

# ANTARCTIC

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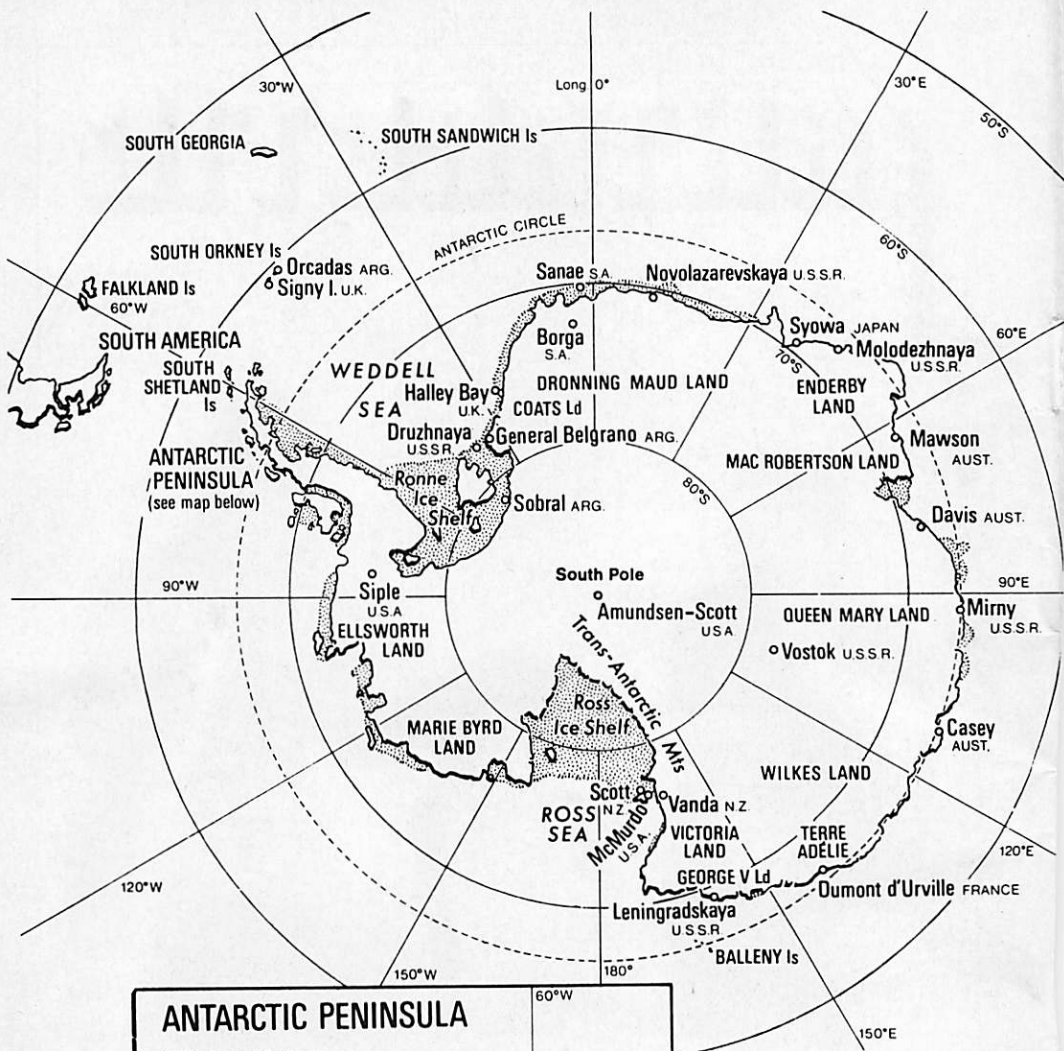
This Adelie penguin on the ice near the Scott Base pressure ridges is an Antarctic interloper. A dummy, made in Japan, is one of two used by a Japanese biologist, Dr Stephen Aoyanagi, in studies this summer of the voice patterns of real Adelies in the Cape Bird rookery on Ross Island. With the dummy, named Ohsuke, are Mr Yasuomi Tamiya (left) and Dr Aoyanagi.

Antarctic Division photo

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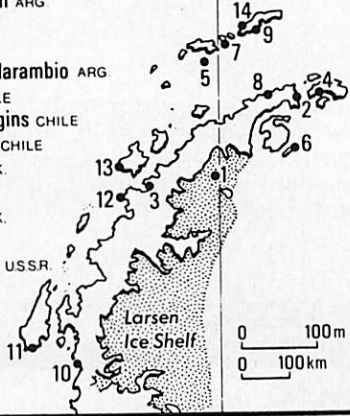
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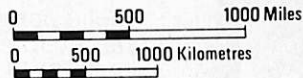


## ANTARCTIC PENINSULA

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



## ANTARCTICA



### ABBREVIATIONS

ARG ARGENTINA  
 AUST. AUSTRALIA  
 NZ NEW ZEALAND  
 S.A. SOUTH AFRICA  
 UK UNITED KINGDOM  
 USA UNITED STATES OF AMERICA  
 U.S.S.R. UNION OF SOVIET SOCIALIST  
 REPUBLICS

# ANTARCTIC

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# NEW ZEALAND FIELD WORK BEGINS

New Zealand's Antarctic research programme for 1978-79 began officially on October 7 when the first party arrived to relieve the winter team of 11 men at Scott Base, and to initiate a wide range of scientific projects. By the middle of this month the first part of the programme was in full swing. In the first two months of the new season, New Zealand field parties or summer support staff were transported by United States Navy Hercules aircraft and helicopters to the dry valleys of Victoria Land, the Darwin and Byrd Glaciers, Cape Bird, on Ross Island, and to remote field camp far away in Marie Byrd Land.

This summer some 120 New Zealand scientists are engaged in research projects in the Ross Dependency. New Zealanders are working with United States scientists in the Darwin Mountains, and at Scott Base and McMurdo Station. They are also working with French and American scientists on Mt. Erebus, with Japanese at Cape Bird and in the dry valleys, and with West German geologists for the first time. Five of the seven women in the project are engaged in scientific projects or providing field support for them.

Early this month the Royal New Zealand Air Force completed 12 flights, three more than last season, using Hercules wheeled aircraft, to provide logistic support for the New Zealand and United States programme. This is the 14th season that the R.N.Z.A.F. has carried passengers and cargo between New Zealand and Antarctica. Last month its Hercules aircraft transported additional building materials south to enable the Scott Base reconstruction programme to proceed during the early summer months.

After the completion early in September of the seven flights made by United States Navy VXE-6 Squadron aircraft to prepare for the new season, and the excitement of mail, fresh food, and few faces, from New Zealand, the winter team at Scott Base settled down to

prepare for the first wave of the summer invasion. Spring tasks, made easier by the return of the sun and ever-increasing hours of daylight, included the transport of a wannigan 26km across the ice to White Island, and a survey of ice conditions in McMurdo Sound between Scott Base and Marble Point.

## NEW RESIDENTS

When the last spring flight ended there were two new residents at Scott Base. They were Ron Garrick, base carpenter this summer, whose first task was to complete the new biology laboratory building, and Tas Carryer, who made an early start on the first stage of the University of Canterbury expedition's study of the Weddell seal population at White Island.

During September Tas Carryer and two members of the winter team, Mike Lord and Randy Waller, spent a week at White Island. Their purpose was to attempt to prove whether the White Island seals wintered in isolation. The party found open water round the island, but was able to record seal noises, using hydrophones through a hole in the ice.

