II sank off the Pennell Coast of Oates Island on December 18 last year.

One of three New Zealand field guides with the Ganovex II expedition, Scottish-born Andrew Brown, was the owner of the kilt. He had worn it in the Antarctic before when he worked for two summers with the New Zealand research programme.

West German teams at two stations

West Germany sent two scientific expeditions to Antarctica last season, one to work from the new permanent station, Georg von Neumayer at Atka Bay, and on the Filchner-Ronne Ice Shelf, and another to work in Northern Victoria Land. The programme of the Ganovex II expedition sponsored by the Bureau of Geosciences and Resources ended suddenly when the research vessel Gotland II was caught in the ice and sank off the Pennell Coast of Oates Land on December 18.

In addition to their programme in the Weddell Sea area and Queen Maud Land West German scientists took part in international projects with scientists from Britain, the United States, Chile, and South Africa. Three biologists also worked in the sub-Antarctic, two on the Prince Edward Islands, and one on South Georgia.

Seventeen scientists and technicians, including a winter team of seven men, sailed from Bremerhaven for Atka Bay in the middle of November aboard the 1050-tonne research vessel Polarqueen. The ship, which is equipped for research in marine biology, physical oceanography, geophysics, and meteorology, also carried additional construction material and supplies for Georg von Neumayer Station (70deg 37min S/ 08deg 22minW), and the Filchner summer station (77deg 09min S/50deg 38minW).

Towards the end of December the Polarqueen reached Atka Bay by way of Montevideo. Her two helicopters, a Bell Jetranger and a French-bult Dauphin SA 360C, were used to transport cargo to the station, and to support scientific surveys. Later the ship took six scientists of the summer team and construction material and supplies to the Filchner summer station, which was set up in January, 1980. By March the Polarqueen left Antarctica, and returned to Bremerhaven by way of Cape Town.

Scientific leader of the expedition was Dr G. Gravenhorst, a glaciologist from the Glaciological Laboratory at Grenoble. The technical supervisor of the expedition was a construction engineer from the Dorsch Consult. Co., which designed Georg von Neumayer Station. Other members of the team were three cartographers, an engineer-glaciologist, an engineer, and three mechanics.

When the summer season ended seven men remained at Georg von Neumayer. The officer-in-charge is the medical officer, Dr H. Dietz. There are two meteorologists, and a geophysicist from the University of Munich, and a West German firm has provided a support team of four — medical officer, mechanical engineer, radio operator, and cook.

One of the first tasks when the expedition reached Atka Bay was to complete construction work on the geophysical and meteorological observatories at the station. This was to allow for continuous recordings to be made throughout the year. Measurements will be made in geomagnetics, seismology, and on tides, and also of temperature, pressure, wind, humidity, and radiation. Other meteorological projects include air chemical measurements during the summer, and continuous recordings of the concentration of condensation nuclei during the winter.

Geodetic investigations at Atka Bay last summer included measurements of ice movements at the station, which is on the Ekstrom Ice Shelf, and in its environment, and ice deformation and

tension. Cartographers made a helicopter survey for mapping to a scale of 1:50,000, and photographic studies for large-scale mapping.

A project to drill through the ice to a depth of about 100m which began in the 1980—81 season was continued by an ice-mechanics group. It extracted ice cores for later study in West Germany, and then used the borehole for inclination measurements.

Two projects were carried out at Atka Bay and from the Filchner summer station. They were the recovery of shelf ice from different regions, and preparations for meteorite searches by helicopter.

A glaciological programme was also carried out on the Filchner-Ronne Ice Shelf. It included ice coring, movement and deformation studies, extension of the research area with helicopter support, and a survey of the edge of the ice shelf.

A co-operative marine biology programme between the Alfred Wegener Institute for Polar Research and the British Antarctic Survey was carried out aboard the Royal Research Ship John Biscoe in the Scotia, Weddell, and Bellingshausen Seas. It covered investigations of primary production and plankton communities, and the physiology and biochemistry of plankton and krill.

Scientists from the University of Hannover worked with the Chilean Antarctic Institute programme in January and February this year on Anvers Island off the Antarctic Peninsula, and at Punta Biscoe and Punta Spring on the peninsula. The geodetic and glaciological investigations included determination of glacier fluctuations and the establishment of highly accurate co-ordinates for positioning ice movements.

In the sub-Antarctic scientsits from the University of Marburg and the State Botanical Museum, Munich, worked with the South African National Antarctic Expedition programme in the Prince Edward Islands studying lichens. Another scientist from the University of Marburg investigated the ecology of terrestrial arthropods on South Georgia.

East Germany's winter parties

Ten scientists and technicians from the German Democratic Republic continued research programmes in Antarctica during the 1980—81 season within the framework of the 26th Soviet Antarctic Expedition. Six spent last winter at the partly self-sufficient GDR base close to the Soviet station, Novolazarevskaya.

Three biologists wintered at Bellingshausen, the Soviet station on King George Island in the South Shetlands. A geologist took part in the Soviet geological field programme from the summer station, Druzhnaya I, on the Filchner Ice Shelf.

East Germany's winter base was opened in 1976. Last winter it was occupied by two geophysicists, a physicist, two engineers, and a cook. The scientific programme included reception of weather pictures from satellites, measurements of the local gradient of the geomagnetic field around the base in the Shirmacher Oasis, and analysis of the isotopic composition of stable and unstable natural environment nuclides in hydrological, biological, and geological samples.

In the South Shetlands the East German team will continue ecological and population studies, and parasitological investigations of Antarctic seabirds and seals on King George and Nelson Islands. This programme was started in the 1979—80 programme within the framework of the 25th Soviet Antarctic Expedition.

BAS NEWS

Twin Otter aircraft lost in gale

Although relief operations went smoothly and work on the seasonal phase of the Offshore Biological Programme was very successful, the British Antarctic Survey had to cancel almost all earth sciences programmes last season when its two Twin Otter aircraft were damaged beyond repair in a gale which hit the Damoy airstrip on Wiencke Island in mid-November. Static biology and observatory geophysics programmes, and sledge journeys, however, were continued.

Two new Twin Otter aircraft, which are vital to the earth sciences programmes, have been bought as replacements. They are being fitted with remote sensing equipment and are likely to be available next month.

Rebuilding of Halley Station on the Brunt Ice Shelf off Coats Land next season has been approved by the National Environment Research Council, and prefabrication of the buildings has started. They will be shipped south aboard the Royal Research Ship Bransfield.

A new design has been chosen for the base which will be built on a site about 24km from the present buildings. Two-storey blocks will be contained in a system of insulated wooden tubes, which will replace the present steel tubes used for the same purpose since 1973. Wooden tubes are expected to be lighter and easier to transport, and should insulate the buildings better against the cold. The planning phase has included computer simulation of stresses and deformation, and rigorous tests on the wooden panels for structural strength and moisture penetration.

