

ANTARCTIC

A NEWS BULLETIN
published quarterly by the
NEW ZEALAND ANTARCTIC SOCIETY (INC)



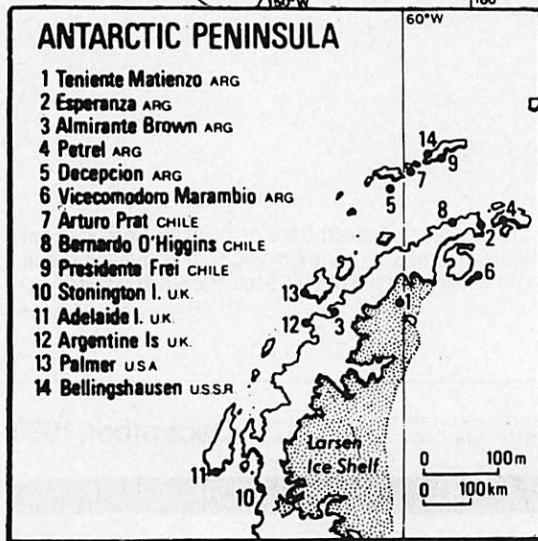
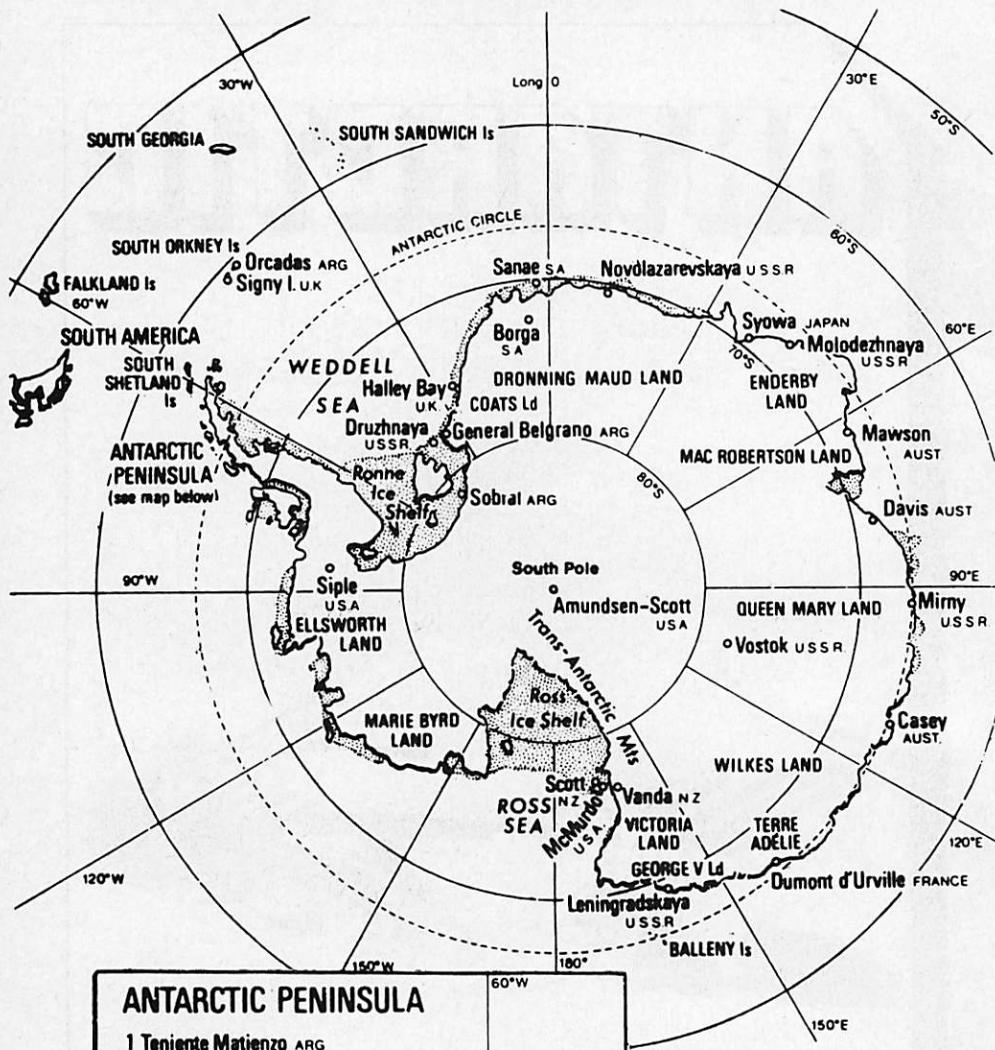
Pause in history. New Zealand huskies from Scott Base rest outside Scott's hut at Cape Evans before resuming their journey up the lower slopes of Mt Erebus late in October. With the team is Con Faber, dog handler at Scott Base last winter.

Photo by Colin Monteath

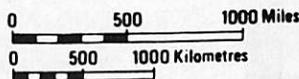
Vol. 9, No. 4

Registered at Post Office Headquarters,
Wellington, New Zealand, as a magazine.

December, 1980



ANTARCTICA



ABBREVIATIONS

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

ANTARCTIC

Vol. 9, No. 4

100th Issue

December, 1980

Editor: J. M. CAFFIN, 35 Chepstow Avenue, Christchurch, 5.
Address all contributions, inquiries etc. to the Editor.

CONTENTS

ARTICLES

AMUNDSEN'S KNIFE 142

POLAR ACTIVITIES

NEW ZEALAND 110-113, 135-136

UNITED STATES 114-119

AUSTRALIA 120-121

JAPAN 126-129

UNITED KINGDOM 130-132

ARGENTINE 132-133

NORWAY 133

WEST GERMANY 136-138

EAST GERMANY 138-139

GENERAL

TRANSGLOBE EXPEDITION 122-123

BIOMASS EXPERIMENT 134-135

SCAR MEETING 124-125

FIRST EMPEROR CHICK 140-141

TOURISM 113

ANTARCTIC CALENDAR 144

ISSN 0003-5327

© New Zealand Antarctic Society (Inc) 1978.

No part of this publication may be reproduced in any way without the prior permission of the publishers.

NEW ZEALAND FIELD WORK BEGINS

Although southerly storms and blowing snow in October delayed the start of some field operations New Zealand's Antarctic research programme for 1980-81 was in full swing by the middle of this month. After the first two months of the new season, which began officially on October 6, field parties or summer support staff from Scott Base were at work in the dry valleys of Victoria Land, on Mt Erebus, at Cape Bird, around McMurdo Sound, and on the Ferrar Glacier.

Early this month the Royal New Zealand Air Force completed 12 flights from Christchurch, using Hercules wheeled aircraft, to provide logistic support for the New Zealand and United States programmes. This was the 16th season that the RNZAF had carried passengers and cargo between New Zealand and Antarctica. Between November 26 and December 6 its Hercules aircraft also transported some of the material for the new accommodation block at Scott Base which is under construction this season.

New Zealand's summer programme began as soon as 20 New Zealanders on the first flight of the season by a United States Air Force Starliner reached Scott Base. The party included Mr N. C. McPherson, executive officer, Antarctic Division, Mr R. J. Clark, officer-in-charge for the summer, and his deputy, Mr H. J. Webb, the 1981 winter team, and key summer support staff.

On the morning of October 9 the 11 men who spent last winter at Scott Base completed their Antarctic service. The leader, Mr C. A. Roper, hauled down his New Zealand flag, which had flown at the base since February 14, and handed over to Roger Clark. Two days later 10 members of the winter team flew back to Christchurch. Con Faber, the dog handler, remained until November 4 to complete the handover of the dog teams to his successor, Allan Taylor.

By the beginning of the third week in October the summer support staff had settled in, and was busy preparing for the dispatch of field parties, and engaged in its duties at Scott Base. The snowcraft

and survival team was on the job early, and on October 17 tested its search and rescue equipment by travelling 26km across the sea ice to White Island where it spent the night. Carl Thompson (leader), John Prosser and Peter Somerville (field assistants) took with them two members of the new winter team, John Mackey and Bruce Scott.

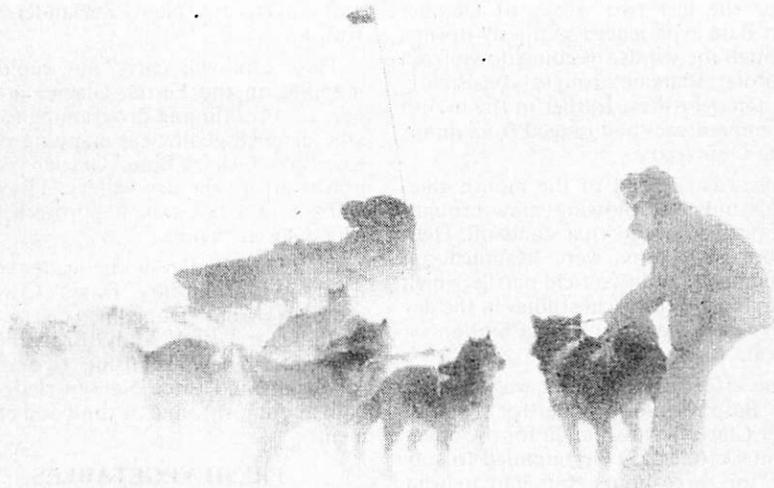
DOGS ON EREBUS

A five-day expedition up the icy slopes behind Cape Royds to the lower slopes of Mt Erebus completed the transfer of the 21 huskies at Scott Base to their new handler. Three men, Colin Monteath, field officer, Antarctic Division, Con Faber and Allan Taylor, left on October 17 with a team of 11 dogs and 272kg of equipment.

They travelled north on the sea ice to Scott's hut at Cape Evans, and camped the night behind the Adelle penguin rookery at Cape Royds about 30km from Scott Base. During the night a strong southerly wind broke out a huge section of sea ice stretching across McMurdo Sound north of Cape Royds.

On October 18 the party began to make its way up the slopes behind Cape Royds, but it was checked by a violent southerly storm when at 600mn. Tethering the dogs and erecting a polar tent in 30 to 40-knot winds took three hours, and the storm pinned the party down for 24 hours.

A sudden clearance in the weather at midnight on October 19 enabled the party to climb the extensive icefields running up towards the Fang Glacier. In



A Scott Base dog team and its driver checked by a blizzard at 600m during a descent from 1700m on Mt Erebus towards Cape Royds early this season.

Photo by Colin Monteath

some parts the party had to push the sledges from behind to help the dogs pull uphill on the smooth ice.

SUMMIT CLIMB

Finally the dogs were tethered below the west face of Erebus at 1770m. Allan Taylor remained with them while Con Faber and Colin Monteath made a 10-hour round trip to the summit area of the volcano, which is 3794m high. Their climb in temperatures of minus 30deg Celsius lay between that used by Shackleton's 1908-1909 expedition, and that used by Scott's 1911-1913 expedition, which made the second ascent.

Both dogs and men had an exciting run over hard sastrugi snow to the sea ice near Cape Royds on October 20. Before the final run home to Scott Base the party inspected Shackleton's hut and the Antarctic Division's survival hut. The historic hut was in perfect condition after the winter.

A Victoria University of Wellington field party which left Scott Base on October 24 to recover cores from the seabed of McMurdo Sound was also pinned down by a storm — for five days — in two tents pitched on cracking ice 5m

thick and 100m from Cape Evans. Alex Pyne (leader), Barbara Ward, Paul Fitzgerald, and Bruce Garrick, an Antarctic Division field assistant, returned to Scott Base at 2 a.m. on October 29 exhausted after four hours of battling high winds over the 20km of sea ice from Cape Evans.

With winds of up to 67 knots for five days the party could do little except read, write, eat, and sleep inside the tents, and wait for a lull in the storm. The constant flapping of the tents and the noise of cracking ice made sleep difficult.

SLEDGES UPSET

Eventually, when there was a lull, the party decided to start for home. But the return journey was the worst part of the stormy week. The sea ice had been swept clear of snow by the gale to a glassy smoothness, and offered little traction to the party's three motor toboggans with their 453kg sledge load. Nearly all the way south from Cape Evans the motor toboggans were hit side on by high winds, and were continually pushed off course. Every violent gust overturned the party's sledges.

For the last two weeks of October Scott Base experienced southerly storms, although the winds sweeping down from the Polar Plateau brought consistently high temperatures. Earlier in the month the temperatures had ranged from minus 45deg C to zero.

Towards the end of the month gale-force winds and blowing snow brought the first field events to a standstill. Helicopter operations were resumed on November 2, and two field parties which will make hydrological studies in the dry valleys were flown to Vanda Station on separate flights.

One effect of the storm was to leave Scott Base without a leader for six days. Roger Clark flew to Vanda for the opening on October 25. He intended to stay there for three hours, but had to wait until November 1 for a United States Navy helicopter to bring him back.

SNOW CLEARING

When the stormy weather ended the Scott Base support staff turned to the task of clearing snow from the doorways and windows of the buildings. Working in shirt sleeves, although the temperature was minus 7deg C, the New Zealanders had the help of 10 Royal Australian Air Force air crew who had been attending the snowcraft and survival course in preparation for their six Hercules flights last month.

AFTER their stormy experience in the previous month the VUW field party headed across the sea ice on November 7 into McMurdo Sound, towing more than 453kg of equipment behind three motor toboggans. One purpose of the journey is to obtain core samples which Barbara Ward, a micro-paleontologist, will study for the presence of micro-organisms, specifically foraminifera, which are present both live and fossilised in seabed sediment.

An Antarctic Division geological team left Scott Base on November 9 for the Ferrar Glacier, about 70km to the west of Ross Island. It will be in the field for 10 weeks, and is expected to cover more than 250km by motor toboggan before returning in mid-January. This will be the longest toboggan journey to be

undertaken by New Zealanders this season.