New Zealand's summer programme began as soon as the three New Zealanders on the first flight of the season by a United States Air Force



Starlifter reached Scott base on October 7. They were Mr R.B. Thomson, superintendent of the Antarctic Division, Mr J.R. Presland, officer-in-charge for the 1978-79 season, and leader of next winter's team, and Professor A.J.W. Taylor, professor of clinical psychology, Victoria University of Wellington, back for the 11th time as a "first footer" to continue his studies of the winter teams.

On October 11 the 10 New Zealanders and one Australian who have wintered at Scott Base received a special farewell from the weather. With a temperature of minus 30deg Celsius, and a 30 knot wind the leader, John Lythgoe hauled down his New Zealand flag which had flown at the base since February 6, and handed over to John Presland. His final task in the Antarctic earned him a frostbitten nose. By the third week of 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.

### FIRST PARTY

On October 21, the first field party of the season was flown by United States Navy helicopter to a camp located at the snout of the Taylor Glacier. There Paul Robinson, a Victoria University of Wellington, geologist, continued his study of the glacier to work out how the rock debris became incorporated in the basal ice. With him was an Antarctic Division field assistant, Stewart Ross.

This is the fifth summer Paul Robinson has worked on the Victoria University programme of glacial sediment studies. In October and last month he continued these studies in the Upper Wright and Upper Victoria Glaciers. Soon after the field party established its camp it discovered a sizeable saline stream flowing out of the Taylor Valley. This stream was investigated by a Victoria University geochemist, J.R. (Harry) Keys, who is working with the Ohio State University team in the United States programme this season.

Later the party searched along the coast between the Koettlitz and Mackay Glaciers for layers of basal debris similar

to those in the Taylor Glacier. Then Paul Robinson joined another geologist, Dr Peter Barrett, and Philip Bentley, a VUW field assistant, for a programme of sampling the sea floor in New Harbour and Granite Harbour to find possible drill sites for future McMurdo Sound sediment and tectonic studies.

Vanda Station in the Wright Valley was opened on October 26. Its population of four, including the leader, Mr Brian Doughty, was soon increased by the arrival of Ministry of Works and Development hydrologists, Ian Halstead, Royd Cumming, Andrew Woods, and Lloyd Smith, who flew from Scott Base to start this summer's monitoring of selected dry valley glaciers, the flow of the Onyx River, and the levels of Lake Vanda and other major dry valley lakes. They were assisted by two Lands and Survey Department surveyors, Nigel Nalder and Colin Fink.

Towards the end of the month members of the 3rd Field Squadron, Royal New Zealand Engineers, began work on the second stage of the five-year programme for the rebuilding of Scott Base. Their task was to erect a new powerhouse where a Ministry of Works team will install two 135kw generators and the mechanical and electrical services to provide heat, light, and power for the base.

For a start the engineers had to work in temperatures of minus 24deg Celsius and in winds of up to 20 knots. They also encountered extremely hard finers of lava running through the site. In preparation for the drilling of 74 holes to a depth of one metre in the permafrost they had to move about 100 cubic metres of snow and rock.

But the outer foundations were completed last month in readiness to take the prefabricated building 14.9m long, 7.4m wide, and 4m wide. Seven tonnes of steel and 18 tonnes of wall and roof cladding were flown south at the beginning of last month, and the generators and boilers will be shipped early in January. Present plans are for the power plant, costing \$500,000, to be operational by the end of the season in February.

Studies of the isolated Weddell Seal population at White Island by University of Canterbury biologists began on October 30 when three members of the team, Tas Carryer (field leader), Michael Summerlee and Jennifer Bassett (research assistants) left Scott Base. The seal population has been studied by the university zoology department since the 1964-65 season, but in the last three seasons the programme has been expanded, and this summer a more intensive study is being made into the background ecology and productivity of the area which supports the seals.

This change in emphasis has occurred because studies have revealed three interesting features about the White Island seal population. All the individual seals tagged there have not turned up elsewhere, the seals are very large and healthy in comparison with other McMurdo Sound seals, and the population is stable.

Until the end of January the research team will continue the study of food chain dynamics of the under-ice ecosystem as well as monitoring seal movements. The primary production and seasonal succession of the tide crack community are also being studied.

Four additional members of the research team, which is directed by Professor George Knox, arrived at White Island in the middle of last month. During his stay Professor Knox, accompanied by Tas Carryer, made a helicopter survey of Heald and Hahn Islands to find out if seal populations existed there in conditions similar to those at White Island. The other members of the team were Dr Laurence Greenfield, of the botany department, who completed a study of the biomass of the microbial population early this month, and Graham Sandlant and Charlotte Holmes.

### POLE RELIEF

In the first week of November the men and women at Scott Base said hullo and goodbye to their southernmost colleagues — John Waller and Kevin Bisset, who ended a year at the Amundsen-Scott South Pole Station when the first relief

aircraft arrived from McMurdo Station on November 1. From that date the meteorological programme at Pole Station, which has been carried out by the New Zealand Meteorological Service for three years, has been resumed by the United States Navy.

Like their colleagues of the winter team 1327km to the north the two New Zealanders welcomed the return of the sun late on the evening of September 20. But the promise of warmth to come in the last six weeks of their isolation was not matched by the temperatures. In the middle of the month the temperature dropped below minus 73.3deg C on three consecutive days, and on the warmest day it rose to only minus 55deg. Then the coldest day of the year arrived early on the morning of September 18 when the temperature dropped to minus 78deg or minus 108.4deg Fahrenheit.

### GLACIAL HISTORY

Early in November Scott Base was a hive of activity when the field parties began to move out to the Darwin Mountains, Marie Byrd Land, and the Canada, Commonwealth, and Taylor Glaciers. Eight scientists from Waikato University, Victoria University of Wellington, and the Soil Bureau, and an Antarctic Division field staff of four were flown to the Darwin Mountains, 325km from Scott Base, by United States Navy Hercules aircraft, to work with United States scientists in studies of the glacial history of the area.

Waikato University's party, led by Dr Michael Selby (geomorphologist) had two main objectives. One was to study the glacial history of the area; the other was to study the slopes upon different lithologies in relation to rock strength and joint spacing. The other members of the party were Peter Kamp (sedimentologist), David Lowe (geochemist) and Craig Law (petrologist).

In addition to these studies the party's programme included mapping the geology of the Britannia Range. Much of this work will be done in the Waikato Basin, a little-known part of the area where a Waikato field party worked in



Antarctic Division photo

Members of the University of Canterbury biological research unit ready to leave Scott Base on their 26km journey to White Island to study an isolated colony of Weddell seals. Michael Summerlee (research assistant) is on the left and Tas Carryer (field leader) on the right.

the 1974-75 season. To carry out the whole programme the party will also make a 70km journey down the Hather-ton Glacier, man-hauling a 226kg sledge, and using three food and fuel dumps set up on the way.

Two geologists from Victoria University of Wellington, John Anderson and Chris Burgess, are working with the international project in another area. Their geological studies are being made south of the Byrd Glacier.

Dr Graham Claridge, who began a programme of Antarctic soil studies in 1959, and Iain Campbell, also of the Soil Bureau, D.S.I.R., spent two weeks in the Darwin Mountains last month. They studied nitrates in soil formation found on some of the nunataks at the head of the Darwin Glacier.