As an economy measure the gradual transfer of Grytviken Station from its present large building to smaller buildings at King Edward Point is proceeding. Good progress has been made with the new building on Bird Island which will provide eventually winter accommodation for eight biologists. Three will winter there this year. A new jetty at Signy Station in the South Orkneys is nearing completion.

In mid-November the R.R.S. John Biscoe, which had resumed Antarctic operations in mid-October delivered more stores and building materials to Bird Island at the north-western end of South Georgia. Visits were then made to two biologists working on fur seals at nearby Schlieper Bay, and to two women wildlife photgraphers at St. Andrew's Bay.

KRILL STUDIES

After testing Offshore Biological Programme equipment, the next OBP project — the South Georgia zone survey — was undertaken. This continued for about a month and included 1,560 nautical miles of acoustic runs and salinity-temperature-depth recording. For three weeks after Christmas, efforts were concentrated on a krill-patch study to investigate the feeding and swarming of krill. This was completed satisfactorily in spite of heavy seas.

The ship put into Grytviken for Christmas, and again on January 8 and from January 19 to 20. On the later date she embarked an Australian family and their yacht, Quackster. After two days at Stanley, Falkland Islands, the ships

proceeded to Ushaia, Argentina, to collect cargo and men, including the co-master, Captain E.M.S. Phelps, arriving there at the end of the month.

Last season's final OBP work, which started at the beginning of February, was a joint BAS—West German venture. A number of West German marine biologists worked from the ship making observations and collecting specimens for their own programme. They worked around the South Orkney Islands, the South Shetland Islands, and the islands at the northern tip of the Antarctic Peninsula.

At the end of November the Bransfield arrived at the Falkland Islands. She relieved Signy at the beginning of December and then proceeded to the west coast of the Antarctic Peninsula. Men and stores were picked up from the Damoy air facility, Wiencke Island, where they had been stranded when the aircraft were damaged.

FAST ICE

Continuing southwards, the ship ran into fast ice but managed to reach Faraday Station. An attempt to reach Rothera, Adelaide Island, was thwarted by heavy pack ice (the ice did not break up until the end of December) so the ship turned north. After a brief visit to Punta Arenas, Chile, to collect more men and stores, and disembark homebound winter staff she returned to Stanley.

The next voyage, starting at the beginning of January was to relieve Halley, call at Bird Island and South Georgia on the way to land more men. Dense pack ice was encountered in the Weddell Sea but the ship managed to find a shore lead and reached the ice shelf near Halley on January 13.

Field parties from Halley had been monitoring sea ice conditions and inspecting possible landing sites before the ship's arrival. Unloading conditions in this area are very variable, and in some years impossible, forcing the ship to unload some 64km from the station. But this year the sea ice and weather were favourable, and there was a convenient ramp up on to the ice shelf. The unloading was completed in six days.

Then the Bransfield was to sail southwest to check the depot placed on the Ronne Ice Shelf last year for the forthcoming Weddell Province Project, but strong winds and severe ice conditions forced the ship to turn back just east of the Soviet station Druzhnaya. However, a party from Druzhnaya (including Dr G. Grikurov who had wintered with BAS on Stonington Island in 1964) checked the depot and found it to be in good order.

SOVIET HELP

Soviet helicopter reconnaissance also assisted the Bransfield to manoeuvre out of the ice, and the ship finally left Halley on January 25.

Among the men on board was one evacuated from Halley suffering from appendicitis. The two doctors then at Halley could have operated but this was not necessary as the patient responded well to conservative treatment.

Continuing relief activities, the Bransfield proceeded to Signy Station, landing biologists briefly on nearby Fredriksen Island on the way. More summer field workers and stores were landed at Signy and others picked up and the ship turned north-east to South George.

After calls at Bird Island and Schlieper Bay the ship arrived at Grytviken on February 4. Four days later she returned to Schlieper Bay and Bird Island and then sailed north to Mar del Plata, Argentina, to pick up the ship's co-master, Captain S. J. Lawrence, and the last group of summer visitors.

Among the visitors were Dr Richard Laws, director of BAS, and Sir Donald Logan, who inspected Antarctic operations on behalf of the Natural Environment Research Council. He was formerly an ambassador and permanent leader of the United Kingdom delegation to the United Nations Conference on the Law of the Sea, 1976—77, and also led the delegation to consultative meetings on Antarctica which discussed the convention for the conservation of Antarctic marine living resources.

One of the two. Twin Otter aircraft arrived at Rothera in mid-October and the second in early November. As usual their first task was to ferry summer field workers from Damoy, where they had been landed by the John Biscoe while fast ice still blocked access to Rothera by sea. This operation was almost completed when four days of gales grounded the aircraft.

On the fourth day (November 18) the wind suddenly rose to 70-knots and changed direction, tearing both aircraft from their moorings on the plateau airstrip and overturning them. They were found to have been damaged beyond repair. In continuing bad weather they were dismantled, taken down to Rothera and crated, ready for shipping home.

At the same time, three field parties on Adelaide Island experienced 100-knot winds, but fortunately survived without serious mishap. Four men and stores left stranded at Damoy were picked up by the Bransfield in early December.

At the end of November two Chilean Otter aircraft set up a temporary air facility at the Rothera airstrip, in preparation for proposed Chilean geophysical flights to Siple Station and reconnaissance over Charcot Island, south-western Alexander Island and the southern end of the Larsen Ice Shelf. They were followed by Hercules and a Buffalo aircraft which dropped fuel and other supplies.

CHILEAN AID

Surplus BAS aviation fuel was made available to the Chileans, and one of the BAS pilots guided a Chilean flight to and from Fossil Bluff in George VI Sound. In the spirit of the Antarctic Treaty, the Chileans reciprocated in December by ferrying two parties of BAS men to Presidente Frei Station on King George Island in the South Shetlands where they were able to join the Bransfield, and one man south from Frei to Rothera.

Sledge journeys were able to continue from Rothera. Two parties travelled to the old Adelaide station, 64km to the south-west, geological field work was carried out on Adelaide Island, and automatic weather stations set up at Adelaide and on Polly Rocks near Blaiklock Island.

Geologists who had been working on James Ross Island throughout November and December were picked up by H.M.S. Endurance in early January. With the help of the ship's helicopters they were able to make a series of landings in the surrounding areas before returning to the island.

VISITING YACHTS

H.M.S. Endurance had earlier (in December) taken the Governor of the Falkland Islands, to Bird Island and Grytviken. The ship also transported a BBC film crew to South Georgia to film sequences for the dramatised television documentary on Shackleton's expeditions. ("Antarctic," September, 1981, Page 222).

A number of other ships also visited Grytviken, including the World Discoverer (which also visited Signy), the Norwegian ship Polar Queen (on charter to the West Germans and on the way to Georg von Neumayer Station), four Russian ships (one going to Druzhnaya), two Polish trawlers, two French yachts, Isatis and Kim, and the Australian yacht Quackster.