This team will carry out geological mapping in the Ferrar Glacier area as part of a continuing programme to provide detailed geological mapping of the Koettlitz Glacier-Blue Glacier region northward to the dry valleys. The work will continue last season's project in the Blue Glacier region.

Dr R. H. Findlay is the leader of the team. With him are David Craw, a geologist from Dunedin, Garry Ball (field leader) and Andy Brown (field assistant). They are using two motor toboggans and three Nansen sledges to haul about one tonne of food and equipment.

FRESH VEGETABLES

This summer Dr Allan Green, leader of the Waikato University biological research team, which began work near the Canada Glacier and Lake Fryxell in the Taylor Valley, hopes that his Antarctic tomatoes will ripen. Last season he grew six tomatoes in a plastic greenhouse, using New Zealand and Antarctic soils, but they would not ripen. Eventually they changed colour when taken to Scott Base.

When Dr Green and Brian Challinor, a botany student, flew to Lake Fryxell by helicopter on November 12, their luggage included a kerosene heater, several boxes of plants, potting mix, fertiliser, and a double-layered bubble plastic greenhouse. The heater will be used to keep temperatures in the greenhouse at 50deg C.

Last season Dr Green's team grew green beans, sugar peas, tomatoes, and cornflowers at Lake Fryxell. But radishes became confused by 24 hours of daylight, and kept on flowering, making themselves inedible.

This season Dr Green and Brian Challinor will use more fertiliser and a new irrigation system to produce fresh vegetables which will supplement their diet of dehydrated food. They hope to grow courgettes, pumpkins, beans, peas, lettuces, and a variety of flowers.

These greenhouse trials, however, are not the main feature of the party's work.

The two men will study the productivity and distribution of mosses and algae near the Canada Glacier at the western end of Lake Fryxell and their adaptation to the Antarctic climate.

PENGUIN CENSUS

Each summer a monthly census of Adelie penguins in the Cape Royds rookery is taken by Scott Base staff. Last month Allan Taylor, Warwick Thomson (assistant cook) and Don McKnight (scientific officer) travelled to Cape Royds by dog team on November 12 to make the first count. They stayed overnight at Cape Evans, and returned to Scott Base on November 14.

While field teams have been moving out from Scott Base the construction team has made good progress on the third stage of the rebuilding programme — erection of a new accommodation block for 42 people. After nearly three

months' work, interrupted at times by bad weather, the team has completed the framework of the building. Panels are being placed in position this month, and by the end of the season the building will be complete except for the internal work which will be done next season.

Since early last month everyone at Scott Base has been able to take more than one shower a week. Showers were rationed at the beginning of the season because water had to be obtained by using the old ice melter which has served the base for many seasons.

A reverse osmosis plant, which filters large quantities of sea water was installed last season, but the pipelines froze up late in April because of the low winter temperatures. The 11 men of the winter team had to make do with the ice melter. Now anti-freeze solution has been flushed through the pipelines, and 8000 litres of water can be produced in 24 hours.

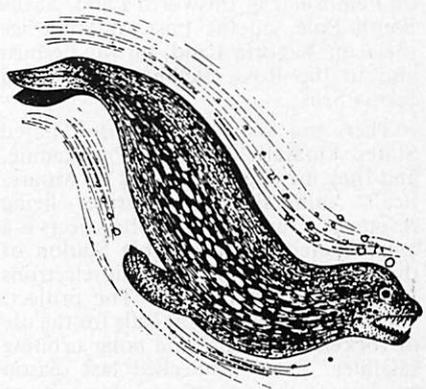
Ships to make six cruises

Six cruises to Antarctica and sub-Antarctic islands will be made by the Lindblad Explorer and the World Discoverer in the 1981-82 season. Three of the cruises will end at New Zealand ports.

Next year the Lindblad Explorer will make only two cruises, both out of Bluff. Both cruises will last 24 days. The programme provides for visits to McMurdo Station, Cape Royds and Cape Adair, the Balleny Islands, Macquarie Island, Campbell Island, the Snares Islands, and Stewart Island.

After three cruises of 21 days from the Falkland Islands (Islas Malvinas) to the Antarctic Peninsula the World Discoverer will make a longer cruise of 30 days to the Antarctic Peninsula, then into the Ross Sea to Ross Island in McMurdo Sound. Visits are planned to Cape Royds, McMurdo Station, Scott Base, and Cape Adare. The ship will also call at the Balleny Islands, and Macquarie and Campbell Islands on her way to Lyttelton.

Prices for passengers on the Lindblad Explorer's cruises range from \$US5,440 to \$US9,040. The World Discoverer's short cruises cost \$US4,700 to \$US8,900, and the prices for the longer cruise range from \$US6,940 to \$US12,420.



U.S. science projects this summer

Economic restraints, including rising fuel prices, and an increase in military pay, have reduced United States spending on research in Antarctica this season. The budget is \$55 million, which is slightly less than last season's figure of \$52 million when more than \$4 million for fuel and pay increases is deducted. Included in the cost of the scientific programme, which is financed and co-ordinated by the National Science Foundation is about \$39.7 million to support the research with aircraft, icebreakers, and cargo ships, and to maintain the four American inland and coastal stations.

Because of the reduced budget Siple Station in Ellsworth Land will be closed next winter. The main field effort in the summer programme — recovery of a United States Navy Hercules aircraft which was damaged on takeoff in East Antarctic nine years ago — has been cancelled, and the number of aircraft flights between Christchurch and McMurdo Station, and in Antarctica, has been reduced. Other economies include less construction work at the bases, and the laying up of the marine research vessel *Eltanin*.

This season about 285 scientists, including 20 women, and representatives of 10 other countries, are engaged in research on the continent, and in southern waters. With air and sea support they are at work around the Antarctic Peninsula, in Ellsworth Land, at the South Pole, on the East Antarctic ice sheet, in Victoria Land, on Mt Erebus, and in the Ross, Bellingshausen, and Scotia Seas.

There are 86 projects in the United States Antarctic Research Programme, and they include evaluations of Antarctica's mineral and marine living resources. One of the major projects is a co-ordinated study at Siple Station of the precipitation of energetic electrons from the magnetosphere. The project, which began this month, calls for the use of rockets, balloons, and polar orbiting satellites. It was cancelled last season because of the operational demands of other projects.

In preparation for next season's operations, a reconnaissance will be made by air in Northern Victoria Land for the establishment of a major field camp. Five possible landing sites in the Evans Neve area will be checked. Between 50 and 60 scientists from the United States, New Zealand, Australia, and West Germany, are expected to take part in programmes of geology, glaciology, and geophysics.

MARINE RESOURCES

Another major project this season is the study of marine resources of commercial interest in the eastern Scotia Sea, particularly krill, by scientists from the United States, Argentina, Australia, Chile, Japan, and Norway. This project is in part the United States contribution to the First International BIOMASS Experiment (FIBEX).

Twenty-eight scientists will work aboard the research ship *Melville*, which left Valparaiso late last month, and will return about April 1 next year. They will concentrate their work in the eastern Scotia Sea at the confluence of surface currents coming from the Weddell Sea and Drake Passage — north-east of the Antarctic Peninsula. This area was chosen because of its high concentration of marine life, especially krill.

On the first leg of the *Melville's* cruise the scientists will study which properties of the northern boundary of the Weddell Sea outflow are important to the high densities of krill, and to krill develop-

ment. Specific areas identified as being of most biological interest will be studied on the second leg.

A survey of the Antarctic continental margin in the Bellingshausen Sea and along the Antarctic Peninsula will be continued by a marine geological field team from Rice University, Houston, Texas, during the voyage of the United States Coast Guard icebreaker *Glacier* from McMurdo Station to Palmer Station. Core samples of ancient sediments will be taken, and iceberg sediment transport will be surveyed. The continental margin survey will include the construction of detailed maps of water depths, and the collection of geological samples. It is expected to provide information about the hydrocarbon potential of the margin.

MINERALISED AREAS

With the support of the research vessel *Hero* a team from Ohio State University's Institute of Polar Studies will investigate and sample mineralised areas in the northern Antarctic Peninsula. Intensive sampling and petrologic and geochemical studies will be focused on two known areas, south-western Anvers Island, and the South Shetland Islands. Data collected will help to determine the mineral resource potential of the area, and assist the development of programmes to evaluate the mineral resource potential of more isolated and less exposed areas of Antarctica and other parts of the world.

Tectonic development of West Antarctica and its relation to East Antarctica will be the subject of a co-operative project between a team from the Lamont-Doherty Geological Observatory of Columbia University, New York, and the British Antarctic Survey. The project will consist solely of airborne geophysical investigations. Ice echo-sounding data will be gathered, using a BAS *Twin Otter* aircraft near the Ellsworth Mountains. To develop a balanced assessment of Antarctic hydrocarbon resources, a better understanding of the nature of the crust between East and West Antarctica is necessary, and it is hoped that this season's study will add to understanding

of the tectonic development of West Antarctic and its relationship to the East Antarctic craton.

A radiometric survey begun in the 1975-76 season to assess the potential resources of uranium and thorium in the exposed rocks of Antarctica will be continued by a team from the University of Kansas, which will include two West German scientists. In past seasons the resource and radioactivity survey has covered the mountains of Victoria Land, exposed rocks in Marie Byrd Land, and the Darwin Glacier area. Last season it was extended to the Ellsworth Mountains.

This season a return to Ross Island and selected areas from the Koettlitz Glacier to the Convoy Range is required. One reason is that the equipment now held enables simultaneous recording of the individual counts from uranium, thorium, and potassium, thus aiding evaluation of the uranium potential of the area. The other reason is that in 1978-79 substantial concentrations of thorium minerals were found in the Brown Hills. An effort will be made to identify similar anomalies in the Windy Gully sandstone.

OFFSHORE OIL

Field research in the Antarctic Peninsula area is related to the Antarctic ecosystem, and studies of seals, birds, and penguins. But there are other projects dealing with the weather, the endurance of insects to prolonged freezing, and food web relationships. One project expected to provide data for a baseline in the event that the exploitation of offshore oil begins in Antarctic waters is the use of water samples to determine the levels of petroleum-derived and related compounds, and of synthetic and natural organic chemical compounds in the marine food webs.

Another project co-ordinated with studies of food web relationships is the capture, tagging, and release of leopard seals in the pack ice near the Antarctic Peninsula. A ship will be used as a mobile research platform, and the seals will be tracked and located again more easily this season by the use of temporary radio tags.

This season a team from the University of Houston, Texas, will continue its examination of the physiological and biochemical basis of freezing in terrestrial arthropods in the Palmer Station area. These insects represent the highest phylogenetic system capable of enduring natural prolonged freezing without discernible damage. The research on insects that function normally in temperatures many degrees below freezing could provide information critical to low temperature storage of tissues and organs.

A field team from the State University of New York will study thermo-regulatory mechanisms in Adelie penguins and giant petrels, working from Palmer Station. Radio telemetry will be used to measure body temperatures and locate penguins in rookeries and at feeding grounds.

KRILL MONITOR

Biologists from the Mount Desert Island Biological Laboratory, Salsbury, Maine, will make a comparative study of the behaviour and ecology of krill-consuming penguins (Adelie, Chinstrap, and Gentoo). Research has shown that pygoscelid penguins may be a valuable monitor of the Southern Ocean's krill stocks. The biologists will work in Admiralty Bay, King George Island, in the South Shetlands.

Rockets and large balloons will be launched from Siple Station to enable scientists from the United States, Britain, and Norway, to study the precipitation of energetic electrons from the earth's radiation belts. The precipitation is caused by very low frequency (VLF) signals generated by lightning discharges in the Northern Hemisphere or by a VLF transmitter at Siple Station. Scientists hope to learn more about the interaction between electromagnetic waves and charged particles, a process that is now poorly understood.

One experiment conducted by scientists from the University of Maryland will use three Nike-Tomahawk rockets provided by the National Aeronautics and Space Administration to investigate controlled wave-particle interactions produced in the magnetosphere by the

VLF transmitter at Siple Station. The rockets will carry instrumented electron spectrometers, and vector electric and magnetic field sensors.

With NASA assistance four Super Arcas rockets will be launched for a University of Houston project to measure from the magnetosphere electron precipitation induced by the VLF transmitter. The scientists will measure x-rays caused by the precipitating electrons, energetic electrons, and VLF emissions. Payloads on the rockets will return to earth by parachute.

BALLOON LAUNCHES

In another University of Maryland experiment scientists will launch 12 balloons with x-ray scintillation counters. These will be used to gather data relating to electronic precipitation near the plasmapause, and to study the physical processes involved in magnetospheric wave-particle interactions. The launches will be co-ordinated with the rocket launches from Siple, balloon flights from Roberval, Quebec, the station's conjugate point in the Northern Hemisphere, and the operation of the Siple VLF transmitter.

SUN STUDIES

Surface features of the sun will be studied from the South Pole this summer by United States and Swedish scientists. Two projects will be carried out at the Amundsen-Scott South Pole Station because the site offers unique advantages to solar astronomers. They will have the sun continuously below the horizon at a relatively constant altitude for many weeks.

Observations of the sun have been made with a compact solar telescope in past seasons. This season the scientists will study the growth and evolution of supergranules on the sun (granules are "specks" on the surface each about 1609km in diameter) with a refracting telescope set up in a tower 8.2m high and 6.4km from the station. The telescope has a 20cm objective lens, a 29.8m mirror, and a focal length of 19.9m.

This project will be undertaken by the Bartol Research Foundation at the

University of Delaware in co-operation with the solar observatory of the Royal Swedish Academy of Science. Another astronomy project will be conducted by the Sacramento Park Observatory, New Mexico. The team will probe the sun's interior by making observations of its normal modes of oscillation with a compact portable refracting telescope.