#### FIELD SAFETY

Four New Zealanders are responsible for the field safety of more than 50 scientists who are taking part in the

Darwin Mountains international project. The co-ordinator is an Antarctic Division field leader, Bill King, who was with the Waikato University expedition to the Darwin Mountains in the 1974-75 season. With him are three other members of the field staff, Peter Radcliffe (field leader), Peter King and Wilf Lammerink (field assistants).

One of the most remote field parties in the New Zealand programme left Scott Base early last month to work in the southern Edsel Ford Ranges of western Marie Byrd Land, which are about 1500km from McMurdo Station. Members of the Geological Survey's expedition, which is led by Dr Peter Andrews, of the Geological Survey, are



Dr John Bradshaw, of the University of Canterbury geology department, Dr Chris Adams, of the Institute of Nuclear Sciences, and Peter Braddock, an Antarctic Division field assistant-mechanic.

A United States Hercules aircraft put the expedition with its motor toboggans and sledges in at a site (76deg 54min S/144deg 12min W) near the 1966-67 Marie Byrd land survey camp used by United States scientists. Bad weather since the expedition was put in on November 10 has seriously restricted its comparative study of the geology of the area with southern and Western New Zealand.

Another field party closer to home which completed its work last month was from the Physics and Engineering Laboratory. Bill Robinson, Allan Tucker, and Tim Haskell, aided by a field assistant, Annette Richards, began their studies of the physical properties of snow and ice early in the month when they took ice samples on the Erebus Ice Tongue, Ross Island. Later the team made measurements of ice at Lake Vanda, and also examined ice on the Canada, Commonwealth, and Taylor Glaciers, and in Windless Bight. One scientist, Bill Robinson, will return to the Antarctic in January to do an additional week's sampling.

### COAL MEASURES

One Victoria University of Wellington party has been in south Victoria Land since early November continuing studies of the Beacon Sandstone made in previous seasons. Andrew Pyne, a geologist, and a VUW field assistant, Chris Mroczek, are engaged in a study of the sedimentology of the Weller Coal Measures, a Beacon Sandstone formation interbedded with thin bituminous coals, and as assessment of the coal in the strata at the heads of the dry valleys.

Dr Christ Christoffel, leader of the party, and his field assistant, Peter Garden, have been working at Mt Bastion, where they have collected samples from Devonian and Permian-Triassic Beacon Sandstone for paleo-

magnetic measurements to establish a polar wander curve for south Victoria Land. Mt Bastion has the thickest and most complete section through the Permian and Triassic part of the Beacon Sandstone, and the Weller Coal Measures are well-exposed.

From Mt Bastion the coal measures team will move to Mt Fleming. There the Weller Coal Measures formation is extensively exposed, and the sequence contains beds of sub-bituminous coal up to 7m thick, the thickest known coal measures in south Victoria Land.

Towards the end of last month, a party of New Zealand and Japanese scientists left Scott Base to begin biological studies at Cape Bird. With Graham Wilson, of the University of Canterbury zoology department, and Dr Frank Austin, of the University of Otago microbiology department, were Dr Stephen Aoyanagi, who teaches biology at the National School for the Blind in Tokyo, and Yasuomi Tamiya, who is studying for a doctorate.

### "PENGUISH" STUDY

Dr Aoyanagi took with him two dummy penguins named Akiko and Ohsuke after his children, which he is using in his studies of the voice patterns of the Adelie penguins in the Cape Bird rookery. He studied Adelie penguins at Syowa Station when he was there in 1971-72 season, and his interest in the voices of penguins or "penguish" as he calls it came from playing tapes of penguin sounds to his blind students.

His colleague, Mr Tamiya, is working with penguins for the first time. The similarity of the nest and colony distribution of penguins and ants has directed his attention to Adelies. He will map several colonies, marking all individuals and their nests, and also observe the hatching success and mortality rate of chicks.

Graham Wilson, who collected ectoparasites from penguins last season, and also studied leopard seal behaviour, and made the annual penguin and skua census, is studying killer whales this



summer, monitoring their fin shapes in an attempt to relate them to sex, body size, and maturity. He is also making observations of leopard seals and visiting sea birds such as snow petrels.

Recording of banded birds, and the penguin and skua census, are also part of the summer programme at Cape Bird. In addition Dr Austin will investigate Adelie penguins and skuas for evidence of past or present infection with influenza viruses.

### SLEDGE JOURNEY

Sledge dogs were used by the two surveyors, Nigel Nalder and Colin Fink, to complete the annual ice movement studies on the McMurdo Ice Shelf. With the Scott Base dog handler, Peter Cleary, the two men spent four days on the ice shelf checking the strain network of 12 stakes set out 18 years ago. Since 1960 there has been an accumulation of up to 9m of snow and ice.

In the four days the party travelled more than 100km. Since the season began, Peter Cleary has had his dogs out on several 16km training runs, and the team of 11 — one extra was taken in case of emergency — worked well, pulling 544kg of survey gear, tents, and food on the sledge.

Early this month one of the major international projects in the New Zealand programme began when a party of New Zealand, French and United States scientists was lifted by United States Navy helicopters to the Fang Glacier camp at 3048m on the north-east slope of Mt Erebus to acclimatise in preparation for its work near the summit of the 3779m volcano. Scientists of the three nations worked around the crater area in the 1974-75 season, and Dr Haroun Tazieff, leader of the French party, returned to Erebus last season, to work with the New Zealanders.

### FIRST WOMAN

Leader of the United States team is a New Zealander, Dr Philip Kyle, now of Ohio State University, who is working on Erebus for the seventh time. A New Zealand geochemist, Harry Keys, who

was on Erebus in the 1976-77 season, is there again as a field assistant in the Ohio State University team. One of the Americans has the distinction of being the first woman to work on Erebus. She is Kathy Cashman, a Fulbright scholar at Victoria University of Wellington, who took part in a reconnaissance on the volcano on October 26. The fourth member of the team is W. McDonald, of Ohio State University.

A New Zealand seismologist, Dr Ray Dibble, who was with the 1974-75 expedition, will make further magnetic, seismic and visual observations around the active crater area of Erebus this month. To test the viscosity of the lava in the lava lake, he intends to launch spears into it from a height of 120m, and observe the results visually. Dr Werner Giggenbach, of the Chemistry Division, D.S.I.R., who worked on Erebus in the 1974-75 and 1975-76 seasons, is back there again this summer.

Dr Tazieff, one of the world's leading vulcanologists, had hoped to make another attempt to obtain gas samples of volcanic gases from the inner crater by the use of a radio-controlled model aircraft, which he tested earlier this year about Mt. Etna in Sicily. But this year he has been unable to bring the equipment, and will support the New Zealand scientists, and lay the groundwork for future experiments.

Field leader of the expedition is Colin Monteath, field operations officer, Antarctic Division. He has worked on Erebus in the last two seasons. His assistant is Carl Thompson, field leader of the survival training course at Scott Base.

### BUSY FISHERMEN

Two other parties started work in the dry valleys early this month. Dr Chris Hendy and his wife, Vivienne, are making geochemical studies of Lakes Bonney, Vanda, and Fryxell, as part of the Waikato University expedition. The other party is from the Japanese Antarctic Research Expedition. Its members are Dr Tetsuya Torii and N. Masuda, who are doing geological and



geochemical research in the dry valleys, aided by field assistant Annette Richards. This party will also work at Lake Fryxell with Dr Hendy and his wife.