Kim with its four-man crew had wintered at Petermann Island north of Faraday station. There was some doubt about the seaworthiness of Quackster and the health of a child on board, so the yacht and crew were taken back to the Falklands on the John Biscoe.

Leaders of JARE-24

Leaders of the 24th Japanese Antarctic Research Expedition (JARE-24) for 1982-84 have been selected. They are Dr Shinji Mae and Associate Professor Yoshikuni Oyama.

Dr Mae will be the leader of JARE-24 and will winter at Syowa Station. He is a glaciologist and led the JARE-23 summer party. Professor Oyama will be his deputy.

SANAE 22

Helicopters' major part in operations

Two Puma SA330 helicopters played a major part in all South African Antarctic and sub-Antarctic operations during the 1980-81 season. They were used on the relief voyages by the research and supply ship Agulhas to Sanae III in Queen Maud Island, and to Marion and Gough Islands.

When the SANAE 22 team arrived from Cape Town early in January geologists were flown by helicopter to Grunehogna, the geological base in the Ahlmann Ridge mountain range 215km to the south, to gain experience of the area for future summer field work. On Marion Island the Pumas were used to carry building materials for a new hydro-electric power scheme to remote areas on the island.

SANAE 22, the relief expedition team led by Dr D. Duthie, left Cape Town on December 30, 1980, aboard the Agulhas. The ship arrived at Polarbjorn Bukta 10 days later, having experienced no bad weather, and encountered very little pack ice.

Because of the height of the ice shelf, and the absence of bay ice, offloading was done with the help of the two helicopters. For the second year running no vehicles were unloaded.

SANAE 22 and SANAE 21 had a more hectic takeover period than usual because of the commitment of the Agulhas to FIBEX, the First International BIOMASS Experiment. Dr Duthie reports that new expedition members had a short time in which to become accustomed to their programmes and responsibilities for 1981.

Geologists were flown to the Ahlmann Ridge mountains to get a feeling for their new home at Grunehogna during future summer expeditions, and the skeleton for a new route between Sanae III and the geological base at 72deg 02min S/02deg 48min W, was mapped with marker poles planted at strategic positions. Helicopter crews, flying under Antarctic conditions for the first time, worked non-stop, and were congratulated on their successful operations.

When the Agulhas sailed she left a winter team of 16 men at Sanae III. Onerous routine tasks such as lifting drums of diesel fuel, hut raising, and general base cleaning, were soon under way. They were completed so successfully that two short field expeditions to establish a well-marked route to the hinge (about 150km south of the base) and a depot of helicopter fuel, were planned and completed by March 23.

Then the team settled down with occasional morale boosters such as auroral displays, bukta trips, birthday parties, good phone calls to South Africa, and the odd perfect days in a generally stormy winter. Sunday radio chat schedules were held fairly regularly with Georg von Neumayer, the new West German base on the Ekstrom Ice Shelf 250km west of Sanae, and on occasions with Mawson and Halley.

Improvements were made in the starting of vehicles in cold temperatures. The electronic and mechanical experts put their heads together and produced an ingenious system, which consisted of a diesel burner to warm the oil in the sumps, and a heater tape system to keep the batteries warm.

Two Puma SA330 helicopters played a major part in South African National Antarctic Expedition operations during relief voyages to its Antarctic and sub-Antarctic stations by the research ship Agulhas. This photograph taken last year shows one of the helicopters on a temporary helipad at Marion Island with some of the base buildings in the background. Black pipes in the middle distance were removed later for use in the hydro-electric power plant under construction on the island.

Photo by R. van Mazijk

Mid-winter's Day was celebrated with a cabaret, excellent food, and fine South African wines and liqueurs. It was all over too soon, and visits to Volkswagen Bukta to see penguins and seals were soon the order of the day. As the sun showed its face a little more each day preparations were made for the final major field expeditions when temperatures allowed in early September.

On the new route the first field expedition moved up the gradually rising slopes of a valley flanked by nunataks and mountains bearing the names of members of the Norwegian-British-Swedish geological expedition of 1949-52. It was hoped that fewer crevasse areas would be encountered in comparison to the old route 50km east, and indeed this was so.

In fact no crevasse were crossed, but the katabatic madman swept his broom of snow to hamper the party's progress. As a result the journey took 12 days. There was a "Lord of the Rings" smack about it as the party worked its way up towards the misty mountains and secure confines of Grunehogna.

A successful navigation procedure was accomplished with a scout on a skidoo ahead receiving hand instructions from the navigator in a Muskeg behind. A D4 tractor brought up the rear with supplies. The party felt that with enough fuel it would have made a dash for the South Pole.

Additional helicopter fuel for the supply at a depot in the mountains was successfully transported from Sanae by the second field expedition. On its return the base began to prepare for the end of SANAE 22 team's year in Antarctica, and looked forward to a more organised takeover.

Polar flight abandoned

A non-stop solo flight over Antarctic from Punta Arenas to Melbourne was abandoned on January 26 when the pilot of a single-engined Cessna 210 had covered slightly more than one-third of the flight distance of 5300 nautical miles. Mr M. Dwyer, a Melbourne accountant with aviation interests, and 300 hours' flight time, decided to return to Punta Arenas when he received a report of unfavourable weather ahead from McMurdo Station.

N.Z. glaciologist with Argentine team

A New Zealand glaciologist, Dr Trevor Chinn, worked for six weeks last season as a guest scientist with the Argentine research programme on James Ross and Vega Islands in Erebus and Terror Gulf off the Antarctic Peninsula. Dr Chinn, who has spent several summers in Antarctica with the New Zealand research programme, is with the Ministry of Works and Development in Christchurch. He has worked in the dry valleys monitoring climatic variations by measuring lake levels, and making mass balance and ablation measurements on selected glaciers.

Late in January Dr Chinn flew to Buenos Aires and joined a glaciological team led by Professor Daniel Cobos, of the geography department, National University of Cuyo, Mendoza, which included a geologist and a field assistant. On February 5 the team flew in an Argentine Air Force Hercules to Vicecomodoro Marambio Island where the Air Force has maintained a permanent base since 1969.

Vicecomodoro Island, better known as Seymour Island, is at the southern margin of Erebus and Terror Gulf, and its geographic position is 64deg 17min S/56 deg 45min W. Helicopters are used to support scientists working on James Ross Island (64deg 10min S/57deg 45min W) and Vega Island (63deg 50min S/57deg 25min W).

James Ross Island, which rises to 1630m and extends 64km in a north-south direction, is off the south-east side and near the north-east end of the Antarctic Peninsula from which it is separated by Prnce Gustav Channel. Vega Island is 27km long and 9.6km wide, and is the northernmost of the James Ross Island group in the western part of Erebus and Terror Gulf. It is separated from James Ross Island by Herbert Sound, and from the Trinity Peninsula by Prince Gustav Channel.