Geophysical monitoring for climatic changes in Antarctica will be continued at the Pole Station this summer and next winter by a team from the National Oceanic and Atmospheric Administration. The team headed by Miss Cynthia McFee, who will be the third woman to winter at the Pole, will continue long-term measurements of trace atmospheric constituents that may influence climate.

ICE DRILLING

Scientists from the State University of New York at Albany will carry out a related project at the Pole Station, McMurdo Station, and Vanda Station, where they will co-operate with New Zealand meteorologists. The purpose of the project is to determine the meteorological processes which transport aerosols to and from Antarctica.

Ice drilling at the Pole Station to extract a core for use in the study of past climate will be carried out by a team from the University of Nebraska. The team will drill to obtain a 500m core. Scientists from the Virginia Polytechnic Institute and the University of Kansas will analyse the core to determine the concentrations of nitrate and ammonium ions over the last 7000 years. Fluctuations of these ion concentrations in polar snow may record such past events as climate or solar variations.

A major project in the McMurdo Sound will be the study of Mt Erebus by an international team of scientists to obtain a long-term record of seismic activities and information about the volcano's magma lake in the active crater. Three permanent seismic stations with radio telemetry links to Scott Base will be established by geologists from Ohio State University and the University of Alaska in collaboration with Japanese and New Zealand scientists.

Two stations will be located on the flank of the volcano at altitudes between 1508m and 2011m; the third, consisting of a seismometer and an acoustic sensor will be installed near the crater of the volcano. Data from these stations over a long observation period will provide a more complete file of earthquake activity, more accurate location of earth activity centres, and a better understanding of the circulation of magma between the deeply buried magma chamber and the magma lake in the centre.

GAS EMISSIONS

Large increases in the levels of aerosols have been noted in the Antarctic atmosphere during the southern summer. These aerosols could originate from volcanoes, stratospheric subsidence, oceans or long-distance transport from man-made sources. A team of scientists from the University of Washington will make airborne measurements of gas emissions from Erebus. These will extend the team's recent airborne studies of six volcanoes in the Northern Hemisphere, and add to knowledge of volcanoes' role as sources of atmospheric aerosols.

Once again most of the research in the McMurdo Sound area will be concentrated on seals and fish. Between January and October next year scientists from the Scripps Institution of Oceanography will study the biology of Weddell seals, working from a winter camp on White Island, and in McMurdo Sound. Their study will focus on aspects of the winter behaviour of the seals.

A long-term project — monitoring the Weddell seal population in McMurdo Sound — begun several seasons ago by University of Minnesota scientists will be continued this summer. Using a radio tracking system with remote sensing the research team will monitor for census purposes near Hutton Cliffs, about 16km from McMurdo Station, and on selected islands in McMurdo Sound.

Two Australian scientists from the University of Queensland are making studies of lactation in Weddell seals. They have established a "seal farm" with an electric fence at Turtle Rock in Erebus Bay where they can observe the

parent-offspring relationship, the influence of changing activity patterns on suckling patterns, and obtain milk samples from mature females. Some of the samples will be frozen for transport to Australia where they will be analysed for milk proteins, fats, fatty acids, and sugars.

FISH CATCHES

For several seasons Dr Arthur L. DeVries, of the University of Illinois, has flown south early in the season to investigate the synthesis of the unique glyco-protein anti-freeze in certain Antarctic fish which enables them to survive while swimming in ice-laden sea water. He and his team began early again this summer, and were catching fish from holes drilled in the ice early in October. By early November they had caught 102 Antarctic cod (*Dissostichus mawsonii*), the largest weighing 51kg.

University of Southern California biologists will also work in McMurdo Sound to learn how micro-algae communities, which are dominated by diatoms, survive the winter under the annual sea ice when continual darkness precludes photosynthesis. An environmental chamber will be built to simulate changes in light, temperature and salinity associated with the onset of winter, and the information gained will increase understanding of how other aquatic life forms survive in the harsh Antarctic environment.

For the next two seasons ornithologists from the Point Reyes Bird Observatory, California, will make a census of banded south polar skuas of known age at Cape Crozier. This season they expect to find 200 birds that were banded between 1961 and 1970. To estimate survival, longevity, and emigration they will compare their data with that collected between 1964 and 1976.

To obtain evidence for testing the hypothesis that the West Antarctic ice sheet retreats to its present position and maintains large ice shelves during interglacial periods, a team led by Dr George H. Denton, of the University of Maine at Orono, will work in the dry valley areas of South Victoria Land for three months. The team, which includes

two New Zealanders, Dr C. Hendy and Mr Howard Conway, will map glacial erosion and depositional features of Marshall Valley, the Quartermain Mountains, and the Asgard Range.

METEORITE SEARCH

Scattered sites in South Victoria Land will be examined in the continuing search for meteorites which started in the 1976-77 season. Last season a team from the University of Pittsburgh collected 24 meteorites from a large patch of bare ice that extends from Reckling Peak about 100km. This season another team will travel by helicopter to the Allan Hills area, and then by motor toboggan to the Reckling Peak ice patch. It will also search for meteorites at Griffin Nunatak, Brimstone Peak, Ricker Hills, and on an ice patch 50km west of this group.

Newly-discovered glassy silicic intrusive rocks in the Ferrar Supergroup rocks from Butcher Ridge near the Darwin Glacier, are unlike any known at present in this geologic formation. This summer an Ohio State University team will map in detail and sample these rocks which are of Jurassic age (about 175 million years old).

Several seasons ago Dr E. Imre Friedmann, of the University of Florida, determined that endolithic organisms — life inside rocks — exist in snow-free arid areas of Antarctica previously believed to be too hostile to sustain life. Several of these micro-organisms have been successfully grown in laboratory cultures.

This season Dr Friedmann and his team, which includes his wife, will continue their studies of the microbial flora living inside rocks in the dry valleys and other arid areas. They will insert micro-sensors inside tiny cracks and fissures in the rocks to record the temperature, humidity, and light in the ecosystem in which the organisms live.

LAKE DIVING

Studies of benthic algal mats and their role in the biological activity of the dry valley lakes will be continued by a team from the Virginia Polytechnic Institute. It will work at Lakes Fryxell, Hoare and

Bonney in the lower Taylor Valley. Half the team will repeat last season's scuba diving observations and make immediate analyses of algae samples at Lake Hoare, which is about 30m deep.

To gather detailed information on the distribution, speciation, and transportation of trace metals and nutrients in Lake Vanda and the Onyx River, which feeds into the lake, scientists from Miami University, Oxford, Ohio, will take water samples every week between December this year and February next year. These measurements will provide data for global and regional monitoring studies, and the scientists hope to determine whether trace metals and nutrients are being recycled, and how this influences Lake Vanda's ability to support life.

Beyond Ross Island and the dry valleys scientists from the United States Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, will try to determine whether the sea ice layer under the Ross Ice Shelf can be detected by radar sounding. The layer was found when Ross Ice Shelf Project scientists drilled through the shield in 1978.

If the radar technique is feasible, the scientists will try to determine the crystal alignment of the sea ice. This will give them information about the orientation of sea currents under the shelf which is 423mm thick at the site of the experiment.

WEATHER STATIONS

Early next year three more automatic weather stations will be added to the three set up last season between the French base, Dumont d'Urville and Dome C in the Wilkes Land. These will provide more data for better understanding of the katabatic or gravity winds. In addition a team led by Dr Gerd Wendler, of the University of Alaska, will carry out two airborne research missions over the stations at D59, D49, and Dumont d'Urville to collect vertical profile wind data.

In Northern Victoria Land a long-range project this summer has been planned to show what effects in regional

climatic change and ice-surface lowering have been generated by the inland movement of the Rennick Glacier, the largest outlet glacier in the region. The interface between floating and grounded ice has been migrating inland ever since the removal of marine grounded ice from the coast more than 10,000 years ago.

Late last month four scientists from the University of New Hampshire were flown from McMurdo Station to the eastern side of the Morozumi Range near the Rennick Glacier. Travelling by motor toboggan they will remain in the region until late in January, studying changes in outlet, tributary, and alpine glaciers, in snow and ice patches, and in ice-marginal lake distribution.

Writers' Antarctic cruise

Two Antarctic tourists aboard the Lindblad Explorer this summer will be the English writers, Richard Adams and Ronald Lockley. Adams is best known as the author of "Watership Down" and "Shardik". Lockley, who is a naturalist now living in New Zealand, has written extensively on birds, seals, and other wildlife, and his book, "The Private Life of the Rabbit", inspired Adams to write his famous novel, "Watership Down".

Early next year the two writers will join the Lindblad Explorer for her cruise to the Ross Dependency, which is planned to end at Lyttelton about March 8. They have ideas of writing a book about Antarctic conservation. Appropriately, the publishers interested are Penguin Books.



ANARE REPORTS

Geological mapping in Prydz Bay area

Scientists in the Australian National Antarctic Research Expeditions (ANARE) will carry out a summer research programme in the Princess Elizabeth Land region this season from Davis Station. Three helicopters will be used for work in the Prydz Bay area, which will include geological mapping, geochemistry and geochronology, geophysical studies, and a reconnaissance geomorphology survey. The Lambert Glacier-Prydz Bay region is considered to be a prime hydrocarbon exploration area.

Glaciologists at Casey Station will measure ice movement and thickness along the 2000m ice-cap contour from the station towards the French station, Dumont d'Urville. Ice thickness and velocity measurements will also be made on the Law Dome and the Vanderford Glacier. The main summer glaciological project at Mawson Station will be measurement of the ice movement of the Jelbart Glacier, and at Prydz Bay aerial soundings will be made of ice thickness.

Biologists will take part in the First International BIOMASS Experiment (FIBEX) on the second voyage of the Nella Dan to Davis and Mawson. Other shipboard programmes will include the installation of two satellite beacons on icebergs, the deployment of glaciological drifting buoys from the Nella Dan, and meteorological observations. Oceanic soundings will be made on passage to Antarctic waters and the approaches to Casey (Thala Dan, Nanok S), Mawson (Nella Dan, Nanok S) and Davis (Nella Dan, Nanok S). Sea ice and iceberg observations will be made on all voyages, and bird and whale sightings will be recorded.

This year 77 men wintered at Australia's three Antarctic stations. There were 31 at Mawson, 21 at Davis, and 25 at Casey. Next year there will be 86 men, and one woman. Mawson will have 33, Davis 25, and Casey 29. The medical officer at Davis will be Dr Louise Halliday. Officers-in-charge will

be Messrs P. L. Butler (Mawson), G. H. J. Wantenaar (Davis), and B. J. Johnson (Casey).

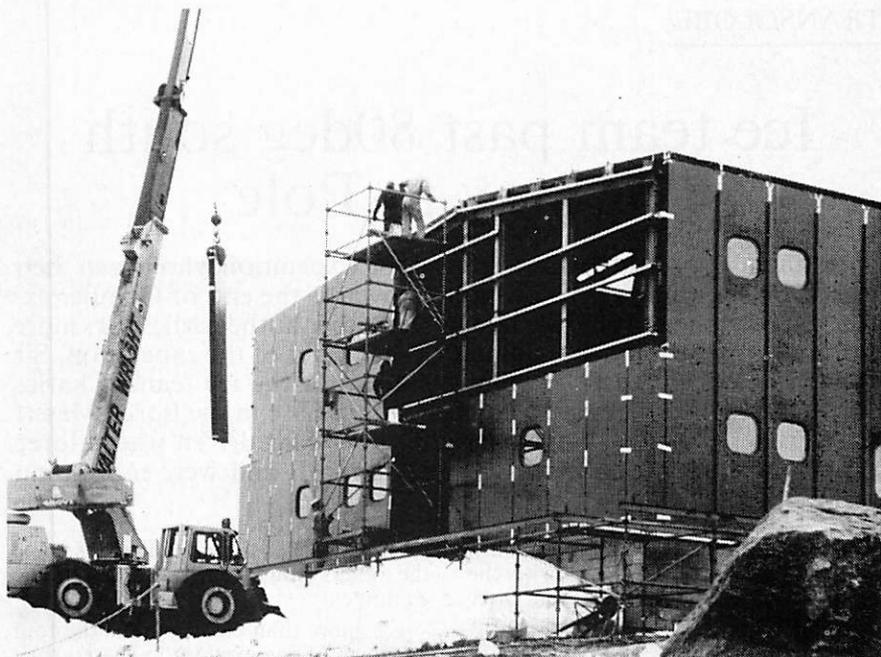
Once again the Nella Dan provided the main support for ANARE parties. In late October she relieved the winter party of 18 at the sub-Antarctic station on Macquarie Island, and last month left Melbourne on her first voyage with relief parties for Mawson and Davis. She carried three Hughes 500 helicopters for ice reconnaissance and the summer scientific programme in the Princess Elizabeth Land region.

SECOND VOYAGE

In the New Year the Nella Dan will return to Melbourne. She will leave on her second voyage, which is expected to be around 73 days, early in the month, and is due back in mid-March.

One voyage under sub-charter from Expeditions Polaires Francaises will be made by the Thala Dan. She will leave Melbourne early in January and call at Commonwealth Bay, Dumont d'Urville, and Casey. Early in February she will call at Macquarie Island to bring the summer party back to Melbourne. On her voyage she will carry two Bell 206 helicopters for ice reconnaissance and other logistics support.

This season the Danish ice-strengthened ship Nanok S has been chartered again to carry cargo to the three Antarctic stations. She will leave



One of the new buildings under construction at Mawson, the oldest of Australia's three Antarctic stations, which is being rebuilt. Work on the sleeping quarters and medical centre began early in 1979, and should be completed early in 1982.

Antarctic Division photo

Melbourne this month for Casey and Davis. On her second voyage in January she will call at Davis and Mawson and is due back at Melbourne in the second week of March. Two Hughes 500 helicopters will be carried on the first voyage for ice reconnaissance and other logistics support.