Fishermen are busy again in McMurdo Sound this month. They are New Zealanders who fish through holes in the sea ice in the cause of science. Dr Benno Meyer-Rochow, of the Waikato University zoology department, has returned to continue his studies of the structure and function of the eyes of marine organisms living under the sea ice. With him is Dr

Simon Laughlin, of the Australian National University, Canberra.

These two scientists share the fishing holes, and the headed hut near Scott Base with a team from the University of Auckland, which is studying the neuro physical adaptations of Antarctic fishes and invertebrates to constant low temperatures, and their haematological adaptations in oxygen transport. Dr John McDonald, who was fishing last season, is back to work on the first project. Three haematologists, Neil Christensen, Stuart Duncan, and Michael Ashby, are responsible for the second.

## Half century of visits south

No New Zealander has been to Antarctica more often than Mr R.B. Thomson, superintendent, Antarctic Division, Department of Scientific and Industrial Research. Since 1960 he has made 50 visits south, the last on November 30.

In the last 19 years Mr Thomson has travelled to Antarctica by sea and air. He has served at New Zealand and Australian bases, and lived in the sub-Antarctic and Antarctic for more than four years. In 1962 he lived for six days at the coldest place on earth, the Soviet station, Vostok, near the South Geomagnetic Pole.

Mr Thomson began his polar apprenticeship in 1958-59 when he spent a year on sub-Antarctic Campbell Island as senior ionospheric observer. His first experience of the Antarctic was at Cape Hallett where he wintered in 1960 as scientific leader of the joint United States-New Zealand Hallett Station. Then from November, 1960 to February, 1961 he was at Scott Base as public relations officer and postmaster.

Early in 1961 Mr Thomson went to Australia and joined the staff of Australian National Antarctic Research Expeditions (ANARE) as stores and logistics officer. He was selected as officer-in-charge of the Australian-United States Wilkes Station for 1962.

After the winter Mr Thomson led a tractor traverse from Wilkes to Vostok, at that time unoccupied. The team

travelled 2896km and was in the field for 120 days. With Soviet permission Mr Thomson and his five companions occupied the station for six days before returning to Wilkes and completing the longest traverse ever made by an Australian expedition, and one of the longest traverses in Antarctic history.

When he returned to New Zealand Mr Thomson was deputy leader at Scott Base for the 1963-64 summer. Then he became technical officer with the Geophysics Division, D.S.I.R. until his appointment as superintendent of the Antarctic Division in 1965.

Since then Mr Thomson has flown south every season. He returned to Vostok in 1969 but in greater comfort than in 1962 as a passenger in a United States Navy Hercules aircraft.

### N.Z. winter team

Next year's winter team at Scott Base will have two new members when it begins its several months of isolation from the outside world. They are the cook, B. Trevathan of Nelson, who is a 22-year-old chef with the Royal New Zealand Air Force at Woodbourne, and A.M. Babington, aged 24, of Hamilton, who will be the Post Office senior radio technician.

One change has been made already. Trevathan has replaced P.G. Jones. Later in the season Babington will replace A.F. Hardie, who is at Scott Base for the summer only.

# Convention on Marine Resources

Substantial progress towards the establishment of an international regime for the conservation of Antarctica's living marine resources was made at the third session of the special Antarctic Treaty consultative meeting in September. After discussions in Canberra, Buenos Aires, and Washington, representatives of the 13 treaty nations have resolved the differences between the countries with territorial claims in Antarctica, and those which are already harvesting marine resources.

Formal approval of a convention for the rational use and conservation of Antarctic marine resources is expected to be given by the treaty nations at a final meeting in Canberra early in January. Originally the treaty nations were committed to establish a conversation regime before the end of this year, but there have been differences on the commercial exploitation of krill and other marine resources, and claims to national sovereignty by some of the treaty nations.

In February and March the first session of the consultative meeting in Canberra did agree that an international conservation commission should be established ("Antarctic," September, 1978). It also produced an informal text for further negotiations. This draft provided for a commission to oversee the harvesting and conservation of the living resources, and a special scientific committee to assist it.

Much of the disagreement at the second session in Buenos Aires, which was held in July, was about the scope and nature of the proposed convention, existing territorial claims, and whether the convention should apply to all countries, and not only the Antarctic Treaty signatories. Other differences arose on the question of placing limits on commercial exploitation of krill and other marine resources.

Broad agreement was reached on a convention during the third session in Washington, which was held in September. The convention will establish a resources commission and a framework

under which future conservation decisions can be made. While the commission will not set limits on catches of Antarctic marine resources, it will be able to deal with conservation problems.

One of the most difficult exercises at the discussions in Washington was to settle the basic political parameters in the convention. The final draft of the text of the convention had to satisfy the two major groups of nations with Antarctic interests — those with territorial claims (Britain, Australia, New Zealand, Norway, France, Chile and Argentina) and the six which make no claims and recognise none. These are Belgium, Japan, Poland, South Africa, the Soviet Union, and the United States. The compromise text is expected to satisfy all the nations concerned.



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## Snow Shovel Day

Scott Base had its warmest day of the season to date on November 21 with an Antarctic spring temperature of minus eight deg Celsius and no wind. But the day was one for work as well as enjoyment.

Support staff and scientists were unable to delay the annual digging out of the base. It was a case of everybody out with shovels to clear the winter's accumulation of snow from the prefabricated wooden buildings. Although the buildings are proof against snow and wind they are close to the ground and tend to trap drifting snow. Drifts of up to 3m in places had to be cleared away so melt water would not seep into buildings.

# U.S. Science Projects this Summer

This season the United States will spend more than \$50 million on research in Antarctica. The cost of the scientific programme, which is financed and co-ordinated by the National Science Foundation, includes \$30 million to support the research with aircraft, icebreakers, and cargo ships, and to maintain the four American inland and coastal stations. More than 320 scientists, including 28 women, and representatives of 12 other countries, are engaged in research in Marie Byrd Land and Enderby Land, on the Ross Ice Shelf, around the Antarctic Peninsula, at the South Pole, in Victoria Land, and on the East Antarctic ice sheet.

There are about 100 projects in the United States Antarctic Research Programme, and they include evaluations of Antarctica's mineral and marine living resources. One field team is continuing a survey to assess the potential resources of uranium and thorium in the exposed rocks of Antarctica. The survey, which began in the 1975-76 season, has been extended this summer to cover coal and carbonaceous deposits in south Victoria Land.

In the 1976-77 season a United States Geological Survey team was flown to the Pensacola Mountains, about 2415km from McMurdo Station, where it spent a month studying the Dufek intrusion, one of the world's largest layered complexes, which has a greater resource potential than most Antarctic mountain areas. Chromium, nickel, cobalt, and platinum occur in trace amounts in the intrusion, which includes the Dufek Massif and the Forrestal Range, but no deposits of potential economic usefulness or of significant size were found in the 1976-77 season.

## THREE TEAMS

This season three field teams have resumed geological and geophysical investigations of the Dufek intrusion, and are working in the upper part of the complex in the Forrestal Range. There are two U.S. Geological Survey parties.

and one from Western Washington State College. One objective of the field teams, as a byproduct of their research, is to appraise the mineral resource potential of the complex.