Argentine scientists have carried out glaciological research on the islands in Erebus and Terror Gulf for several seasons. In the 1979-80 and 1980-81 seasons they worked in an international co-operative programme with French scientists from the Glaciological Laboratory in Grenoble.

In the 1980-81 season glacial morphology and geology projects were carried out on James Ross and Vicecomodoro Marambio Islands, Mass balance, deformation, and dynamics measurements were made on ice domes on James Ross and Vega Islands.

French glaciologists who were on James Ross Island in the 1980'81 summer conducted a drilling programme on the ice dome which is about 1600m above sea level. They drilled to a depth of 220m and took ice cores for geochemical analysis.

Nearly 100 visitors to tiny island

Scott Island, the tiny island in the Ross Sea almost on the 180th parallel had nearly 100 visitors this season — the first for 21 years. The island at 67deg 24.5min S/179deg 55.5min E, and about 506km north-east at Cape Adare, has now had at least 102 visitors since it was discovered on Christmas Day, 1902.

Lieutenant William Colbeck, commander of the Morning, the relief ship for Scott's 1901-04 expedition, discovered the island, which is 1207m long and 201m wide, and named it after Scott. A landing was made by boat on the southern part at 9.30 p.m. Rock specimens were collected, the island was claimed for Britain, and a record of the discovery and the date was left behind.

Since then the island has been sighted many times, and New Zealand, United

States, and Soviet scientists have worked from ships in the area. But the second landing was not made until 1961.

On January 15 a New Zealander, Lawrence Bridge, and three United States officers landed by helicopter from the United States Coast Guard icebreaker Eastwind, which was returning to New Zealand. They were on the island for an hour and a half. Bridge, who died in 1973, was leader at Scott Base in the 1960-61 summer. He was unable to remain for the winter because of domestic reasons.

Twenty-one years later on January 7 eight scientists landed again on the island in two helicopters from the United States Coast Guard icebreaker Glacier and remained there for four hours doing geological and ornithological work. The New Zealanders in the party were Drs R. M. Kirk and P. C. Harper, and Graham Wilson (University of Canterbury), Dr M. Gregory (University of Auckland), and the Americans were Drs G. Hunt, W. Testa and R. Reichle, and Stephen Morrell.

This was the second landing by helicopter. On January 14 about 90 passengers and crew from the cruise ship Lindblad Explorer made the fourth landing, and only the second from the sea. Aided by fine weather and an area free of pack ice landings were made in relays from Zodiac rubber boats. The ship's scientific staff included two ornithologists.

When the scientific party landed on the island it was puzzled about the presence of a box on top of a promontory at the north-west corner, and 45m above the sea. The scientists did not have an opportunity to examine the box. It was painted grey, and was about .76m long, .3m wide, and .45m deep. Lying on one side of it was a wire or cord which hung over the cliff.

Soviet scientist winters at Pole

This winter a Soviet scientist, Dr Yuri Latov, of the Arctic and Antarctic Research Institute, Leningrad, will do upper atmosphere research at the Amundsen-Scott South Pole Station. He is the fourth Soviet scientist to winter at the South Pole in the exchange programme between the United States and the Soviet Union.

Thirty-one-year-old Dr Latov is a member of the 27th Soviet Antarctic Expedition, and has been on the staff of the Arctic and Antarctic Research Institute for the last seven years. He has worked at several Soviet Antarctic stations, and has wintered at Vostok. In 1978 he carried out scientific studies during an 1800km tractor train journey from Mirny to Komsomolskaya and back.

United States sanctions against the Soviet Union, announced at the end of last year, could affect future scientific collaboration between the two countries in the Antarctic. One of the sanctions announced was the suspension of talks on new science exchange agreements.

Soviet scientists have continued to work with Australians at Mawson. Dr N. Voloshinov spent 1979 studying aurora-related ionospheric currents. In April, 1980, a long-range helicopter from a passing Soviet ship landed his replacement, Dr P. Evgoniyk, and picked up Dr Voloshinov. Dr Evgoniyk was picked up by a Soviet ship in April last year.

Since the beginning of 1980 Australian scientific collaboration with the Soviet Union has been suspended indefinitely because of its action in Afghanistan. But the sanction applies to bilateral and not multilateral collaboration. As signatories to the Antarctic Treaty Australia and the Soviet Union are expected to share scientific information and research facilities.

India's first expedition to Antarctica

India, which is not an Antarctic Treaty nation, sent an official scientific expedition to Antarctica last season. The expedition of 20 men sailed from Goa on December 6 aboard the chartered Norwegian research vessel Polarsirkel, and landed in Antarctica on January 9.

A summer camp was established on the Prince Olav Coast of Enderby Land at 70deg S/41 deg 07min E about 48km east of Japanese Syowa station in Lutzow-Holm Bay. The scientific programme included glaciology, meteorology, seismology, and magnetism.

According to an official announcement from New Delhi the expedition was expected to carry out oceanographic experiments mainly along the Anarctic Convergence, and off the coast of Enderby Land between Syowa station Molodezhnaya, and Mawson, the Australian station.

Leader of the expedition was Dr S. Z. Qasim, Secretary of the Department of the Environment, who is a former director of India's National Institute of Oceanography. Last year he led an oceanographic expedition aboard the research vessel Gaveshani. It discovered a large deposit of managanese nodules on the seabed of India's Exclusive Economic Zone.

India's Prime Minister (Mrs Indira Gandhi) is reported to have taken a personal interest in the expedition. She sent a message to the Polarsirkel which said in part ". . . it (the expedition) is the fulfilment of one of my long-standing wishes . . . The Indian Ocean links India to Antarctica. The entire area is of deep interest to us and ocean studies are of vital importance . . ."

India plans to apply for membership of the Antarctic Treaty and may set up a permanent research station, according to a report in "The Economist." The English report also says that India is considering the purchase of a ship for work in Antarctica, and is acquiring or chartering three oceanographic vessels.

In 1970 India became involved in scientific research in Antarctica as the result of an agreement with the Soviet Union for joint meteorological exploration of the upper atmosphere. Under the agreement an Indian scientist worked with the 17th Soviet Antarctic Expedition in 1971-73, and became the first Indian ever to winter on the continent.

Dr Parmjit Singh Sera, of the Physical Research Laboratory, Ahmedabad, who gained his doctorate for his Antarctic research, was sent south by the Indian Space Research Organisation. He spent 18 months in the Antarctica, and took part in the Indian-Soviet project for meteorological rocket soundings of the upper atmosphere from Molodezhnaya. During his stay he visited three other Soviet stations, Bellingshausen, Mirny, and Vostok.

Smaller team at Arctowski

Poland will have a smaller winter team this year at its permanent station, Arctowski, on King George Island in the South Shetlands. As from this month the team will be reduced from 23 to eight.