In addition to the science programmes at the three stations the Antarctic Division will continue the rebuilding programme which began in 1978, and is expected to be completed in 1990. The programme, under the control of the Antarctic Division and the Department of Housing and Construction includes the progressive replacement of all existing facilities at Mawson, Casey, and Davis.

EARLY FLIGHT

Fifteen construction workers, who will spend 15 months at Casey, arrived there nearly a month before the rest of the relief party. They were flown first from

Christchurch to McMurdo Station in a United States Air Force Starlifter, and then to Casey by a United States Navy ski-equipped Hercules on November 12. The party, included two botanists, one from the University of Melbourne, and the other from the Japanese National Institute of Polar Research.

Scientists from the Soviet Union, Japan, and the People's Republic of China, will take part in ANARE research programmes this season. A Soviet physicist will conduct auroral radar studies at Mawson this year, and his work will be continued by a colleague next year. The Japanese botanist will spend the summer at Casey, and a Chinese oceanographer and a geomorphologist will also do research at Casey. Later in the season the geomorphologist will move to Davis. Another Chinese oceanographer will take part in FIBEX aboard the Nella Dan.

TRANSGLOBE

Ice team past 80deg south on way to Pole

Three members of the British Transglobe Expedition who began their crossing of Antarctic by snowmobile towards the end of October expect to reach the South Pole late in December at the earliest or, more probably, by the middle of January. The leader of the expedition, Sir Ranulph Fiennes, and the other members of the ice team, Charles Burton and Oliver Shepard, left their winter base in the Borga Massif on October 29. By November 28 they had driven their three snowmobiles to 81deg 15min S/1deg 10min E and were more than halfway to the Pole.

Bad weather and the need to establish a major food and fuel depot with the support of the expedition's Twin Otter aircraft kept the ice team at 80deg S for more than a fortnight. A four-day storm caused another delay, but the three men were under way again by November 26.

By December 4 the ice team had reached 84deg 32min S/2deg 5min E, and was 607km from the Pole. Its progress had been slowed to 16km a day in an extensive field of sastrugi up to 2m high.

One of the two sledges being hauled by Charles Burton's snowmobile was damaged when it hit sastrugi. Supplies were loaded on to the remaining five sledges and the damaged sledge was left behind on the ice.

Early this year the expedition established its winter base in the Borga Massif at 72deg 38min S/2 deg 45min W, about 375km south of Sanae, the South African base on the Fimbul Ice Shelf. Borga, the small base used by South African geological field parties in past seasons is at 72deg 50min S/3deg 48min W.

Named Ryvingen after Mt Ryvingen (72deg 55min S/3deg 29min W) the expedition's base consists of three prefabricated insulated cardboard huts. One has been occupied during the winter by the ice team and Lady Fiennes, who is

responsible for communications, and the others house generators and radio equipment.

For more than eight months the four members of the expedition shared their isolation with Bothie, the long-haired Jack Russell terrier belonging to Lady Fiennes. Their frail hut was shaken by storms, temperatures dropped to minus 40deg Celsius, and then minus 45deg, and wind recordings ranged from 33 to 36 knots.

When the sun disappeared early in May the party experienced the full rigours of an Antarctic winter. Power cables were split by the intense cold, visibility outside the huts was reduced at times to just over a metre, and the sledges were buried under snow. To maintain the expedition's VLF whistler programme Lady Fiennes had to make her way to the radio hut regularly in darkness and driving snow.

SNOW CLEARING

In September Ryvingen was still hit by storms, and constant digging was needed to clear snow from the sledges and power cables. One task between storms was to remove .6m of winter snow from some 80 45-gallon drums of petrol, Antarctic diesel fuel and kerosene needed for the crossing to Scott Base. Another

task was to overhaul the seven snowmobiles — three for the departure for the Pole, three for emergencies, and one for the base camp.

Towards the end of October the winter party's isolation was relieved by the arrival of the Twin Otter aircraft with welcome mail and supplies. Captain Giles Kershaw and Flight Sergeant Gerry Nicholson had flown the aircraft from England to Fimbulisen, the base camp on the Fimbul Ice Shelf, 3.2km inland from Sanae, refuelling at the British Antarctic Survey bases, Rothera and Halley.

To prepare for the journey to the Pole the air support team began ferrying fuel and supplies from Fimbulisen to Ryvingen. Captain Kershaw and Sergeant Nicholson were assisted by Simon Grimes and Anthony Birkbeck, who had wintered at Fimbulisen to ensure that stored and equipment were not buried by snow and lost.

On October 29 Sir Ranulph Fiennes, Charles Burton, and Oliver Shepard left Ryvingen on the first stage of their crossing — 1448km along the polar meridian to the Amundsen-Scott South Pole Station. They made their way out of the Borga Massif down the Kirwan Escarpment, and then headed their light snowmobiles towing laden stainless steel sledges in the direction of 90deg S.

FASTER PACE

Once on the Polar Plateau the three men travelled faster than expected, and on October 31 had reached 74deg 32min S/2deg 26m W. They were at 75deg 12min S/1deg 50min W on November 2, 75deg 45min W on November 4, and 77deg 29min S/17min W on November 5.

In the first 10 days the team covered about 485km, battling against gales of up to 67 knots in driving snow with temperatures ranging from minus 24deg to minus 51deg C. Despite their heavily loaded sledges the snowmobiles, driven 10 hours a day, averaged 80km a day, and one day's run was 105km.

By November 7 when the team had laboured up a climb of 2000m on hard ice which offered little traction for the

snowmobiles, the gales had dropped. The three men sheltered to wait for an air drop of fuel and supplies by the Twin Otter from Ryvingen.

Although the party reached 79deg 12min S/40min W on November 9, having travelled 796km since leaving Ryvingen, and were able to drive on to 80deg S during the night, the terrain past 75deg S took its toll of both men and vehicles. Sastrugi 7cm to a metre high reduced the average daily run to 72km, and Sir Ranulph Fiennes and Charles Burton were jolted off their snowmobiles. At 77deg S Burton's snowmobile overturned twice.

RADIO CALL

Later the drive shaft of the leader's snowmobile was shattered. Lady Fiennes, back at Ryvingen, could not pick up the team's radio call because of severe atmospheric disturbances. But Captain Kershaw, on a flight to Fimbulisen, heard the call, and within two hours another snowmobile and more fuel and food had been flown to the ice team.

Four days after reaching 80deg S the ice team reported that it intended to remain there for 10 or 12 days, and planned to reach the Pole between Christmas and the New Year. The Twin Otter was to make 10 shuttle flights between Fimbulisen and Ryvingen with fuel and supplies for a depot at 80deg S.

On November 15 the party reported that there had been bad weather at 80deg S. for several days, and it was awaiting the Twin Otter's next flight. Because of the storm the party had no communication with its London headquarters until November 18, and radio contact with Ryvingen was lost for 60 hours.

Air support was delayed as the Twin Otter was grounded at Fimbulisen. But later on November 18 the party reported that the aircraft had managed to take off and was on its way to 80deg S.

By November 22 the ice team was still at 80deg S, and reported that a major depot would be established within four or five days. When it was resupplied the party would get under way again.

SCAR XVI

Antarctic resources and environment

A group of specialists which will study the environmental impact of mineral exploration and exploitation in the Antarctic was established by the Scientific Committee on Antarctic Research (SCAR) at its 16th meeting, which was held in Queenstown, New Zealand, from October 13 to 24. SCAR made this decision after it was asked by the 10th consultative meeting of the Antarctic Treaty nations to consider the scientific issues raised by the possibility of future exploration and exploitation.

SCAR XVI chose a group of eight specialists for their expertise in a range of scientific disciplines related to the Antarctic environment. The group will work for the next four years in co-operation with SCAR working groups to identify gaps in knowledge and proposed research programmes. Its purpose will be to estimate the status of the environment before any exploration and exploitation begin, and also to predict what environmental impact would result.

SCAR XVI was the first meeting to be held in New Zealand since 1961. It was attended by 77 representatives from 13 of the 14 SCAR member countries, and international unions of biological sciences, geodesy and geophysics, geological sciences, and the World Meteorological Organisation. Also present were an observer from the German Democratic Republic, and two from the People's Republic of China, which intends to develop an Antarctic research programme. Belgium was the only SCAR country not represented because of the death in September of its permanent delegate, Professor J. Van Mieghem.

Professor G. A. Knox welcomed the delegates as president of SCAR and chairman of the New Zealand National Committee for Antarctic Research, and on behalf of the host body, the Royal Society of New Zealand. He outlined the

issues to be discussed, among them the rapidly developing request for resource-related research.

"We have lived through the era of pioneer scientific exploration of Antarctica during which SCAR provided the inspiration for, and co-ordination of international scientific efforts in Antarctica," said Professor Knox. "We are now approaching an era in which economic, and consequently, political interests may tend to dominate Antarctic research activities.

RESOURCE PLANS

"There is also the danger within SCAR itself that concentration on the responses to requests from the Antarctic Treaty nations, and on large interdisciplinary research programmes designed to provide the scientific basis for resource management and assessment of environmental impact may be detrimental to the individual scientific disciplines as represented by the permanent working groups."

When New Zealand's Minister of Science and Technology (Mr W. F. Birch) officially welcomed the delegates, he emphasised the significance of Antarctica as one of the world's untouched, untapped, environmental resources. In the face of possible exploitation of both the living and the mineral resources there was a clear need for some sort of programme for international co-

operation. This, if unable to present entirely the exploitation of Antarctic resources, would at least provide machinery for scientific investigation of the various ecosystems.

SCAR's co-ordination of the 10-year BIOMASS programme in the Southern Ocean, which involves 13 of the member countries, was one of the main topics discussed by the delegates. They decided that it will be necessary to establish a BIOMASS data system to deal with the large volume of biological material collected.

There is a need also for a data centre for the programme, and SCAR hopes that it will be established by the Australian Government, which has expressed interest. The need to establish a BIOMASS secretariat was recognised by the delegates, and SCAR will look to member countries for financial contributions towards the cost.

Antarctica's contribution to the world climate programme planned by the World Meteorological Organisation and the International Council of Scientific Unions was considered by the meeting. It decided to co-operate in the programme, and set up a group of specialists on Antarctic climate research. The group has been asked to prepare a plan for the Antarctic countries' contribution to the programme.

ANOTHER MEMBER

SCAR XVI agreed to the admission of another country, the German Democratic Republic, which acceded to the Antarctic Treaty in 1974, and has been engaged in Antarctic research activities since 1959 as an associate in Soviet Antarctic expeditions. SCAR now has 15 members. Originally membership was confined to the 12 signatories of the Antarctic Treaty in 1959. Since then Poland and the Federal Republic of Germany have been admitted.

Two delegates who have had a long association with SCAR announced their retirement at the meeting. They were the French delegate and vice-president, 84-year-old Mr G. R. Laclavere, and the Australian Dr P. G. Law, who had held the position since 1966.

Mr Laclavere, who is regarded as the father of SCAR, was one of the founders of the organisation in 1958, and was its first president. To succeed him as vice-president the meeting elected the Argentine delegate, Captain R. M. Martinez Abal.

Dr Law, who has also retired as chairman of the Australian National Committee on Antarctic Research, has been associated with Antarctic research programmes for more than 30 years. He was the first director of the Australian Antarctic Division, and established Australia's first base on the Antarctic Continent at Mawson in 1954. His successor is Professor David Green, professor of geology, University of Tasmania, Hobart.

SCAR's next meeting will be held in 1982 in the Soviet Union, provisionally in Leningrad. The arrangement is subject to confirmation by the Soviet Academy of Sciences. Chile has extended an invitation for the 18th meeting to be held there in 1984.

Scott Base accident

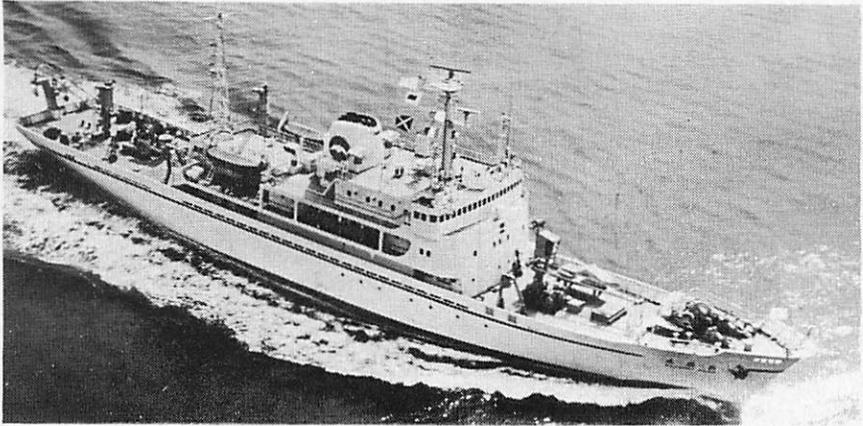
As assistant maintenance officer at Scott Base was hurt in a tractor accident on October 15. Mr S. Nickson, one of the summer staff, fell from a Caterpillar 920 loader he was driving and one wheel passed over his body.

Mr Nickson was bruised but suffered no injuries. He was flown back to Christchurch on October 16, admitted to hospital, and discharged the next day.

A New Zealand Army driver, Mr R. Cannon, flew south later in the month to replace Mr Nickson. He remained at Scott Base until Mr Nickson returned to duty this month.

No tropical fish

Movements of tropical fish will not relieve the monotony of next winter for New Zealanders at Scott Base. The dog handler, Allan Taylor, had planned to have an aquarium stocked with tropical fish installed this season, but because of the fuel situation only priority cargo could be flown south.