With the aid of an airborne gamma-ray spectrometer a field team from the University of Kansas is making the resource and radioactivity survey, which in previous seasons has covered the mountains of Victoria Land, and exposed rocks in Marie Byrd Land. This season's survey is concentrated on the Darwin Glacier area, and the team's primary interest is in the coal and carbonaceous deposits of the Beacon Supergroup. Its secondary interests include the metamorphic series on the south side of the Byrd Glacier, and the extensive igneous intrusives throughout the study area.

Assessment of the uranium and thorium resource potential is one of the basic objectives of the survey. The others are to provide fundamental geological information by remote sensing, and to obtain data which might help to protect the Antarctic environment in the event of resource exploitation.

## KRILL RESEARCH

Marine resources of commercial interest are being studied again in the Antarctic Peninsula area. One purpose is to learn more about the larval development and duration, life span,

and growth rates of the dominant species of Antarctic krill (*Euphausia superba*). Another goal of the research is to obtain data relevant to the formulation of management policies for the exploitation of krill, and to prepare for the effects of petroleum-derived and related compounds in marine food webs in advance of the possible exploitation of offshore oil deposits.

One field team led by an international authority on krill, Dr Mary Alice McWhinnie, is doing its research at Palmer Station, and from the research vessel *Hero*. Live krill collected from the *Hero* in Bransfield Strait, the Palmer and Biscoe archipelagos, and the Scotia Sea, are being maintained in special aquaria for the study of their growth rates in different temperatures, light, and feeding levels. The factors that cause krill to swarm in vast numbers are also being studied.

In its study of flows of organic compounds through Antarctic marine food webs supporting and dependent upon krill another team led by Dr Robert Risebrough will work from the *Hero* in March next year. It will sample water, phytoplankton, and other particulate material, krill and other zooplankton, and the eggs and tissues of seabirds. The research is designed to contribute to an understanding of the dependence of other Antarctic species on krill, and to establish baseline levels of petroleum-derived and related compounds, and synthetic and natural organic chemical compounds in marine food webs.

### MAJOR EVENT

A major event in this year's programme is the first intensive study of the Darwin and Byrd Glaciers by scientists from seven United States institutions, and New Zealand, Japan, and West Germany. The Darwin-Byrd project is the largest in the programme, and includes 12 geological and glaciological studies. There are 47 scientists in the glacier area about 325km from McMurdo Station. Three United States Navy helicopters are operating within a 185km radius of the base camp to support satellite tent

camps used by scientists working in other areas.

Both the Darwin Glacier, about 16km wide, and the Byrd Glacier, about 19km wide, cut through the Transantarctic Mountain range, the largest in Antarctica. They flow eastward and merge with the Ross Ice Shelf. The present studies of the two glaciers will help glaciologists to learn more about the dynamics of major glaciers as their flow is impeded by an ice shelf. Geologists working in the Darwin Mountains are engaged in the study of the geological and tectonic history of the area from the time the oldest rocks in the region were formed about two billion years ago to the present formation of glaciological deposits.

All the studies in the glacier project are being co-ordinated by Dr George H. Denton, professor of geology at the University of Maine, who has worked in the Antarctic in previous seasons, seeking evidence that the West Antarctic ice sheet is disintegrating. The present studies may give some of the answers to the question; they are also expected to help scientists determine whether an ice shelf similar to the Ross Ice Shelf existed in the Arctic about 18,000 years ago, and why a great ice sheet in the Northern Hemisphere disintegrated rapidly some 12,000 years ago.

Studies of the Darwin and Byrd Glaciers flowing into the Ross Ice Shelf and how they interact with it will help to determine whether the ice shelf over the Arctic Ocean may have existed in the past, and how it affected the North American ice cap. This information could provide better understanding of the changes in global climate that took place in the past, and also clues as to what climatic change might be expected in the future.

### SHELF DRILLING

Another major event in the programme — the Ross Ice Shelf Project — which began in 1973, will end this season. The main purpose of the project was to drill through the ice shelf to study the biological, chemical, and physical



characteristics of the waters beneath the shelf, hidden by ice for at least 120,000 years. This was done last season after four years of research, and financial and technical setbacks.

Scientists drilled through 377m of the ice shelf, and closed-circuit television cameras lowered into the drill hole enabled them to study life in the frigid waters and on the seabed. But later the hole froze solid despite efforts to keep it open by means of a dangling heated cable.

This season the project drill camp, J9, which is 667km south-east of McMurdo Station, was opened again in October, and last month a start was made on the drilling of three access holes through the 396m thick ice of the shelf. One hole has been drilled using a new hot water system to produce "clean" holes. Two holes are being used for freeze-in experiment, and the third is the main access hole which is being used this month to sample the water mass and sediments beneath the ice shelf.

Scientists from Norway, Britain, Australia, and the Soviet Union are participating in the project this season. A Soviet field team headed by Dr Igor Zotikov, who worked on the project last season, is engaged in a study of the freezing-melting processes at the bottom of the Ross Ice Shelf by taking repeated measurements of the water-ice boundary position, and temperature distribution and change through the ice shelf thickness. To determine the thickness of the ice layer frozen at the bottom since the sheet began to float ice cores will be taken, using a thermal drill. This type of drill has been used by Soviet scientists to take cores on the Riiser-Larsen Ice Shelf.

### DOMES C STUDY

Sciences of five nations — Australia, France, the Soviet Union, the United Kingdom, and the United States, are engaged again this season in joint studies of the East Antarctic ice sheet which are part of the International Antarctic Glaciological Project. Much of the work is being done at Dome C, the ice dome in Wilkes Land 1150km from McMurdo Station. This dome contains some of the world's thickest known ice.

Now at work in the area are scientists from the University of Wisconsin, Ohio State University, the University of Washington, the U.S. Geological Survey, and the French Glaciological Laboratory. A Scott Polar Research Institute team in co-operation with American investigators is responsible for the airborne radio-echo sounding of the ice sheet, which is part of the IAGP.

A geophysical investigation of the Dome C area is being made by a University of Wisconsin team headed by Dr Charles R. Bentley. Its programme includes radar sounding of ice thickness and internal layering, and an examination of the sub-glacial structure of seismic refraction and gravity techniques.

Dr Ian M. Whillans is leader of the Ohio State University team which has begun a glaciological investigation area of the ice dome area. This includes a study of the dynamics of the ice sheet near Dome C, which involves investigations of snow accumulation, near-surface temperature and ice velocity. The data will be used to calculate any thickening or thinning of the ice sheet. Another study is devoted to the possibility of past and future changes in the configuration of the ice sheet.

### SHALLOW DRILLING

Last season a French team of glaciologists led by Dr Claude Lorius drilled a core hole to a depth of 900m at Dome C. This season another French team, which includes an Argentine glaciologist, plans to fill the drill hole with special fluid to preserve it for further study. The core from the site can help to describe climate changes over the last 25,000 years, and determine the origins and changes over time of chemical impurities.

To support the glaciological studies extensive shallow drilling is being done at Dome C by a team from the University of Nebraska led by Dr John W. Clough. Other shallow ice coring projects are being carried out at the Amundsen-Scott South Pole Station, Siple Station, and on the McMurdo Ice Shelf.