First Chinese expedition in 1985

China is expected to send its first expedition to the Antarctic in 1985. According to reports from Tokyo plans are being made to assist the People's Republic of China to launch its own Antarctic surveys, and this year the National Polar Research Institute will invite Chinese scientists to Japan for Antarctic study programmes.

Scientists from the People's Republic of China will winter this year at Australia's three continental bases, Casey, Davis, and Mawson. They will carry out research programmes in glaciology, biology, and meteorology. This will be the first time Chinese scientists have wintered at each continental station.

Four Chinese scientists arrived in Australia in November last year and began training with the Antarctic Division at Kingston near Hobart. Three will winter this year; the fourth did marine research last season.

A 42-year-old biochemist, Mr Lu Peiding, will winter at Davis to conduct biological studies. He is an assistant research fellow from the First Institute of Oceanography, National Bureau of Oceanography, Qingdao.

Meteorological research at Mawson will be the responsibility of a 30-year-old engineer, Mr Brian Lin'gen. He is with the Institute of Meteorology, Central Bureau of Meteorology, Beijing (Peking).

In the winter team at Casey will be a 44-year-old glaciologist, Mr Xie Zichu, of the Lanzhu Institute of Glaciology and Cryopedology, Academia Sinica. Mr Xie has made several visits to Mt Everest to carry out glaciological studies, and has climbed to heights of more than 7000m.

A fourth scientist, Mr Yan Zide took part in a marine geoscience cruise aboard the Nella Dan last summer. He is a 41-year-old geophysicist from the Second Institute of Oceanography, National Bureau of Oceanography, Hangzhou.

Chinese scientists first worked with Australian National Antarctic Research Expeditions during the summer of 1979—80 under the agreement between the two countries on co-operation in science and technology. An oceanographer and a geomorphologist spent a month at Casey. They visited Scott Base and McMurdo Station and were flown to Casey in mid-January, 1980, returning to Australia on the Thala Dan in February.

Both scientists returned to Australia towards the end of 1980 to take part in Antarctic rsearch. The geomorphologist, Mr Zhang Quinsong, wintered at Casey last year and returned to Australia in the Nella Dan.

A physical oceanographer, Mr Dong Zhaoquian, took part in the Fibex marine science cruise of the Nella Dan during January-March, 1981. He spent the rest of last year at the Antarctic Division to write up his research notes, and to make further investigations.

New Zealand has been associated with the long-term plans of the People's Republic of China to establish a station on the Antarctic Continent. There have been discussions on scientific and logistic questions, and last season two guest scientists took part in the New Zealand research programme.

A geochemist, Dr Sheng-yuang Wang, and Dr Dezan Ye, a microbiologist, worked from Vanada Station in the dry valleys of Victoria Land and on Ross Island. They were the first scientists from their country to work with the New Zealand programme.

Brazil plans expedition next season

Brazil, which acceded to the Antarctic Treaty in 1975, plans to send an expedition to Antarctica in the 1982-83 season. As part of its plan to take an active part in Antarctic research four military officials were sent south in 1979 on an exploratory and training mission aboard H.M.S. Endurance, the Royal Navy's ice patrol ship which also provides support for British Antarctic Survey programmes.

Last year Brazil began negotiations to buy the Endurance, one of a number of ships which the British Ministry of Defence wishes to sell as surplus to naval requirements. Later the Minister of the Navy (Admiral Maximiano Fonseca) revealed that military officials had joined Britain and Chile in expeditions to Antarctica.

Although Brazil has acceded to the Antarctic Treaty its Antarctic interests have not been evident except in 1972 when there were reports of a privately sponsored scientific expedition to the Antarctic Peninsula. This expedition did not proceed. Then in 1973 there was a Rio de Janeiro newspaper report that the Brazilian Merchant Marine intended to buy a Norwegian laboratory ship for scientific work in Antarctica.

Two other South American countries which recently acceded to the Antarctic Treaty have also indicated their interest in Antarctic research. They are Uruguay, which acceded in 1980, and Peru, which acceded in 1981. Last season representatives of both countries were among visitors to Antarctica with the United States research programme.

Uruguay has had an Antarctic Institute since 1970 when a national Antarctic convention was held in Montevideo.

An alternative member of the institute's directive council in 1970 was a Uruguayan Air Force officer, Captain Roquea Aita, who was also delegate to the International Astronomical Federation. In January this year Colonel Aita, now a member of the institute's advisory council, and another Air Force officer, Captain Bernabe Gadea, who is director of aviation meteorology, visited McMurdo Station. They flew to the Amundsen-Scott South Pole Station, and visited American research projects in the dry valleys.

Chile, one of the original signatories of the Antarctic Treaty, had two representatives of its National Committee for Antarctic Research on the Ross Sea side of the continent as visitors in late January and early February under the auspices of the United States National Science Foundation. They were Captain Pedro Romero Julio, president of the committee and director of the Chilean Antarctic Institute, and Dr Roberto Schlatter.

Captain Romero Julio is Chile's permanent delegate to the Scientific Committee on Antarctic Research; Dr Schlatte, of the Institute of Zoology, University of the South, Valdivia, heads the ornithological sub-committee of the Chilean National Committee.

Peru's visitors with the United States programme were two naval officers, Lieutenants A. Leon and H. Koechlin. They travelled aboard the United States Coast Guard icebreaker Polar Sea on her voyage from Palmer Station on Anvers Island off the Antarctic Peninsula, and then to McMurdo Station.

SUB-ANTARCTIC

Hydro-electric power on Marion Island

A hydro-electric scheme may provide Marion Island with power as early as mid-1982. The system is planned to provide 125KWA from an installation on the Van den Boogaard River.

When the research and supply ship Agulhas arrived from Cape Town in April-May last year with the 38th team under the leadership of Rex Riley, she brought a construction team from the Department of Community Development, which is also responsible for normal base maintenance during relief periods. The team built a large permanent helipad during April-May; it also continued work on the hydro-electric scheme after the Agulhas departed.

This difficult task involved laying a 23cm pipe a distance of about 2km, and a power cable roughly the same distance, and building a turbine hut. The tremendous task of conveying the building material to remote areas on the island was achieved with the aid of the two Puma helicopters on the Agulhas which were in use for the first time.

In their report on activities for the first eight months of 1981 Rex Riley and his team say that two research teams are on the island. They are members of the Mammal Research Institute, University of Pretoria, and the Percy Fitzpatrick Institute for African Ornithology, University of Cape Town.

FERAL CATS

Two research projects, one on feral cats, and the other on fur seals, are being carried out by the Mammal Research Institute team. It is headed by Dr M. N. Bester, who has done research before on Gough and Marion Islands.

Mr P. J. van Rensburg is responsible for the cat project. He is examining the cats' effect on the bird population, partly by tracking them by radio. The fur seal project is the responsibility of Mr G. Kerley. Two species of fur seal, and a hybrid between the two, exist of the island. Assistants for the two projects are Messrs. L. Ford, T. Leask, and F. Smith.