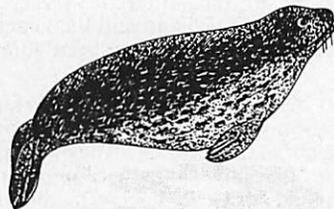
Bellingshausen Sea oil survey

A survey for geological indications of oil in the Bellingshausen Sea will be made by the Japanese Metal Mining Agency's geological survey ship Hakurei Maru (above) this season. The survey which is being carried out by the Japan National Oil Corporation for the National Agency of Natural Resources and Energy, is expected to be followed by similar surveys in the Weddell Sea in 1981 and the Ross Sea in 1982.

With a crew of 35 and 20 scientists from the National Oil Corporation and the Tokyo University Ocean Research Institute, the Hakurei Maru sailed from Funabashi, near Tokyo, on November 24. She will call at Wellington on December 10 to refuel, and will make the first leg of the survey between December 17 and January 8. Leaving Valparaiso on January 19 the ship will complete the survey between January 26 and February 8, returning to Wellington on February 22. She is due back at Funabashi on March 13.

In April the Japanese Government appropriated 530 million yen from the Budget for the survey to the Agency of Natural Resources and Energy, a division of the Ministry of International Trade and Industry, which commission-

ed the National Oil Corporation to do the work. The agency plans to ask for more funds for the Weddell Sea and Ross Sea surveys. Officials of the Ministry of International Trade and Industry expect approval of the application to be a mere formality.



JARE-22

Three Japanese ships in Antarctic waters

Three Japanese research ships will work in Antarctic waters this season. Two oceanographic research ships, the Kaiyo Maru and the Umitaka Maru, will take part in the First International BIOMASS Experiment (FIBEX) project from December, 1980 to February, 1981, and marine geophysical and geological surveys will be conducted by scientists aboard the Hakurei Maru during the same period.

Radio-echo soundings of the Antarctic ice sheet near the Yamato and Mizuho Mountains, and along the Soya Coast, and a search for meteorites on bare ice near the inland mountains, are among the projects of the 22nd Japanese Antarctic Research Expedition (JARE-22) this season. The programme will be conducted at Syowa Station and Mizuho Station, about 300km to the south-east on the inland ice sheet, and from the icebreaker Fuji.

A Pilatus Porter fixed wing aircraft owned by the National Institute of Polar Research will be operated at Syowa Station by a civilian crew from January, 1981 to January, 1982, except next winter. Trials will also be made this season of an experimental hovercraft, designed for ship to shore use, and inland transport in the Antarctic environment.

Built by the Mitsui Engineering and Shipbuilding Co., Ltd, the MV-PPO5A weighs 2.8 tonnes and carries a driver and a crew of two. Its payload is 600kg, and it has been designed to operate at a minimum temperature of minus 20deg Celsius, climb a three-degree slope, and cruise at 30 kmh a smooth surface in a 7ms head wind.

EXPEDITION LEADER

This season's programme was initiated on November 25 when 44 men of the JARE-22 winter and summer parties left Tokyo on board the Fuji. The leader of the expedition, and of the winter party of 34, is Professor Yoshio Yoshida. Dr

Hiroshi Fukunishi is the deputy leader of the summer party of 10, and the deputy leader for next winter is Dr Katsutada Kaminuma, who worked on Mt Erebus last season.

Under the command of Captain Shigeru Nei the Fuji called first at Fremantle, and is expected to reach the pack ice late this month. The transport of JARE-22 to Syowa by helicopters is expected to begin early next month, and the relief of the JARE-21 winter party will begin in February.

Upper atmosphere research will be continued at Syowa this season. The programme includes the reception of geophysical data from the scientific satellites ISIS I and II, TIROS-N, and NOAA-6, aurora and ionosphere studies, meteorological and seismological observations, gravity and aeromagnetic surveys, and tide observations.

Geological and geophysical surveys will be made on ice-free areas in the inland mountains, and along the Soya Coast, and a search for meteorites on bare ice areas near the inland mountains. Other projects include a radio-active survey, radio-echo soundings of the ice sheet near the inland mountains, and along the Soya Coast, and geomorphological and sedimentological surveys on the continental shelf of Lutzow-Holm Bay.

An environment survey will be made of chlorinated hydrocarbons and heavy metals, and a pollen analysis of snow and lake sediments. Other environmental science projects include limnological

studies of fresh and saline lakes, continuous measurement of atmospheric gases, and a population census of seals and penguins.

Scientists at Mizuho Station, which has been occupied continuously since May, 1976, will make meteorological observations and glaciological and geomagnetic studies from February, 1981 to January, 1982, and will also work on the Mizuho Plateau. Records of blowing snow will be made at the station, at 73deg 10min S/53deg 30min E, and at 69deg 50min S/47deg 40min E.

Micrometeorological observations will be made with sensors mounted on a 30m tower at Mizuho Station. These observations will also be made with sensors on a 10m tower carried on a snow vehicle in the Yamato Mountains area and at 73deg 10min S/53deg 30min E. Aerological soundings will be made in the same areas, and at Mizuho Mountains.

WEATHER STATIONS

Automatic weather recorders at four unmanned stations will provide information on temperatures, wind speeds, and solar radiation. These stations are at 69deg 02min S/40deg 04min E; 69deg 37min S/42deg 01min E; 71deg 16min S/46deg 30min E; and 71deg 46min S/48deg 55min E.

Samples of firn snow will be taken along the traverse routes between Syowa and Mizuho Stations. Other glaciological projects include photographic observations of sea ice and land ice from the Pilatus Porter aircraft, and the use of laser-radar equipment to obtain a surface micro-relief of the Mizuho Plateau.

Marine geological research, and surveys of krill and fish, will be carried out by the three ships which will make cruises in the Antarctic Treaty area this summer. The 1821-tonne geological survey ship *Hakurei Maru* will work between 60 and 71deg South and 70 and 100deg West, starting her first cruise from Wellington in the second week of December, and the second cruise from Valparaiso in the middle of January. She is expected back in Wellington about February 22 next year.

Built for the Japanese Metal Mining Agency, the *Hakurei Maru* has been in

service since 1974. She was designed to make geological surveys of mineral resources on and under the seabed. Last summer one month of her four-month cruise was spent studying sedimentary formations in Antarctic waters.

This season the *Hakurei Maru's* research programme will include a reflection seismic survey, depth sounding, sub-bottom profiling, and a sonar buoy refraction survey. Other projects are magnetometer and gravimeter surveys, measurements of terrestrial heat flow, and bottom sampling.

Leader of the research expedition, and chief scientist, is a geologist, Dr Yasafumi Ishiwada. He will lead a research staff of 17, the principal members of which are four geologists, Mr Kenchiko Yasukochi, Dr Hideo Kagami, Mr Seizo Nakao and Dr Katsuhiko Kimura, and a geochemist, Dr Shuji Sato.

A new krill research ship, the 2359-tonne *Kaiyo Maru*, which is operated by the Japanese Fishery Agency, will survey an area south of 63deg to the pack ice, and between 30deg and 85deg East. Seven scientists will be on board to carry out the national programme of fisheries and biological surveys, and also to take part in FIBEX.

After calling at Fremantle early this month the *Kaiyo Maru* will begin her Antarctic cruise from Cape Town early in January next year. She is expected back at Fremantle in the last week of February.

An acoustic survey of Antarctic krill is the main project in the research programme. Scientists will also make observations of oceanographic environments, the primary production, and the three-dimensional distribution of young and adult krill. Samples of the larval stages of krill will be taken, and visual observations of marine mammals and seabirds will be made.

Dr Yuzo Komaki, who is a biologist, will be the chief scientist in charge of research aboard the *Kaiyo Maru*. Other members of the staff are Dr Uno Shiro (chemistry and primary production), Dr Shozo Sawamoto (planktology), and Messrs. Mikio Naganobu (physical oceanography), Tsukasa Kikuno, Junishi

Sugai, and Yoichi Nakamura (biology). Several officers and members of the crew will support the survey and research from the Hakurei Maru.

An area between 45deg and 68deg South and from 120deg and 170deg East will be covered by the 1828-tonne Umitaka Maru, which is operated by the Tokyo University of Fisheries. After calling at Singapore she will sail from Fremantle towards the end of this month on her first cruise, and return to Melbourne on January 16. Her second cruise from Melbourne will end at Sydney on February 14.

A research staff of 18 headed by Professor Masaaki Murano, who is a biological oceanographer, will carry out 15 projects. These include temperature and salinity observations, water sampling for pollutants, measurements of solar and underwater irradiance, and the collection of particulates by a sediment trap.

Krill research will include measurement of primary production, and plankton and krill collections. Continuous sampling of krill will be made by fish pump, and other research will cover rearing experiments, assessment of krill stocks by fish finder, the collection of fish and squid by vertical long-line and angling, and visual observations of marine mammals and seabirds.

Most of the scientists are from the Tokyo University of Fisheries. There are eight biological oceanographers, Assistant Professor Yukuyo Yamaguchi and seven research assistants, Messrs. Hiroh Satoh, Susumu Segawa, Takashi Maruyama, Shigemi Suzuki, Yoichi Sasada, Mitsuo Kato, and Yoshiaki Shibata.

There are also four physical oceanographers, Professors Juichi Katoh and Satoshi Nishizawa, and two research assistants, Messrs. Tsutomu Morinaga, and Noboru Matsuura. The four chemical oceanographers are research assistants, Messrs. Eiichiro Tanoue, Naoji Fujita, Shinsuke Tanabe, and Masahide Kawano. There is one biologist, Mr Kazue Nakamura, chief curator of the Kanagawa Prefectural Museum.

Members of JARE-22 and their duties (surnames first) are:—

Summer staff aboard Fuji (1980-81) — Fukunishi Hiroshi, Dr., (upper atmosphere physicist), Kuramoto Sigeaki, (physical oceanographer), Koyama Kaoru, (chemical oceanographer), Nakajima Yasushi, Watanabe Kentaro, (marine biologists), Osakabe Masayuki, (surveyor), Hiroi Yoshikuni, Dr., (geologist) Kasuga Takashi, Dr., (geophysicist), Miyashita Yoshio, (construction engineer), Kuriki Shigeo (general assistant).

Winter Staff (1981-1982), Syowa and Mizuho Stations:— Yoshida Yoshio Professor, (geomorphologist), Kam-inuma Katsutada, Dr., (geophysicist), Tezuka Masaichi, Satou Motoyasu, Sakuma Kiyoshi, Mabuchi Kazuo, (meteorologists), Kurihara Noriyuki, Sato Natsuo, Seo Yoichi, (upper atmosphere physicists), Sakai Ryoki, (geophysicist), Inoue Jiro, Sato Kazuhide, Nishimura Hiroshi, (meteorologists), Moriwaki Kiichi, (geomorphologist), Sasaki Kiyotaka, Dr., (sedimentologist), Nagao Toshiyasu, (geophysicist), Sweda Tatsuo, (dendrologist), Hidaka Hideo, (geochemist), Takahashi Shigeo, Terasaki Masayoshi, Kamitani Norio, Sato Tadashi, Tomura Kiiti, (mechanics), Omomo Zenichiro, (radio engineer), Ishimura Akira, Takahashi Yuichi, (radio operators), Ishida Yukio, Mishima Hirofumi, (cooks), Tsuji Takahiko, Drs., Hayama Keiichi, (medical officers), Yamane Makoto, (pilot), Okumura Mutusi, (aircraft mechanic), Nakajuma Daisuke, Mashima Tamotu, (general assistants).

Four members of JARE-22 will take part in the United States research programme this season. Messrs Kei Terai (leader), Tetsuo Takanami, and Noboru Osada will make geophysical surveys of Mt Erebus in co-operation with United States and New Zealand scientists.

In addition the field team will help to instal several seismological recording stations on the flanks of the mountain to measure volcanic activity. Instruments will also be set up at Vanda Station for use in a survey of micro-seismicity patterns in the dry valley region.

BAS NEWS

Heavy pack ice affects early programme

Unusually severe ice conditions in the Scotia Sea and the northern part of the Weddell Sea prevented the early relief of seven of the 83 men who wintered at the five British Antarctic Survey main stations this year. In mid-September the ice conditions were the worst for many years, and the ice edge was 100 miles north of South Georgia.

Last season the seven men who worked on Signy Island in the South Orkneys had to remain there for the winter. They could not be picked up by the Royal Research Ship John Biscoe because of heavy pack ice. The John Biscoe returned to the area in mid-October this season — earlier than usual — but could not reach Signy to pick up the men, and returned to the Falkland Islands (Islas Malvinas) by way of South Georgia.

BAS began its summer programme on September 23 when the John Biscoe sailed from Southampton. She arrived at South Georgia a month later and called at Grytviken where 18 men wintered this year. Field huts were inspected, and a summer field party was landed on Bird Island.

When she returned to the Falkland Islands from her unsuccessful attempt to reach Signy Island the John Biscoe embarked men who were to be flown to the Damoy air facility on Wiencke Island, and then flown south to Rothera and southern field sites. By that time ice conditions were almost normal for the time of the year, but before the ship could sail south again she was diverted back to South Georgia to pick up a man with suspected appendicitis.

This task completed she once more set off from the Falklands for Damoy, but it was then found that her propeller was badly damaged, causing severe vibration, and she will have to be dry-docked for repairs. Because of this, the Bransfield had to undertake the run to Damoy while the John Biscoe proceeded to Montevideo.

It is still hoped that it will be possible for the John Biscoe to undertake this year's phase of the Offshore Biological Programme (OBP) as planned. The OBP

is a long-term programme to investigate the biology, environment and principal predators of krill, (*euphausia superba*) which forms the food base for the dense populations of seals and penguins in the Southern Ocean as well as the remnants of the baleen whale population.

KRILL MOVEMENTS

This programme includes a study of the occurrence and movements of krill and other important zooplankton, by means of net hauls and echograms, while measurements of the physical and chemical characteristics of the ocean at various depths are made with electronic probes. In February, the ship will join the First International Biomass Programme (FIBEX) investigating the distribution of krill.