A 100m core near the Pole Station will be analysed for nitrate and ammonium concentrations related to variations in past solar activity, and a team from Ohio State University will place a permanent thermistor chain down the drill hole for a long-term temperature study. One 100m core will be obtained by drilling at Siple Station in Ellsworth Land, and as many as three 50m core holes will be drilled in the McMurdo Ice Shelf to support an investigation of the brine infiltration layer by the United States Army Cold Regions Research and Engineering Laboratory.

### METEORITE SEARCH

Another United States-Japanese team will continue the search for meteorites which began in the 1974-75 season. This season the team, led by Dr Williams A. Cassidy, of the University of Pittsburg, is concentrating on a search for meteorites brought to the surface by the wasting away of ice. In these blue ice areas it has been found meteorites become concentrated on the surface.

Two of the 310 meteorites found last season near the Allan Nunatak about 200km north-west of McMurdo Station have since been identified as examples of the extremely rare carbonaceous chondrites, so named because of their high abundance of carbon. This year the team is back in the vicinity of the Allan Nunatak. Before the project ends in February next year the scientists will make helicopter flights from the Darwin Glacier base camp to blue-ice areas.

As well as searching for meteorites the Japanese team from the National Institute of Polar Research is working in the dry valleys of southern Victoria Land on structural geological and petrological studies. The programme also includes the collection of rock specimens in the dry valleys and in the McMurdo Sound region for paleomagnetic study.

Last month the American unit of the meteorite team and one of the Japanese took part in the motor toboggan traverse from Carapace Nunatak to Reckling Peak with an Ohio State University

team which has been sampling and investigating Ferrar Group basalt flows and dolerite sills in the Darwin and Transantarctic Mountains. On the journey north the meteorite hunters were able to visit blue-ice areas east and west of Reckling Peak.

### EREBUS EXPEDITION

This month the Ohio State University team has joined the New Zealand-French-United States expedition on the summit crater of Mt Erebus. Two of the team are New Zealanders — Dr Philip Kyle (leader) who is on Erebus for the sixth time, and J.R. (Harry) Keys, who has also been on the volcano before with a Victoria University of Wellington expedition. The others are Katharine Cashman, a Fulbright scholar at Victoria University, and W. McDonald, of Ohio State.

From a hut constructed at the summit of Erebus the scientists are monitoring the persistent anorthoclase phonolite lava lake in the active crater. They are using audio-visual observations, temperature measurements, heat flow studies, and sample lava ejected from the crater.

Because Erebus is isolated and virtually devoid of vegetation it has been selected by a team from the University of Hawaii headed by Dr Stanford M. Siegel as a site where the volcanic emission of mercury can be examined exceptionally well. Volcanic sites are important sources of atmospheric and fallout mercury, but human activity also can release large quantities of mercury into the environment.

With helicopter support the team began this month to study the emission of mercury from Erebus, and its local distribution in gases, air, water, snow, ice, soils, and whatever vegetation can be found. This investigation has been planned to add to scientific knowledge of the natural sources of mercury, its geochemistry and geobiology, and ultimately to the picture of it as a pollutant.

### TRACE ELEMENTS

Another field team from the University of Maryland, which is led by Dr William H. Zoller, is using helicopter

support to collect gas, residue and atmospheric samples from the crater of Erebus for comparison with aircraft data and atmospheric samples from the South Pole Station. This is part of a continuing project to analyse the source and distribution of trace elements in the Antarctic atmosphere.

For this analysis the team is making flights over central Antarctica and the dry valleys of southern Victoria Land in a specially instrumented United States Navy Hercules aircraft fitted with an airborne research data system. Samples are being collected near the South Pole to compare with those collected at the new clean air facility at the Pole Station. Blue ice and dust deposits are to be collected for windblown debris analysis on the flights to the dry valleys.

A team from Washington State University headed by Dr R.A. Rasmussen is working this summer to determine the concentration distribution in Antarctica of man-made fluorocarbons and related chlorocarbons by systematically measuring their buildup in the snow and ice, and in the atmosphere. Air and snow sampling is being continued in the vicinity of the Pole and McMurdo Station, and flights are being made in the instrumented Hercules aircraft. This month a special effort is being made with helicopter support to collect samples on Erebus to determine the impact of volcanic emissions on the observed trace gases in the snow samples.

### ECHO SOUNDING

For the sixth season a field team from the Scott Polar Research Institute with American investigators is continuing the glaciological and geophysical exploration of the Antarctic ice sheet, which is part of the International Antarctic Glaciological Project. It began its work this month, using radio-echo sounding equipment and an airborne magnetometer system installed in the specially instrumented Hercules.

Last season the team with Dr David J. Drewry and David T. Meldrum as co-leaders worked in West Antarctica east of Byrd Station, and towards the

Ellsworth Mountains and the Filchner Ice Shelf. This summer the flights are being made in West Antarctica from McMurdo Station, using the Pole Station and the Byrd Station field camp for refuelling. This is the last year of work in West Antarctica because the Byrd field camp will be closed next season.

Provision has been made for 150 hours of support by the Hercules aircraft for the radio-echo sounding-magnetometry programme. Thirty or forty hours of this are being flown in the Dufek Massif region of the Pensacola Mountains for magnetometry work in support of the U.S. Geological Survey party which is making geophysical investigations of the Dufek intrusion.

Geophysical monitoring for climate change in Antarctica is being continued at the Pole Station this summer and next winter by a team from the National Oceanic and Atmospheric Administration. The team will continue to measure near-surface aerosols, total atmospheric turbidity, total solar radiation, and concentrations of trace gases (including carbon dioxide and ozone). The objective is to identify present levels and long-term trends in the concentration of significant atmospheric trace constituents that may affect the environment and possibly induce climatic change. Air samples are also being collected for this purpose at Palmer Station on Anvers Island off the Antarctic Peninsula.

### SOLAR WEATHER

Investigations that may provide a valuable new tool for monitoring certain aspects of the earth's history are being made at the Pole Station, on Mt. Erebus, and form the Darwin Glacier base camp by Dr Edward J. Zeller's team from the Virginia Polytechnic Institute and State University. Numerous samples are being taken from ice sheet surfaces, now pits, icebergs, and cores to investigate the nitrogenous chemical composition of snow and ice at various Antarctic locations.

Tests are being made of the use of trace impurities as indications of sun spot activity cycles that are related to cosmic ray and auroral activities, to past world

climate, to depletion of the ozone layer, and to change in ultra-violet fluxes on earth. It is hoped to gain information about non-biological nitrogen fixation, natural rates of ozone depletion in polar regions, and the potential fertilisation of Antarctic oasis soils, lakes, and polar seas through the melting of glacial ice.

Summer and winter measurements of cosmic ray intensities at McMurdo Station and the Pole Station in past seasons by the Bartol Research Foundation have given atmospheric scientists more understanding of how the sun controls interplanetary "weather" and the earth's immediate environment. Observations from McMurdo Station combined with those from the counterpart station at Thule, Greenland, provide unique information about the directions of galactic and solar cosmic ray streaming.

New cosmic ray detectors at the high altitude Pole Station — the most sensitive of their kind in the world — are being used this year to study the highest energy particles the sun is able to produce, the so-called relativistic solar cosmic rays. The first optical observations at the South Pole are being attempted this summer in an effort to measure large-scale motions on the sun's surface caused by oscillations in its interior. Solar observations will be made by two French scientists associated with the project for which Dr Martin A. Pomerantz is the leader.