Research on the energy used by penguins while on the island is being done by the Percy Fitzpatrick Institute. Mr N. J. Adams is working on King penguins, and Mr C. R. Brown is working on Macaroni and Rockhopper penguins. A second project run by Mr S. R. Fugler is examining the effect of guano from some petrel species on the island, and the breeding biology of the blue petrel. The assistant for these projects is Mr P. van Litsenborgh.

Other team members are: Rex Riley (leader — assistant meteorological technician), Trevor Stalboom (deputy-leader — diesel mechanic), Dave Conway (senior meteorolgical technican) Martin Hurst, Johnny Truter (assistant meteorological technicans) and Marius Gobbelaar (medical orderly). The radio operator, Eugene van Heerdan, formerly served on Gough Island. Mark van Aardt, the radio technician, is also responsible for geomagnetic research.

BIRD STUDIES

When the Agulhas returned during October-November she brought several visitors. One whose visit was of great value to the ornithologists on the island was Professor D. Parmelee, of the University of Minnesota, who has worked in the Arctic, Antarctic, and sub-Antarctic. He was particularly interested in skuas, blue petrels, and Kerguelen terns. Although he demonstrated an uncanny ability for finding new blue petrel

An aerial view of the base buildings and immediate surroundings of the scientific station on Marion Island. The photograph was taken from a Puma helicopter by R. van Mazijk, of the Department of Transport, when the research ship Agulhas made its first relief voyage from Cape Town during April-May last year. Photo by R. van Mazijk

colonies he was not fortunate enough to see the elusive Kerguelen tern.

Two well-known former team members returned to continue their work on nitrogen in the island's ecosystem. They were Messrs V. Smith and M. Steyn, of the Institute of Environmental Studies, Orange Free State University. An important visit for the meteorological team was that of Mr J. Bothma, from the head office, who spent three years with a Marion Island team in the 1950s.

GOUGH ISLAND

Gough Island's 27th relief expedition arrived aboard the Agulhas on September 25. The shore party was landed immediately by Puma helicopters on the newly-constructed helipad situated behind the base in Transvaal Bay.

Leader of the new team (1981-82) which relieved the 1980-81 team after 11 months is Mr R. J. Cadman (senior meteorologist). Other members are: Messrs G. Kuit (deputy-leader and radio technician), C. W. Bosch (medical orderly), D. W. May (diesel mechanic), C. J. Bonnet (communicator), J. A. Cilliers, W. J. le Roux, and C. du Plessis (meteorologists).

As weather and sea conditions were favourable on the day the ship arrived, offloading of stores and equipment began soon after the landing of staff. The bulk of the building material for the erection of a new food store with a self-contained emergency base, was lowered directly onto the site from a helicopter, and perishable foodstuffs and baggage were landed on the helipad.

Offloading continued for two days under favourable conditions. Fifty-six tonnes of cargo were moved from ship to shore, and then the Agulhas proceeded to 40deg W directly from Gough Island to deploy floating weather buoys in the South Atlantic.

MARINE LIFE

Two independent scientific groups from Cape Town were among the 41

people in the takeover party. The Agulhas also carried two guests from Tristan da Cunha, Messrs H. Green (head islander) and J. Whittington (school headmaster).

One scientific project entailed a population count of wandering albatrosses in Goonydale, a marshy plain on the south-west side of the island. The count was made by three ornithologists from the Percy Fitzpatrick Institute.

Five divers from the University of Cape Town made a study of the marine life around the island. The results will be compared with those from a similar study undertaken at Tristan da Cunha, Nightingale, and Inaccessible Islands.

Erection of the new food store was completed in two weeks by a Public Works Department team which also did minor repairs to the existing base to make it more comfortable for the new team.

A new SR-140 transmitter was installed in the radio room for the transmission of weather data to Pretoria. It replaces the ageing Racal equipment. The island now has two complete separate communications systems with emergency transmitter and receiver sets some distance from the main base.

OBITUARIES

Athol Roberts served twice at Scott Base

A leader at Scott Base in the 1961-62 season, Athol Roberts, who was also leader of one of the early New Zealand climbing expeditions to the Nepalese Himalayas in 1953, died in Wellington last year. He was information officer at Scott Base in the 1959-60 season.

Roberts was manager of the tramping, mountaineering, and skiing equipment branch of a Wellington sports goods firm for a number of years. He was a member of the Tararua Tramping Club and the Wellington Tramping and Mountaineering Club, and was a skiier as well as an outstanding mountaineer. Because of his experience he was called on to take part in many search and rescue operations.

Although the New Zealand expedition to the Nepalese Himalayas was small, and included only four Sherpas, it made some notable climbs up to nearly 6096m on several peaks, and reached the summit of Mt Chamar (7176m). In addition the botanist in the party, Philip Gardner, collected 1600 specimens for the British Museum.

After climbing to 5791m on Lampu (6400m) and to nearly 6096m on an unnamed 7406m peak in the Ganesh Himalayas, the expedition made a second attempt to conquer Chamar. The first attempt stopped at 5791m.

Roberts, Maurice Bishop, and Sherpa Namgyl reached 6705m, but the leader became sick and had to remain at Camp 5 on the summit ridge. Bishop and Namgyl reached the summit on June 6, 1953, having taken nine hours for the last 457m. On the next day Graham McCallum, Gardner, and Sherpa Nima also reached the summit.

For his Antarctic service Athol Roberts was awarded the Polar Medal in 1960. In 1961-62 the southern party of New Zealand Geological Survey expedition gave his name to a snow-free massif at the head of the Shackleton Glacier. Roberts Massif (85deg 32min S/177deg 05min W) rises more than 2700m and is about 60 square miles in area.

Three men with Antarctic links

A veteran of Byrd's second expedition (1933-35), **Percy John Dymand,** who decided to remain in New Zealand after his return from Antarctica, died in Christchurch on September 22 last year. He was 66.

Dymand, who was born in Seattle, made two voyages to the Bay of Whales from Dunedin in the crew of Jacob Ruppert. He remained in Dunedin and became a restaurateur. In 1969 he moved to Christchurch where he opened two restaurants which were taken over by his two sons after he was seriously injured in a car accident in 1976.

Tracey M. Simpson, a New Zealander, who played a leading part in the establishment of the memorial to Byrd on the summit of Mt Victoria in Wellington, also died towards the end of September. He was 71.

As chairman of the Richard E. Byrd Fellowship Simpson headed the committee of Wellington citizens which carried out the establishment of the memorial. He worked for many years for the promotion of better relationships between New Zealand and the United States, and was president of the New Zealand-American Association at the time of his death.