FIBEX is part of the larger international BIOMASS programme the aim of which is to achieve a better understanding of the status of the Southern Ocean living resources. (Last year the commercial catch of krill amounted to about 130,000 tonnes).

Having completed her offshore work, the John Biscoe will return to the Falkland Islands to discharge the marine scientists. She will then support earth sciences research in the region of the Antarctic Peninsula before returning again

to Montevideo. Then she will sail for Southampton, where she is expected to arrive in April.

As in past seasons the R.R.S. Bransfield will be responsible for the major part of the relief of the five main stations. When she sailed from Southampton on October 23 she carried in addition to routine cargo a new two-storey building for Signy, an advanced ionospheric sounder (AIS) for Halley, and materials for rebuilding the BAS jetty at Grytviken. Passengers included builders who will erect and fit out the Signy hut, and a detachment of Royal Engineers who will work on the Grytviken jetty. This task will include diving and pile-driving in difficult conditions.

MAIN PROJECT

Installation of the AIS at Halley is by far the most important BAS project this season. The equipment is housed in a large insulated metal container, and consists of 250,000 worth of micro-processor and computer-controlled radar equipment. This has been specially purchased from the United States. The equipment is powered by its own diesel generators housed in a similar container.

AIS is designed to evaluate much more of the information contained in the radio signals reflected from the ionosphere than is possible with the older and much simpler ionospheric sounders. The initial studies will be directed towards the improved understanding of the trough, which is a low value of electron density occurring at night in high latitudes.

This trough lies at the foot of the plasmopause aligned along a line of force of the earth's magnetic field which extends 2,000 km from the earth's surface. The plasmopause is an imprudent boundary layer in the earth's ionised environment which was first discovered by studying the "whistler" phenomenon. This research is an important experiment which can be carried out only in regions which experience long periods of winter darkness. The results will have considerable relevance to radio communications as well as providing new insights of a fundamental scientific nature.

In mid-November the two Twin Otter aircraft left Canada for Rothera to begin ferrying summer field workers and replenishing depots.

AIRCRAFT DELAY

One arrived at Rothera on November 23 but the other was delayed at Punta Arenas with a mechanical fault and had to await the arrival of a spare part. On arrival the first aircraft reported that much of the west coast of the Antarctic Peninsula south to the Argentine Islands was clear of ice, so the Bransfield would be able to reach Damoy without difficulty. The aircraft will begin ferrying summer field-workers from Damoy and replenishing depots as soon as possible.

A party of geologists will be taken to James Ross Island to carry out a general reconnaissance, two ionosphericists will be flown to Halley to await the arrival of the AIS, and other groups will be taken to George VI Sound. Ice cores will be picked up from Glaciologists drilling in central Palmer Island and on an east coast ice rise and stored temporarily at Rothera. One aircraft will also spend two months carrying out radio echo ice-depth soundings.

Considerable assistance will be given to BAS, as usual, by the H.M.S. *Endurance*, the Royal Navy's ice patrol ship, and her helicopters in between hydrographic surveys. At the beginning of the season, vertical photography for seal censuses will be undertaken on South Georgia, and in the South Sandwich Islands.

In the New Year, support will be given to the geologists on James Ross Island, and to others who will be collecting samples from otherwise inaccessible localities on the west coast of the Antarctic Peninsula. Later priority will be given to the continuance of a general survey of the approaches to Marguerite Bay, and also the approaches to Rothera, within Marguerite Bay, where the Bransfield ran aground last season.

ICEBERG TILT

During the 1980-81 season the *Endurance's* helicopters will also assist a party from the Scott Polar Research Institute, and the Norwegian Polar Institute, to

install automatic equipment on an iceberg to monitor tilt and strain.

A former BAS ship, R.R.S. Shackleton, which is now operated by the research vessels services unit of the Natural Environment Research Council, will also operate in Antarctic waters again this year. Staff from the Department of Earth Sciences at the University of Birmingham will use the ship to continue work on their long-term Scotia Arc Project. The Shackleton is due to arrive at South Georgia in the middle of this month and will remain in the area for three months.

Preparations for summer activities were made by all stations in September and October. At Rothera, 700 drums of aviation fuel transported to the landing area 4.8 km inland at a height of 274 m, an airstrip was marked out and radio navigation beacons installed.

At Halley, routes down from the ice shelf to the sea ice, a few kilometres away, were reconnoitred in preparation for the Bransfield's arrival. A route to the 'low shelf', 64 km to the northeast, was also marked out in case, as has happened in some years, this proves to

be the nearest point at which unloading is possible.

PENGUIN COLONY

From September onwards, Halley men enjoyed recreational journeys to the local Emperor penguin colony. (It is estimated that there were 11,000-12,000 penguins present this year). The distance to the colony is increasing as the ice-shelf on which Halley is situated is moving westwards by about .8km a year, while the penguins return to precisely the same longitude.

Parties from Rothera travelled around northern Marguerite Bay and visited the Argentines 112 km away at San Martin. Two members of the Argentine team paid a return visit to Rothera. Journeys were also undertaken from Faraday, Signy and Grytviken.

At Signy, it had been predicted that a tame skua, "Red", which has frequented the station in past years, would arrive at 8.30 a.m. on October 13, but he was 10 minutes late. Another tame skua, "Fred", which has spent about nine summers at Faraday has not yet reappeared, but he does not usually arrive until November.

Japan and Argentina replace icebreakers

Japan will have a new icebreaker to replace the Fuji in the support of its Antarctic research expeditions by the summer of 1983. A contract for the ship's construction has been let to Nippon Kokan K.K., and it is planned to be delivered from the Tsumuri shipyard, Yokohama, in November, 1982. The total cost is estimated at 25 to 30 billion yen.

Designed to transport scientists and cargo to Syowa Station, and for research along the route to Antarctica, the new icebreaker has a displacement of 11,647 tonnes, compared with the Fuji's 7,760 tonnes. Her dimensions are: length: 134m, width, 28m, depth, 14.5m. With a cruising range of 25,000 nautical miles at 15 knots she will be capable of breaking level ice 1.5m thick at a speed of about three knots.

Like the Fuji the new icebreaker will carry three helicopters, two to transport cargo from ship to shore, and one for ice reconnaissance. She will be able to transport 1000 tonnes of cargo, and will have accommodation for 60 scientists and a crew of 174. Laboratories and equipment will be provided for research in upper atmosphere physics, earth science, oceanography, biology, and gravity data analysis.

Argentina's new icebreaker and supply ship *Almirante Irizar* has been in service since the 1979-80 season. She was built at Helsinki by the Finnish shipyard Wartsila, the contract price being \$US60,000,000.

Built to carry 80 passengers and a crew of 153 (including loading and unloading staff) the *Almirante Irizar* can do 16.5 knots in open water. Her tonnage is

14,000 tonnes, and her dimensions are: length, 119m, width 25m, depth 12.6m.

To reduce friction when navigating amid ice the Almirante Irizar is fitted with an air bubble system. She was designed to navigate at a fairly constant speed across winter icefields one metre thick, and to ram her way through floating ice five to six metres thick.

Astern the Almirante Irizar has a

hangar and platform for the operation of two Sikorsky SH-3 Sea King helicopters or similar aircraft. She also carries two 15-passenger hydrographic boats and two loading barges. Other facilities include laboratories for meteorological and oceanographic research, a hydrographic plotting room, a sewage treatment system, and a garbage and oil disposal burner.

Norwegian and British iceberg research

Scientists from the Norwegian Polar Institute and the Scott Polar Research Institute will participate in a joint iceberg research project in Antarctica this summer. The research will be conducted from H.M.S. Endurance, the Royal Navy's ice patrol ship, as part of a British expedition to the Scotia Arc area.

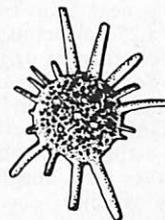
Three scientists will study icebergs to determine their response to waves and winds. They are Dr. Olav Orheim and Miss Monica Kristensen, of the Norwegian Polar Institute, and Dr. Peter Wadhams, of the Scott Polar Research Institute. Their studies will include short-term measurements on several icebergs, using various sophisticated instrumentation, and the placement on three icebergs of automatic recording stations which, for a year, will transmit various data on the icebergs' behaviour to satellites.

This project will continue the programme of iceberg research started by the 1978-79 Norwegian Antarctic Research Expedition during the second cruise of the Polarsirkel to Queen Maud Land and the Weddell Sea. Numerous icebergs were studied, and automatic stations were placed on eight of them. Last season two Norwegian scientists conducted iceberg research as part of the West German expedition aboard the Polarsirkel to the Weddell Sea and the Bouvet Island area.

As part of this season's research programme one Norwegian biologist will take part in the First International

BIOMASS Experiment (FIBEX) with the United States Antarctic research programme. He will work aboard the research ship Melville with scientists from the United States, Argentina, Australia, Chile, and Japan.

In the 1977-78 season a Norwegian field team led by Dr. Orheim planned to lower equipment through the access hole drilled through the Ross Ice Shelf to measure the mass balance and heat flow of sea water under the ice. This could not be done because of the closure of the access hole. The equipment, designed to transmit data to a tape recorder on the surface was placed in position in the 1978-79 season. It remained there last season, and will be recovered this summer in co-operation with the United States.



FIBEX 1980-81

Biological research in Southern Ocean

A fleet of 15 research ships and supply ships with research capability, backed by 13 member countries of the Scientific Committee on Antarctic Research, will participate this summer in the first co-ordinated international research programme to provide a sound basis for the wise management of the living resources of the Southern Ocean. Known as FIBEX, it will be the largest biological oceanographic programme yet mounted, and will concentrate on the study of krill.

FIBEX, the First International BIOMASS Experiment, is a major project in Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS), a 10-year programme initiated in 1976, and co-ordinated by SCAR. Its main scientific objective is the study of the krill population in their environment in the West Atlantic, and in two smaller areas in the Western Pacific. Krill is the largest under-exploited marine resource in the world, and the key species in the food web linking primary producers with ultimate consumers.

Between December and March ships of 11 nations will take part in a multi-disciplinary study of the Southern Ocean's marine ecosystem. Scientists aboard the ships will also study the distribution and biology of invertebrates, fish, birds, mammals, and plankton. At the same time ornithologists from seven to eight countries will take part in the first stage of the International Study of Antarctic Seabirds (ISAS), a programme which will continue until 1983.

In February next year FIBEX ships will carry out a 25-day acoustic survey of krill in the western part of the Atlantic sector of the Southern Ocean, and supporting parallel studies in the eastern Atlantic/Indian, and Pacific sectors. The aim is to estimate the abundance of krill in the survey area, and so determine the feasibility of echo surveys for krill stock assessment.

Accompanying observations of the acoustic survey will include, as far as possible, estimation of phytoplankton abundance, primary production, and sampling of krill, other zooplankton, and ichthyoplankton. Observations will also be made of the abundance and distribution of krill predators (birds, seals, and whales.)

PATCH STUDIES

After the acoustic survey middle and small-scale patch studies will be made of krill swarming behaviour. To make these studies ships will follow krill patches for seven to 10 days, and will use data from satellite-monitored drifting buoys to examine the relationship between krill drift and water movements.

FIBEX ships will also study fish population, and make oceanographic surveys to elucidate features of importance to krill distribution, behaviour, and life history. Short-based field and laboratory FIBEX projects will include studies of krill feeding behaviour and physiology, fish studies, bird and seal population dynamics and trophodynamics, and inshore studies of water column processes.

Nations which will take part in FIBEX or contribute to BIOMASS, their ships, working areas, and periods at sea are:—

Argentina:

Ship: Edwardo Holmberg
Area: South-west Atlantic
Period: January, February

Australia:

Ship: Nella Dan
Area: South Indian Ocean
Period: February

Chile:

Ship: Itsumi
Area: North of Atlantic Peninsula and Bransfield Strait.
Period: January, February

France:

Ship: Marion Dufresne
Area: South Indian Ocean
Period: January 25-March 6

Federal Republic of Germany

Ship I: Walther Herwig
Area: South-west Atlantic
Period: Leg 1, January 26-March 3;
leg 2, March-April 10

Ship II: Meteor

Area: South-west Atlantic
Period: November 20-March 10

Ship III: Polar Queen

Area: Weddell Sea
Period: January-March

Japan

Ship I: Kaiyo Maru
Area: South Indian Ocean (65 - 100 E and south of 62 S)

Period: About 20 days in (January) February

Area II: Scotia Sea
Period: About 14 days in January (February)

Ship II: Umitaka Maru
Area: Western Pacific (120 E — 180 E south of 55 S)

Period: January, February
Ship III: Yoshimo Maru (chartered trawler)

Area: Eastern Pacific, off Marie Byrd Land

Period: December to February

Ship IV: Fuji

Area: South-west Indian Ocean
Period: During relief voyages to Syowa Station

Poland:

Ship: Professor Siedlecki
Area: South-west Atlantic
Period: End of January to March 10

South Africa:

Ship: Agulhas
Area: South-west Indian Ocean
Period: February 5-28

United Kingdom

Ship: John Biscoe
Area: South Georgia
Period: Leg 1, December 27 to end of January; leg 2, February 1-25

United States

Ship: Melville

Area
(Leg 1): Drake Passage to Bouvet Island

Period: December

Legs

2 and 3: East of South Georgia

Periods: Leg 2, January 5-February 5;
leg 3, February 15-March 25

U.S.S.R.

Ship I: Odysee

Area: South-west Atlantic

Period: December to March

Ship II: Academic Knipovich. Krill studies and ecology as part of a national programme.

Area: Scotia Sea and western part of Lazarev Sea (20 to 30 W).

Three of the ships operating in Antarctic waters this season will contribute to the BIOMASS programme. They are the Fuji, and Academic Knipovich, and H.M.S. Endurance, the Royal Navy's ice patrol ship.

Butter Point justifies its name

There is still butter at Butter Point. Scott's first expedition left three tins there 77 years ago; last month a New Zealand field party found tins of butter perfectly preserved in snow and ice since 1957.