### WEATHER STATIONS

Meteorological research and operational weather forecasting for flights by aircraft and helicopters are an important part of the United States research programme in Antarctica. But some regions provide sparse data to assist the meteorologists.

To collect data from these regions for research and forecasting eight automatic weather stations are being installed this summer by a field team led by John Katsufrakis and Bill Trabucco. Two are being placed at Byrd Station, one at Siple Station, one in the dry valleys, and four near McMurdo Station. Field sites in the McMurdo Sound area include Minna Bluff, White Island, and Marble Point.

## New president of SCAR

A New Zealand scientist, Professor G.A. Knox, now heads the Scientific Committee on Antarctic Research (SCAR), the committee of the International Council of Scientific Unions which co-ordinates scientific research in Antarctica. He was elected president at the 15th meeting of SCAR held in Chamonix, France, earlier this year.

Professor Knox, who is a zoologist, succeeds Dr T. Gjelsvik, director of the Norwegian Polar Research Institute. Since the 1961-62 season he has been responsible for the direction of the work of the University of Canterbury biological research unit at Cape Royds, and later at Cape Bird and White Island. He is a member of the Ross Dependency Research Committee, served as chairman of SCAR's permanent working group on biology for eight years, and for the last four years has been secretary of SCAR.

SCAR's vice-president is Dr P. Welkner, a geophysicist, who is Chile's permanent delegate to the committee. The new secretary is Dr G.A. Avsiuk, who is a geologist, and the Soviet Union's permanent delegate. He is a former vice-president of SCAR.

Fifteen nations engaged in Antarctic research are represented on SCAR which meets biennially in different member countries. Poland was admitted to membership after the 1978 meeting in Mendoza

Fifteen nations engaged in Antarctic research are represented on SCAR which meets biennially in different member countries. Poland was admitted to membership after the 1976 meeting in Mendoza, Argentina, and West Germany became a member this year. The Polish permanent delegate is Dr A. Urbanek, and West Germany's representative is Dr G. Hempel, of the Institute of Marine Science, University of Kiel.

## No Australian Pole flight

A planned flight from Australia to the South Pole in an Australian-built Nomad aircraft, which was to have been made on November 16, was abandoned because the promoter was unable to obtain a clearance for the Nomad from the Australian Department of Civil Aviation.

Originally, the promoter, Mr Dick Smith, a Sydney businessman, who pioneered the first day trips to Antarctica, proposed to make the flight from Hobart to mark the 50th anniversary of

the first aeroplane flight in Antarctica. This was made by Sir Hubert Wilkins from Deception Island off the Antarctic Peninsula.

Mr Smith intended to charter a stretched version of the Nomad, a twin-engined unpressurised aircraft, from its makers, the Australian Government Aircraft Factories. With two of the Nomad's test and development pilots he planned to fly from Hobart to McMurdo Station, later make a round trip without landing to the Amundsen-Scott South Pole Station, and then back to Hobart.

## American Scouts in Antarctica

Fifty-seven years ago Shackleton was the first explorer to include a Boy Scout in an Antarctic expedition. He took a Scottish Scout, J.W.S. Marr, south on his last expedition in the Quest. Byrd followed his example when he chose Eagle Scout Paul Siple to winter at Little America on his first expedition in 1928-30. Both Marr and Siple subsequently became internationally known for their scientific research in Antarctica.

To commemorate the 50th anniversary of Paul Siple's first trip to Antarctica another Eagle Scout, Mark Leinmiller, has gone south to spend three months working with the United States Antarctic research programme. He was selected from more than 1000 entrants in a national competition sponsored by the Boy Scouts of America, the National Science Foundation, and the Reader's Digest Foundation.

Mark Leinmiller, who comes from Marietta, Georgia, is a 19-year-old mechanical engineering student at the Georgia Institute of Technology. He will spend most of his time in Antarctica working with a glaciological and geological project in the area of the Darwin and Byrd Glaciers about 325km south of McMurdo Station. Like his famous predecessor he will visit the Amundsen-Scott South Pole Station, but not to stay like Dr Siple, who was the scientific leader of the first United States team to winter at the Pole in 1957.

Dr Siple's widow, Mrs Ruth Siple, was one of the members of the final selection committee which chose Mark Leinmiller. The chairman of the committee was Dr Richard L. Chappell, now a professor of biology at Hunter College, New York. As an Eagle Scout he was selected to work with the United States programme during the International Geophysical Year (1957-58).

Mark Leinmiller will be able to meet another Scout in Antarctica this season. He is Ross Hughson, of Hastings, one of three representatives of youth organisations who will work with the New Zealand research programme at Scott Base. The others are Richard Garlick, of Christchurch (Boys' Brigade), and Heemi Hill, of Hawera (St. John Ambulance Brigade).

There have been New Zealand Scouts in Antarctica with other youth organisation representatives every season since 1961-62. This season's representatives will go south from Wellington this month in the United States Coast Guard icebreaker Polar Star. They will spend about a month at Scott Base, and will return early next year.





# Award of Conservation Trophy

This year for the first time the New Zealand Antarctic Society's Conservation Trophy has been awarded for work in the sub-Antarctic. The award has been made to Mr Alex J. Black, of Dunedin, in recognition of his contribution to the conservation of flora and fauna on New Zealand's sub-Antarctic islands by his support of scientific expeditions for more than 30 years.

There have been six previous wards of the trophy — a 43cm carving of an Emperor penguin in African walnut, which was presented to the Canterbury branch by one of its members in 1971. The trophy is awarded to any person or organisation contributing significantly to any aspect of Antarctic conservation — preservation of historic buildings and flora and fauna in the Antarctic or on sub-Antarctic islands. Mr Black was nominated for the award by the Wellington branch of the society.

Mr Black's association with the sub-Antarctic islands began in 1947 when he took a scientific expedition to the Snares Islands in the motor vessel *Alert*. This expedition, led by Sir Robert Falla, was primarily to take an eminent United States ornithologist, Dr Robert Cushman Murphy, of the American Museum of Natural History, to the Snares. Since then Mr Black has taken scientific parties, first in the *Alert*, and then in the *Acheron*, to the Antipodes and Bounty Islands, the Auckland Islands, Campbell Island, and several times to the Snares Islands. New Zealand, United States, and Australian scientists have been indebted to Mr Black for the way in which he has supported their research, and enabled them to study bird and marine life in almost inaccessible places.

Between 1947 and 1954 the *Alert* made several voyages to the outlying islands. She had been acquired primarily for training Sea Scouts; Mr Black was their New Zealand Commissioner from 1941 to 1963. Because of her excellent seagoing capabilities Mr Black was able to take scientists to the Solander Islands, the Antipodes and Bounty Islands in 1950, and to the Chatham Islands in 1954.

Although he maintained his interest in marine research, Mr Black had a break

from sub-Antarctic voyages between 1958 and 1972. Then he was associated with expeditions to the Snares Islands and the Auckland Islands, using his new motor-vessel *Acheron*, in 1972 and 1973. The *Acheron* was chartered three times in 1975 and 1976 by parties interested in the wreck of the *General Grant* on the Aucklands. Mr Black made it a condition of the charters that scientists went with the expeditions.