Between 1963 and 1968 Simpson, who was a committee member of the Wellington branch of the New Zealand Antarctic Society, made two visits to Antarctica, the first in 1963 as a guest of the United States Government. In 1968 he was a passenger on the first tourist flight across Antarctica from New Zealand to South America. The flight over the South Pole was organised by the Richard E. Byrd Polar Centre in Boston.

New Zealanders at Scott Base in the 1960s received regular deliveries of the Christchurch morning newspaper, "The Press", through the good offices of **Chief Warrant Officer Gerald Pagano,** who died in Washington on October 17. He arranged for deliveries while in Christchurch as an assistant for plans and operations on the staff of the United States naval support force commander from 1960 to 1965. When he retired from the U.S. Army Pagano worked in the scientific and polar archives section of the National Archives. Pagano Nunatak (1830m) at 83deg 41min S/87deg 40min W was named after him.

Transglobe ice team on way to North Pole

On the last stage of its planned circumnavigation of the world by sea, ice and land, using the Greenwich meridian as a basic route, the British Transglobe Expedition has begun the attempt to cross the Arctic Ocean to Spitsbergen by way of the North Pole. The leader, Sir Ranulph Fiennes, and Charles Burton, left Alert on the northern tip of Ellesmere Island at 2.30 p.m. G.M.T. on February 12, and early this month were reported to be 720km from the North Pole.

Between July 3 and the end of August last year Fiennes and Burton completed their river and road journey from the mouth of the Yukon River to Tuktoyaktuk, and then navigated their 5.4m Boston whaler through the North-West Passage to Tanquary Fiord on Ellesmere Island. Late in September they covered the final stage of 240km on foot to Alert. ("Antarctic," December, 1981).

When they began their 960km journey to the North Pole Fiennes and Burton, pulling sledges, planned to travel 160km north-west from Alert to Ward Hunt Island near Cape Columbia, and then move across the frozen Lincoln Sea. Early in March they were reported to have encountered bad weather and 9m ice ridges on the first 80km from Ward Hunt Island.

TOURISM

Landings on Scott Island and Peter I Island

Neither McMurdo Station nor Scott Base was able to welcome tourists from Antarctic cruise ships last season. The Lindblad Explorer made two voyages from the New Zealand port of Bluff, and each time the entrance to the Ross Sea was barred by heavy pack ice. Later in the season the World Discoverer sailed into the Ross Sea on her voyage from Punta Arenas, Chile, but did not enter McMurdo Sound because of ice conditions.

But passengers on the Lindblad Explorer received unexpected bonuses. Those on the December cruise were the first tourists to visit Mawson's hut at Cape Denison in Commonwealth Bay, and also the first to call at the French base, Dumont d'Urville. On the second cruise 90 passengers were able to land on Scott Island, the tiny island in the Ross Sea about 506km north-east of Cape Adare at 67deg 24min S/179deg 55min E, where there have been only three previous recorded landings in 79 years. Then they also visited Dumont d'Urville.

Although the World Discoverer was unable to enter McMurdo Sound her passengers went ashore at Polish, British, and United States stations off the Antarctic Peninsula, and on the voyage to Bluff spent some time on Macquarie and the Auckland Islands. Captain Heinz Aye and members of his crew made only the second landing in 53 years on Peter I Island in the Bellingshausen Sea.

When the Lindblad Explorer sailed from Bluff on December 13 she carried 92 passengers, including Japanese, Australians, Europeans, Americans, and New Zealanders. She made calls at the Snares Islands and spent two days at the Auckland Islands and Macquarie Island.

On December 21 the ship crossed the Antarctic Convergence and the first iceberg was sighted the next day at 63deg S. Then the Lindblad Explorer encountered the first pack ice in the 482km belt barring the way into the Ross Sea. Progress was slow through rafted ice 3km thick, and after two attempts to penetrate the barrier the ship had to return to the open sea, having reached 64deg S/175deg E.

Then a new course was set on December 26 for Commonwealth Bay, a distance of 1187 nautical miles. The ship made good progress and at 4 p.m. on December 28 she dropped anchor off Cape Denison. The day was fine and windless, and landings of passengers were made throughout the night. All were able to see Mawson's hut.

Another landing was made from rubber boats on some of the Mackellar Island in the centre of Commonwealth Bay to study Adelie penguins. The weather deteriorated in the afternoon so the ship weighed anchor and headed for Dumont d'Urville, sailing along the coast past the Mertz Glacier.

Early on the morning of December 30 the ship nosed her way through pack ice towards the Ile des Penguins where Dumont d'Urville is sited. With French assistance the ship entered unfamiliar waters and anchored near the snout of the Astrolabe Glacier.

Calm weather enabled the tourists to photograph Adelie penguins and Crabeater and Weddell seals. A rare Ross seal

was sighted, and also a group of 28 Emperor penguin chicks. Because of lack of time the ship could stay only a day.

On the return voyage to Bluff the Lindblad Explorer's passengers experienced a change in Antarctic weather. The ship ran into three days of storms with rough seas and winds gusting to 70 knots. For the first time on recent cruises the farewell dinner consisted of sandwiches because the ship was rolling so much in the heavy seas. She could not visit Campbell and Stewart Islands and reached Bluff on January 5.

Early the next morning the Lindblad Explorer sailed for the sub-Antarctic islands south of New Zealand on the first stage of her second cruise. She was off the Snares on January 7, and passengers made a trip round the islands. A small ship's party landed to check refuge huts.

A landing was made on Enderby Island, one of the Auckland Islands, and passengers went ashore in Sandy Cove. There they met two New Zealand scientists, Dr Martin Cawthorn and Simon Mitchell, who were studying a Hooker's sea lion colony. A small party of ornithologists also visited Disappointment Island to study the bird life.

SCOTT ISLAND

After two days at Macquarie Island the Lindblad Explorer headed south towards the Ross Sea. Advice was received from McMurdo Station that the pack ice extended for 482km, and the captain was advised to set a course along the 180th parallel towards Scott Island.

When Scott Island was sighted on January 14 there was an area of about 20 square miles clear of ice. The weather was fine, the sea was dead calm, and 90 passengers were able to make only the second landing on the island from the sea since it was discovered on Christmas Day, 1902. A party of New Zealand and United States scientists had landed by helicopter on January 7 from the United States Coast Guard icebreaker Glacier, but the tourists were unaware of this.

Passengers went ashore in relays, toasted the occasion in gluwein and champagne, and then returned to the ship with high hopes of sailing into McMurdo Sound and seeing the historic huts on Ross Island. But the pack ice was still heavy beyond Scott Island, and the ship was forced to turn north at 68deg 53min S.

Thirty-six hours later the ship was hove to off Commonwealth Bay unable to enter because of the fierce katabatic winds for which the area is famous. There was another ship in the bay, anchored about 800m away. It was the Oceanic Research Foundation expedition's ship Dick Smith Explorer. Although the Lindblad Explorer could not enter the bay it was in touch with Dr David Lewis, leader of the expedition.