On November 17 two surveyors, Colin Fink and Gary Neale, and a field assistant, Bruce Garrick, were returning to Scott Base from New Harbour after

working on the western side of McMurdo Sound. They noticed what looked in the distance like a group of small penguins. When they drew closer they discovered a number of drums and cans protruding about a metre out of the ice.

Using ice axes the party chipped 23 years' accumulation of ice away and found tins of butter, wafer biscuits, dehydrated beetroot, canned peas,

golden syrup, Christmas hams, and about 200 blocks of chocolate. The three men made immediate inroads into the chocolate, and found that nothing had been lost in 23 years of natural refrigeration. If anything the chocolate was superior to the fresh chocolate of today's field rations.

All the food except the chocolate was taken to a nearby survival hut for the use of other field parties which might have to shelter there. The rest of the chocolate was brought back to Scott Base where it was sampled with equal enjoyment by the field party's colleagues.

Butter Point, which forms the south side of New Harbour, was named by the

party which ascended the Ferrar Glacier in 1903. Three tins of butter were left there on October 14 because the party hoped to obtain fresh seal meat on the return journey.

In 1957 Butter Point was considered as a site for Scott Base. A food depot was established there in January by a reconnaissance party from the New Zealand section of the Commonwealth Trans-Antarctic Expedition. After Scott Base had been built at Pram Point, about 70km away, the depot was restocked by a tractor party which made a spring journey to Butter Point in September.

West German research programme

West Germany's Antarctic research programme this season will be concentrated on the construction of its permanent station on the Filchner-Ronne Ice Shelf, and an extended expedition by the research vessel Meteor in the Scotia Sea and the northern Weddel Sea. Sixteen West German and 14 foreign institutions will take part in investigations of plankton, krill, and fish.

Apart from the crew of the research ship Polar Queen, which will carry materials for the new station, and the construction team, about 125 West German scientists and technicians will be engaged in scientific studies in Antarctica during the 1980-81 season. They will take part in the First International BIOMASS Experiment (FIBEX) to study the Antarctic ecosystem, and will work with Polish scientists at Arcowski Station in the South Shetlands, on South Georgia, and in the dry valleys of Victoria Land with the United States research programme. Other projects will be undertaken in co-operation with scientists from Argentina, Australia, New Zealand, Norway, and the United Kingdom.

In 1978 the Federal Republic of Germany decided to seek consultative status in Antarctic Treaty meetings. After it acceded to the treaty last year a

programme for substantial scientific research activities in Antarctica was prepared, and about DM380 million has since been allocated for the period ending in 1983.

Among the measures planned and their estimated costs are: construction of the research station (DM20 million) and a polar research and supply ship (DM185 million) and establishment of a polar research institute (DM40 million). The institute's operations are expected to cost DM28 million to DM30 million a year.

Last season a site for the research station was selected on the Filchner-Ronne Ice Shelf west of Berkner Island. It is 20km south off the edge of the ice shelf at 77deg 08min S/50deg 30 min W. To prepare for construction this season a field station was built to serve as a base for thorough exploration of the site. The expedition also made investigations in

the fields of marine biology, oceanography, glaciology, geodesy, and ice dynamics.

SNOW ENGINEERING

This season scientists from seven universities and other FRG scientific institutions will carry out a programme of glaciology and geophysics on the Filchner-Ronne Ice Shelf, and marine biological and oceanographic studies aboard the Polar Queen in the southern Weddell Sea. Projects include radio-echo soundings and seismic investigations, ice movements and deformation studies, meteorological and nivological investigations, snow engineering experiments, and the collection of trace elements. There will also be studies of micro-meteorites and cosmic dust from Antarctic ice probes, and magnetospheric VLF emissions.

West Germany's main contribution to marine research in the Southern Ocean this season will be made by the Meteor. The expedition, which began last month, will work in the Scotia Sea and the northern Weddell Sea until early March next year. Its studies of the Antarctic ecosystem will emphasise food web relations, and the interactions between krill and its food base, phytoplankton.

Scientists aboard the Meteor will study primary production, physical oceanography, marine chemistry, sedimentology and benthos, krill biology, plankton, and trace elements. The Meteor will also participate with the fisheries research vessel Walther Herwig in the krill patch study, which is part of FIBEX.

Between January and April next year the Walther Herwig will take part in the FIBEX acoustic survey and krill patch study in the central Scotia Sea, and scientists aboard will make observations of seabirds and mammals. The second leg of the ship's cruise will concentrate on the distribution and abundance of krill and fish in the Atlantic sector of Antarctica.

KRILL STOCKS

This co-operative venture of the Federal Institute for Fishery Research, Hamburg, and the Institute of Marine

Sciences, Kiel, will include investigations by marine biologists and fishery biologists into stocks and early life history of krill and fish, and food web relationships. Fishing gear and processing technology will also be studied.

During the Polar Queen's voyage to the Weddell Sea will carry on work related to the BIOMASS programme from January to March. They will study the distribution of krill and ichthyoplankton, survey seals in the Weddell Sea, and make pollution studies of seals.

Two FRG scientists will work on South Georgia next year with the support of the British Antarctic Survey. They will study herbivorous insects and their adaptation to plant nutrition in a cold environment.

On the other side of the continent three scientists will join United States field parties at work in the dry valleys of Victoria Land. They will investigate land forms and land-forming process, search for meteorites, and take part in a resource and radio-activity survey.

RESEARCH SHIP

In 1982 West Germany expects to have its polar research and supply ship completed. The contract was awarded in July this year to shipbuilding firms in Kiel and Rendsburg. With a length of 117m, a width of 25m, and a draught of 11m, the ship will be the biggest West German research vessel.

Designed for research in polar regions, and to supply the station on the Filchner-Ronne Ice Shelf, the ship will also be employed for experimental studies in the fields of shipbuilding, ice-breaking, and communication technology. It will be able to carry up to 1600 tonnes of supplies each year to maintain the research station.

Scientific equipment will include laboratories, workshops, and special devices for research in meteorology, geology, geophysics, oceanography, biology, and fishery science. There will be provision for two helicopters, and balloon launching.

In addition to the regular crew and the scientists and technicians on board the ship will be able to accommodate

another 26 persons for passage to the Antarctic research station. This will bring its total complement to 90 if necessary.

As part of the Antarctic research programme the polar research institute was established in July this year at Bremerhaven. It has been named after Professor Alfred Wegener, the German polar explorer, who won international fame as a geophysicist and meteorol-

ogist, and died on the Greenland ice in 1930.

There will be four departments in the institute for basic research in various fields of polar science, and one for technology and logistics. The institute's logistics functions will be to co-ordinate and support relevant scientific activities carried out by other institutions in the FRG. It is planned to staff the institute with about 45 scientists and 30 technicians and clerical workers.

Marine research by East German scientists

Reconnaissance surveys of the distribution pattern of Antarctic and sub-Antarctic fish and krill stocks are planned by East German marine biologists this season. Five scientists from the Institute for Deep-sea Fishery and Fish Processing will work in the sea areas of the South Orkney and South Shetland Islands, the northern Weddell Sea, and west of Graham Land. Other projects in the German Democratic Republic's Antarctic research programme include geological studies in the Pensacola Mountains with Soviet field expeditions.

East Germany, which acceded to the Antarctic Treaty in 1974, and was accepted as a member of the Scientific Committee on Antarctic Research this year, has been engaged in Antarctic research as far back as 1959 when a first group of scientists took part in the 5th Soviet Antarctic Expedition. Since then 98 GDR Scientists and technicians have taken part in Soviet expeditions, carrying out independent but fully integrated research in meteorology, geodesy, glaciology, geophysics, biology, isotope physics, and medicine.

This research has been carried out at Soviet stations which have been used as bases for investigations or starting points for field expeditions. Most of the work has been done at Mirny, Novolazarevskaya, Vostok, ¹Iolodezhnaya, and Druzhnaya. In 1979 GDR biologists began studies of birds and seals from Bellingshausen on King George Island in the South Shetlands.

For the last four years East Germany has had a partly self-sufficient winter

research base close to Novolazarevskaya, which can accommodate eight people. It was established during the 21st Soviet Antarctic Expedition, and opened on April 21, 1976.

GDR scientific programmes at the research base have included auroral and ionospheric studies, geomagnetic and meteorological observations, and the investigation of environmental isotopes. The geomagnetic and environmental isotope programmes will be continued from December, 1980 to December, 1981.

Marine biologists began their studies of various species of Antarctic and sub-Antarctic fish off South Georgia in 1977, and in the 1977-78 season extended their work to the South Orkneys. They also made their first investigations of the biology and the catch techniques of krill.

In 1979 the research was continued in the South Orkneys, and the waters off Joinville Island, Elephant Island, King George Island, and Livingston Island.

Early this year the main objects of study in the South Shetlands and the South Orkneys, and off Joinville Island, Bouvet Island, and Graham Land, were krill and six fish species. This season reconnaissance surveys are planned between January and May next year in the sea areas of the South Orkneys and South Shetlands, the northern Weddell Sea, and west of Graham Land.

Geological research began in 1974 when GDR scientists worked in the southern Prince Charles Mountains and on Reinbolt Island. In the 1977-78 season structural-geological field work was concentrated mainly in the Shackleton Range, and short visits were made to the Theron and Pensacola Mountains, Touchdown Hills, Whichaway Nunatakas, and the Dufek Massif, for sampling.

In the 1978-79 season geologists began

structural-geological field work in the Neptune Range, operating from a field station in the Pensacola Mountains. Last season the field work was continued with the mapping of tectonic and sedimentological features. This season GDR scientists based at Druzhnaya, the summer station on the Filchner Ice Shelf will continue their structural-geological studies in the Pensacola Mountains.

Last season GDR biologists began studies of birds and seals, working from Bellingshausen Station. The main work consisted of bird and seal counts, and 866 birds were banded with rings of the GDR ornithological station Hiddensee. The ecological relations between different bird species were also studied. This month the investigations will be continued until March, 1982, particularly in the Nelson Island and King George Island area.

Lyttelton and Antarctic ships

Lyttelton's role in early Antarctic exploration has been recognised by the placement of a plaque there which records that the New Zealand port was used by four ships as their main point of departure. The plaque was paid for by the Lyttelton Harbour Board and produced by the New Zealand National Historic Places Trust.

Several years ago Mr Clements Markham Colbeck, second son of William Colbeck, who wintered at Cape Adair in 1899 with the Southern Cross Expedition, and later commanded the Morning on her first voyage south, visited New Zealand. He came to Christchurch and wanted to visit the point of departure of his father's ship from Lyttelton on December 6, 1902.

After his visit Mr B. N. Norris, honorary curator of the Antarctic section of the Canterbury Museum, and curator of the Lyttelton Historical Museum, conceived the idea of a plaque to mark the association of expedition ships with the port. Difficulties in agreeing on a suitable text, and other factors, delayed the project for almost five years. One problem was that Port Chalmers was the final point of departure of the

Discovery and the Terra Nova.

But on October 8 this year the plaque was unveiled by Mr J. E. Mannering, chairman of the Lyttelton Harbour Board. One man who was unable to attend was Mr William Burton, of the crew of the Terra Nova, and now sole survivor of the expedition. The ceremony was attended by representatives of the Harbour Board, Lyttelton Borough Council, Historic Places Trust, New Zealand Antarctic Society, and the United States naval support force, Antarctica.

As the vessels of the three expeditions left from different wharves the plaque has been placed in a central position on a concrete pillar of the overhead bridge close to the end of No. 2 wharf from which the Morning sailed in 1902.

On the plaque the inscription records that during a decade of Antarctic exploration the Discovery, Morning, Nimrod, and Terra Nova, each less than 486 tons, used Lyttelton as the main point of departure. The departure dates are: Discovery (December 21, 1901), Morning (December 6, 1902), Nimrod (January 1, 1908), Terra Nova (November 26, 1910).

First Emperor penguin chicks hatched

Three Emperor penguin chicks, the first to have been bred and hatched outside the Antarctic Continent made their way into a Californian world in September this year. One arrived on September 16, and was followed by two more on September 20.

Sea World, of San Diego, has established, in conjunction with the United States National Science Foundation, an Antarctic penguin facility, the only one of its kind in the world, at the Hubbs-Sea World Research Institute. It houses 300 penguins, primarily Emperors and Adelies. They are maintained strictly for research and are not on public display, but Sea World plans to construct a polar exhibit within the next few years.

Five years ago Sea World began its project to establish a self-perpetuating colony of Antarctic penguins available for research all the year round. Long-term biological research in Antarctic is difficult because of the severe weather.

In 1975 Sea World transported 80 Adelies and 20 Emperors safely by air to California from McMurdo Sound, but all died from smoke inhalation in a fire which destroyed their quarantine building. Another 95 Adelies and 40 Emperors from Cape Crozier and the McMurdo Sound area all arrived safely in November, 1976. The last collection of 80 Adelies and 20 Emperors from the same area was flown to San Diego in November, 1977.

To accommodate these penguins 19,312km from their natural environment Sea World has constructed a building 10.3m by 25.2m where temperatures are maintained below freezing point. Every day 3628.7kg of flaked ice are produced to approximate the penguins' natural environment. Lighting in the unit is timed to simulate Antarctic light cycles; six months of darkness follow six of light, with the Southern Hemisphere winter coinciding with summer in the Northern Hemisphere.