FIERCE WINDS

On January 19 the ship cruised along the coast for 34 nautical miles past the Mertz Glacier towards Dumont d'Urville. It had to heave to again in a Force 11 gale on January 20, and the next day made two attempts to reach Dumont d'Urville. The anchors would not hold in a gale of 60 to 70 knots.

Finally the ship was able to anchor at 10 p.m. The winds dropped to 40 or 50 knots, and with three hours of sunshine 70 to 80 passengers were able to go ashore. Another attempt was made to enter Commonwealth Bay on January 22 but once again the katabatic winds were blowing fiercely, rising to 70 or 80 knots.

Then the ship turned north and headed for Campbell Island which was reached on January 26. Passengers spent the next morning ashore, and after calling at Stewart Island the next day the ship proceeded to Lyttelton where she arrived on January 29.

FOUR CRUISES

Last season the World Discoverer made four Antarctic cruises, each carrying about 190 passengers. The first three were to the Antarctic Peninsula area, one originating from Rio de Janeiro, and the others from Punta Arenas.

On the fourth cruise to the Ross Sea, McMurdo Station, and the sub-Antarctic Islands, the World Discoverer sailed from Punta Arenas on January 21. She called at the Polish station, Arctowski, on King George Island in the South Shetlands on January 24, and then made visits to Nelson and Deception Islands.

Later the ship called at the British Antarctic Survey station Faraday in the Argentine Islands. On January 27 the passengers went ashore at Palmer Station on Anvers Island, and then visited nearby Torgersen Island the next day. By January 29 the World Discoverer was in the Bellingshausen Sea. On that day Captain Aye, the cruise director, Werner Zehnder and eight members of the crew, made the second landing in 53 years on Peter I Island (68deg 50min S/90deg 30min W), which is 314km north-east of Thurston Island and 48km west of Cape Byrd, the western extremity of Charcot Island.

Captain Aye and his team landed in two rubber boats on the west coast of the island at Norvegia Bay. The island was discovered by Bellingshausen on January 22, 1821, but he was unable to approach within 24km of it because of heavy pack ice.

FIRST LANDINGS

Between 1910 and 1960 French, Norwegian, British, United States, and Soviet ships sighted or circumnavigated the island, but made no landings, mainly because of the heavy pack ice. The first landings were made on February 1, 1929, from the Norwegian research ship Norvegia, which stayed for a week in the area, surveyed the island, and landed a party which erected a depot at the head of Sandefjord Bay.

When the World Discoverer reached the Ross Sea area she was unable to enter McMurdo Sound. She headed north towards Scott Island but ice conditions prevented her from spending time off the coast of Northern Victoria Land and passing Cape Adare. The ship headed for Macquarie Island where she arrived on February 12. Her next call was at the Auckland Islands where the passengers went ashore in Sandy Cove on Enderby Island. There Dr Cawthorn and Simon Mitchell were picked up and taken to Bluff.

Because of rough weather the World Discoverer could not call at the Snares Islands. Calls at Campbell Island and Stewart Island had to be omitted, and the ship berthed at Bluff early on the afternoon of February 17.

Arrangements were made for three New Zealand parks and wildlife rangers to travel aboard the Lindblad Explorer and the World Discoverer as some of the sub-Antarctic islands the tourists visited are nature reserves. Brian Ahearn was on the Lindblad Explorer's first cruise, and Paul Dingwall travelled on the second. Pat Sheridan flew from Christchurch to McMurdo Station to join the World Discoverer, but had to return after spending three days at Scott Base.

Solo Antarctic dog sled journey

A Japanese climber and explorer, Naomi Uemura, who was the first man to reach the North Pole alone by dog sled in 1978, now plans another solo journey from the Antarctic Peninsula into Ellsworth Land next season. During his 3000km round trip he intends to climb the Vinson Massif (5140m), the continent's highest peak, in the Sentinel Range of the Ellsworth Mountains.

Uemura, who left Tokyo for Buenos Aires towards the end of January, intends to train for about seven months before he leaves for the Argentine base, General San Martin. He will start his journey early in September, and with the help of dogs, expects to complete the round trip in about 100 days.

General San Martin is manned by the Argentine Army, and is on the Antarctic Peninsula in Marguerite Bay at 68deg 07min S/67deg 08 min W. It has no landing facilities for aircraft, and is relieved and supplied by ship.

NEW ROSS DEPENDENCY STAMPS

To coincide with the 25th anniversary of the establishment of Scott Base a new set of definitive stamps for the Ross Dependency was issued by the New Zealand Post Office on January 20. They replace the present set which was first issued in 1972.

Adelie penguins appear on the 5 cent stamp and tracked vehicles moving over the ice are shown on the 10 cent. Scott Base on Ross Island appears on the 20 cent stamp, and a scientific field party is shown on the 30 cent. New Zealand's mainland station, Vanda, in the Wright Valley of Victoria Land is the subject of the 40 cent stamp, and the 50 shows the hut at Cape Evans used by Scott's last expedition in 1910-13.

Maurice Conly, the New Zealand Antarctic Division's official artist, who spent two summers in Antarctica, designed the stamps which were printed in Australia by the lithographic process. Each stamp measures 37.5mm by 26mm.

Philatelic history in the Ross Dependency area goes back almost 80 years. When Scott led his 1901-04 expedition he did not have an official post office or stamps but used a cachet which had no official status as a cancellation. It read: "Antarctic Expdn. 1901 S.S. Discovery."

New Zealand's first postmaster in Antarctica was Shackleton. On his 1908-09 expedition in the Nimrod he took south 24,000 penny "Universal" New Zealand stamps overprinted in green "King Edward VII Land." He could not establish his base in King Edward VII Land, and opened his post office at Cape Royds on Ross Island. It was closed on March 4, 1909.

Scott was the next postmaster and established his post office at Cape Evans on Ross Island. He was appointed postmaster on November 26, 1910, and the expedition secretary, F. R. H. Drake, was appointed assistant postmaster. The post office, closed on February 13, 1913, sent four mails to New Zealand, using 24,000 penny "Dominion" stamps overprinted "Victoria Land."

Ross Dependency stamps were first issued in 1957. Sir Edmund Hillary was appointed postmaster on November 23, 1956. He delegated A. S. Helm, a Post Office official, and secretary of the Ross Sea Committee, as assistant postmaster.

On January 11, 1957, Helm opened the first official post office on the site of Scott Base in a tent with a packing case for a counter. He cabled the Director-General of the Post Office in Wellington who ordered that the first Ross Dependency stamps be placed on sale to philatelists.

In 1967 the world's southermost post office was designated as a permanent office. Since then postmasters have served at Scott Base, each summer and winter.

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$7.00, Overseas NZ$8.00, 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.

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$5.00 (or equivalent local currency). Membership fee, overseas and local, including "Antarctic", NZ$11.00.

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