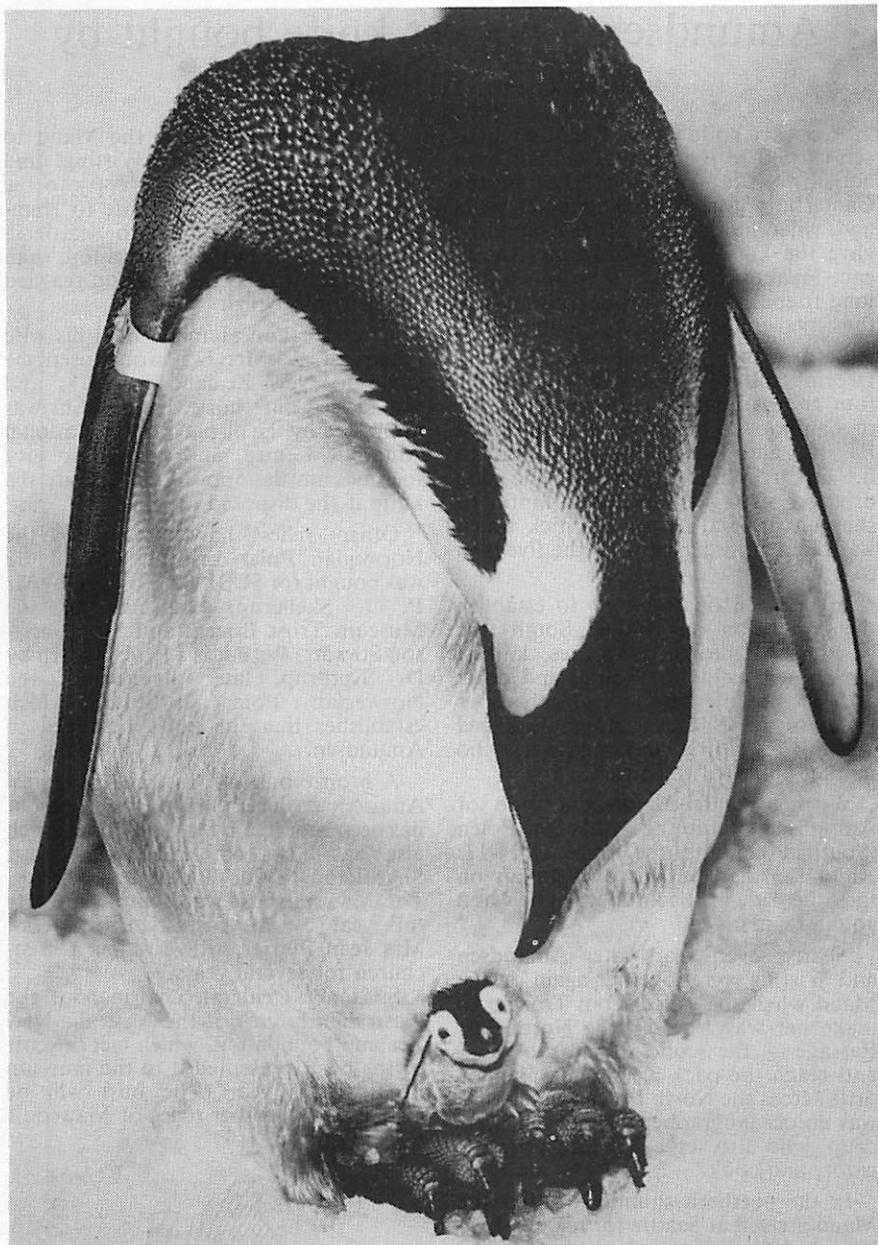
Parents of the three chicks are among 45 of the Emperors airlifted from McMurdo Sound in 1976 and 1977. Emperors are the largest of the 17 penguin species, weighing 36.2kg to 45.3kg, and standing up to 1.2m tall.

Unlike many birds, including some penguin species, Emperors do not build nests. The female lays a single egg in July at the start of the Antarctic winter. At Sea World as they would in Antarctica the females transferred the eggs to their mates who incubated them for 64 days under their warm abdominal folds.

During the incubation period the males were kept inside a special enclosure in the Sea World freezer unit. Females remained outside to imitate behaviour in Antarctica where, normally, they would return to the sea to feed during the two-month period. After the chicks hatched the mothers were reunited with the fathers.

Staff members at the penguin facility now have a unique opportunity to study little-known Emperor breeding and chick rearing behaviour. A video cameraman installed in the unit allows them to monitor the chicks' progress 24 hours a day. Mr Scott Drieschman, curator of birds at Sea World, expects the continual observation to reveal information on feeding frequency and duration, growth rates, chick-parent behaviour.

When the Emperors were collected they were believed to be sub-adult, about three to four years of age. They are now seven to eight years old, the age at which breeding begins. Studies of the Emperors are expected to provide information that will help to develop safeguards to protect the species.



Only days old, the first Emperor penguin chick ever to have been bred and hatched outside Antarctica peeps out from under the protective abdominal fold of its father in the Hubbs-Sea World Research Institute's Antarctic penguin facility at Mission Bay, San Diego.

Amundsen's pocket knife bought by N.Z. museum

A pocket knife which Roald Amundsen carried to the South Pole has been added to the Antarctic relics in the Canterbury Museum. Nearly 60 years ago, when he was in Seattle, Amundsen gave the knife to a Norwegian-American, Haakon Hammer, who was a life-long friend, and had explored islands of the Spitsbergen archipelago in the 1920s.

Before they reached the Pole on December 14, 1911, Amundsen and his four companions lashed together a pair of bamboo ski sticks as an improvised flagstaff and bent the Norwegian flag to it. Oskar Wisting, one of the dog drivers, used Amundsen's knife to sharpen the end of the ski stick which was planted in the snow by the five men together.

In between observations to establish their position at 90deg South the Norwegians scratched watches, knives, Amundsen's old briar pipe, and other articles with the date and place as souvenirs of the Pole. Amundsen described Wisting as a first-class engraver, who marked many of the articles.

Wisting scratched on one side of Amundsen's knife the words Syd Polen (South Pole) and the date, 12-14-11. Amundsen had put his own initials on the other side of the knife when he was a young seaman.

Nearly seven years later Amundsen and Wisting were together again on the Maud when she sailed from Tromsø to make her way through the North-East Passage — the second ship to do so — and reach the pack ice for the planned drift across the North Pole. Also aboard was an oceanographer, Dr Harald Sverdrup, who also served as seaman, navigator, and cook.

In the northern summer of 1921 the Maud arrived at Seattle for repairs, having spent three winters locked in the ice, and broken her propeller. Amundsen returned to Norway to obtain additional funds for the drift experiment. With Wisting in command the Maud left Seattle in June, 1922, to resume her drift.

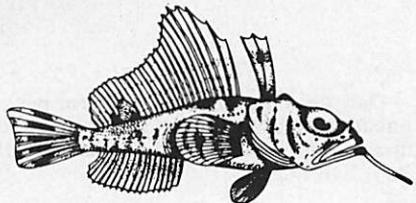
Before Amundsen left the Maud to finish her voyage under Wisting, and concentrated on his plans to fly to the North Pole, he gave his knife to Hammer. The Maud returned to Seattle in October, 1925, having spent more than three years in the pack ice, and reached 76deg 51min North.

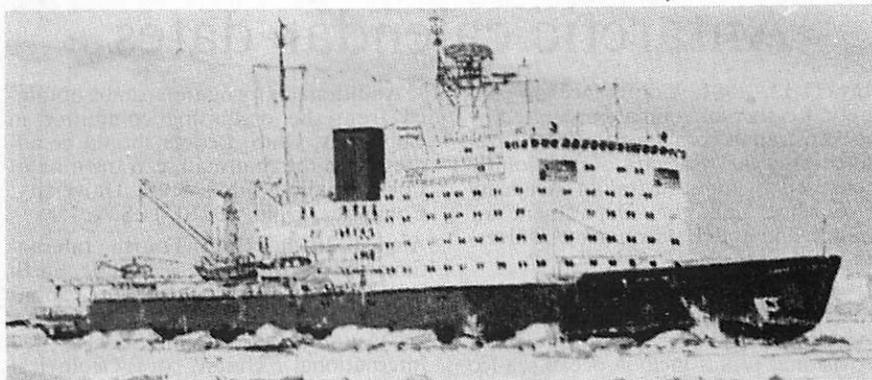
After Haakon Hammer died his wife remarried. As Mrs J. F. von Rosen she came to New Zealand in 1978, and visited the Canterbury Museum. She was impressed by the displays in the National Antarctic Centre, and decided to give the museum the opportunity to buy the knife if she disposed of it.

Other relics have gone to the Norwegian Polar Institute. The knife was bought for \$US1000 provided by Mr P. J. Skellerup, chairman of the Museum Trust Board, and Sir Robertson Stewart. With it is a letter written by Dr Sverdrup, later director of the Norwegian Polar Institute, which establishes that the knife belonged to Amundsen.

A bronze bust of Australia's greatest Antarctic explorer, Sir Douglas Mawson, has been acquired by the museum, which also has busts of Amundsen, Scott, Shackleton, Byrd, Fuchs, and Hillary. The Mawson bust was completed early this year by an Australian sculptress, Mrs Jean Perrier, who lived in Christchurch for several years.

Sir Peter Denham, chairman of the Australian branch of the Australia-New Zealand Foundation, which met the cost of the bust, presented it to the museum in July this year. The bust will be displayed with other relics of Mawson's expeditions.





Argentina's new icebreaker and supply ship Almirante Irizar which replaced the General San Martin in the 1979-80 season.

Shackleton's motor-sledge now has both its engines

After 67 years the motor-sledge built for Shackleton's Imperial Trans-Antarctic Expedition, 1914-17, now has both its four-stroke two-cylinder Coventry-Simplex engines — the original and the spare. The sledge, part of the Ross Sea Party's equipment, was left behind at Cape Evans in 1917, and was brought back to New Zealand in 1957. But it has taken another 23 years for the two engines to be reunited with the sledge in the Canterbury Museum.

In 1913 the sledge was shipped to Australia, and was aboard the Aurora when she arrived off Cape Evans on January 16, 1915. It was unloaded before the Aurora was blown out to sea by a gale on May 16, 1915.

With equipment for the Ross Sea Party, including the spare sledge engine, the Aurora became locked in the ice until February 13, 1916. She reached Port Chalmers on April 3, 1916, and returned to McMurdo Sound on January 1, 1917, to pick up the surviving members of the Ross Sea Party.

In 1957 a party from H.M.N.Z.S. Endeavour, the Royal New Zealand Navy's first Antarctic supply ship, brought the motor-sledge back to New Zealand. It had performed with little

success in Antarctic conditions.

Thirteen years later Mr. G. W. Nation, storekeeper at Scott Base for the 1970-71 season, made a caretaker trip to Scott's hut at Cape Evans, collected the original sledge engine, and brought it back to the base where it was crated for return to New Zealand. The Antarctic Division, Department of Scientific and Industrial Research, had it shipped back early in 1971.

During the Aurora's stay at Port Chalmers the spare engine was acquired by a local resident, Mr. Thompson, and is believed to have been used as a stationary engine. Mr. Thompson moved to Christchurch and brought the engine with him. About 10 years ago a city garage owner, Mr. J. Gobbe, acquired the engine from Mr. Thompson's grandson.

Now Mr. Gobbe has decided to restore the engine, still in remarkably good condition for its age, before he gives it to the Canterbury Museum. He has to make new bushes, bearings, and gaskets, but is confident he can put the old engine back in full working order.

Reference: "Antarctic," March, 1971, Page 33.

Antarctic calendar dates

May 11-13, 1981. Conference on Antarctic weather and climate organised by the Australian branch of the Royal Meteorological Society, and jointly sponsored by the Australian Academy of Science and the Department of Science and the Environment, University of Melbourne.

Papers are invited on aspects of the observation, analysis or modelling of the environment of high southern latitudes. Provisional topics include ocean-sea-ice interaction, boundary layer and tropospheric processes, general circulation and climate, atmospheric chemistry, and precipitation.

Additional information can be obtained by writing to the Antarctic Conference Chairman. The address is Department of Meteorology, School of Earth Science, University of Melbourne, Parkville, Victoria 3052, Australia.

September 7-12, 1981. To accommodate the changed calendar of Ohio State University and some preferences by participants, the dates of the Third International Symposium on Antarctic Glaciology have been changed to September 7-12, 1981. This symposium was to have been held at Ohio State University from August 31 to September 4.

Additional information can be obtained from the organising committee in Columbus, Ohio. Letters should be addressed to the chairman, c/o Institute of Polar Studies, Ohio State University, Columbus, Ohio, 43210, U.S.A.

August 16-20, 1982. Fourth International Symposium on Antarctic Earth Sciences, University of Adelaide. Sponsors to date are the Scientific Committee on Antarctic Research (SCAR), the International Union of Geological Sciences (IUGS), the Australian Academy of Science, Geological Society of Australia, and University of Adelaide.

Previous conferences have been held at seven-year intervals in Cape Town (1963), Oslo (1970), and Madison (1977). The Adelaide conference has been brought forward to 1982, which is the centenary of the birth of Sir Douglas Mawson, professor of geology, University of Adelaide, from 1921 to 1952.

All aspects of Antarctic earth sciences will be discussed at the symposium. Scientists interested in attending can obtain additional information by writing to Dr J. B. Jago, School of Applied Geology, South Australian Institute of Technology, P.O. Box 1, Ingle Farm, South Australia 5098, Australia.

ADVERTISING RATES

Advertising rates for "Antarctica", which is published four times a year in March, June, September, and December are:—

Whole page:	180 x 115mm	NZ\$100
Half page:	180 x 57.5mm or 90 x 115mm	NZ\$50
Quarter page:	90 x 57.5mm	NZ\$25

These rates can be reduced by negotiation for standing orders of three issues or more.

All advertising inquiries should be addressed to the Treasurer, New Zealand Antarctic Society, P.O. Box 1223, Christchurch 5, New Zealand.

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.

New Zealand Secretary: P.O. Box 1223, Christchurch

Branch Secretaries: Canterbury: P.O. Box 404, Christchurch.
Wellington: P.O. Box 2110, Wellington.