In January this year Mr Black made a special voyage to the Auckland Islands to emphasise to the Government the need for stronger controls over activities in the area to ensure better protection of the flora and fauna. His passengers in the *Acheron* included the Minister of Lands (Mr V.W. Young), the Associate Minister of Finance (Mr H.C. Templeton), Sir Robert Falla, and Mr J.H. Miller, chairman of the Ross Dependency Research Committee, who went to the Antipodes and Bounty Islands with Mr Black in the *Alert* in 1950.

Mr Black also knows the waters around Campbell Island well. He has made seven visits there since 1973, most of them to service the meteorological station. In 1975 he provided support for the scientific expedition organised by the Lands and Survey Department.

Since the first award in 1972 the Conservation Trophy has been awarded for work in the Antarctic. Previous awards have been made to J.N. Foster (1872), L.B. Quartermain (1973, posthumous), B.N. Norris (1974), E.R. Gibbs (1975), P.M. Sagar (1976), and Project Jonah (1977).





## Mawson's Hut will stay at Cape Denison

Sir Douglas Mawson's historic hut at Cape Denison, Commonwealth Bay, which was the main base of his Australasian Antarctic Expedition (1911-14) will remain in the Antarctic, and will be restored at its present site where it has been for more than 65 years. The restoration programme will begin early next year, and will be continued in 1980 and 1981.

There were suggestions in Australia that the hut should be dismantled, brought back, and placed in an Antarctic museum. But after study of a report by an Antarctic Division team which spent nearly six weeks at Cape Denison last summer to evaluate the structural soundness of the hut, and determine whether it could be restored, the Minister of Science (Senator James Webster) has decided that it should remain where it is, and be restored as far as possible to its original condition.

Early next year the Antarctic Division will send a team of four to Cape Denison to begin the restoration work. The team will leave Melbourne, probably on the relief voyage to Casey, about January 12, and arrive at Commonwealth Bay about January 21. It will leave Cape Denison about February 26.

One member of the restoration team will be representative of the ANARE Club, whose numbers have all served at Australian stations in the Antarctic or sub-Antarctic. The club has been interested in the future of Mawson's hut, and one of its members, Mr Ray Brookes, was the carpenter-builder in the team which went to Cape Denison last summer.

Two main questions the first team had to answer were whether the hut could be repaired and could it be returned to Australia. After its investigation the team concluded that the hut should remain at Commonwealth Bay because the task of returning it to Australia would be a major and highly expensive one, outside the capabilities of a small party and the present effort involved. It could also result in the total loss of the hut if, for any reason, there was any delay in completing the operations quickly.

Detailed recommendations for the repair of the hut on the site were made in the team's report to the Antarctic Division. This work, done with timber from Australia, would involve the removal of the outer skin of planking, and the replacement of several structural beams. The outer frame would be reclad with pine and sealed with modern sealing compounds.

One recommendation was that the original outer timber should be returned to Australia and replaced on a replica frame built at a suitable site, preferably indoors, to be used as a museum for artefacts from the hut. Excavation of the hut's interior could be completed in later years after the outer cover had been sealed, and artefacts of interest could be cleaned and restored and placed in the building be returned to Australia as museum exhibits.

## Yacht voyage to Antarctic

Two French mountaineers, Jean Lescure and his wife, Claudine, sailed from Lyttelton early this month in their 10-metre aluminium yacht *Isatis* for the Antarctic Peninsula where they plan to climb more mountains. The Lescures, both aged 28, have climbed in Nepal, Greenland, and Alaska, and have been sailing around the world for the last two years and a half with one aim — to climb mountains.

With the Lescures is Claudine's 18-year-old brother, Jean-Marie. They have a year's supply of food aboard the *Isaris* in case they have to winter in the Antarctic. Their first call will be at the United States Palmer Station on Anvers Island. Then they will sail through Gerlache Strait to the South Shetland Islands. After their Antarctic climbing they plan to tackle peaks in Chile.

## B.A.S. NEWS

# Less transport for summer activities

Summer activities at the British Antarctic Survey's five bases have been restricted by lack of transport — the Royal Research Ship John Biscoe is now undergoing a major refit at Liverpool — and delays to ships and aircraft in the relief of the 70 men of the winter parties. Both the R.R.S. John Biscoe and Bransfield have had engine trouble, and the return of the two B.A.S. Twin Otter aircraft to the Antarctic has been delayed by labour disputes in Canada while one aircraft was being repaired. However, it is hoped that a substantial part of the summer programme will be completed.

Men for the Rothera, Signy, and Grytviken bases sailed from Southampton in the John Biscoe on September 6, but just before the ship entered Montevideo the crankshaft on one of her main engines fractured. It was decided that it would be unwise to commit her to any area where she might meet ice, and the parties for Rothera and Signy were disembarked at Stanley, Falkland Islands (Islas Malvinas).

Then the ship sailed for South Georgia where she landed men and supplies at Grytviken on October 16 and established a field party on Bird Island. She returned to the United Kingdom by way of Rio de Janeiro and Salvador, and arrived at Liverpool early this month. The loss of one main engine reduced her service speed from about 12½ to nine knots.

R.R.S. Bransfield was to have sailed from Southampton on October 20 but she was delayed for a few days by engine trouble. Then she was delayed for two more days when she answered a distress call from a capsized Norwegian vessel in mid-Atlantic. Another vessel picked up 26 survivors out of 30, but the Bransfield, searching with other vessels, failed to find the other four.

After a call at Mayport, Florida to take on supplies for the United States Palmer Station, the Bransfield sailed for the

Falklands by way of Montevideo, and arrived at Stanley early this month. There she disembarked a number of men to make room for those who were bound originally for Rothera on the John Biscoe.

## CRUISE SHIP

Arrangements were made for the men remaining in Stanley to be picked up by the West German cruise ship *World Discoverer*, and taken south to rendezvous with the *Bransfield*. It was hoped that by the time this meeting took place, the Rothera men would have been disembarked at the Damoy summer air facility and ferried to Rothera by the B.A.S. Twin Otter aircraft. Then the *Bransfield* was to sail to Faraday (Argentine Islands) to unload base cargo and about 250 tons of building materials for the first stage of a base improvement scheme.

One of the Twin Otters damaged her nose-ski mechanism beyond local repair while trying to take off with a full load from a very rough surface at Rothera at the end of last summer. The aircraft was shipped home in the *Bransfield*, but repairs and overhauls were delayed by labour disputes at the de Havilland factory in Toronto. Both aircraft left for Rothera last month and arrived towards the end of the third week.

Winter parties at the five bases made a number of short journeys in September and October — some of them for recreation. Several field huts were visited on South Georgia, and local field work was continued, but because transport is restricted this season more distant field work will be confined to Bird Island.

### RAIN ON ICE

In the South Orkney Islands relays of parties from Signy Island were able to travel over the ice to Coronation Island in September, but at the end of the month rain ruined the surface and the sea ice broke up. Fast ice remained near Signy into October, and the biologists were able to continue diving operations, the man-made holes being greatly appreciated by the local Weddell seals. When the ice finally disappeared, the Signy "fleet" of three dinghies and a 7m work boat was launched.

Skiers at Faraday in the Argentine Islands made good use of this year's abundant snow. Several trips were made to the old station on Winter Island.

Four parties from Rothera on Adelaide Island visited the north of the island, the Arrowsmith Peninsula (the mainland to the east), the Horseshoe Island. In the course of these journeys, the old stations on Detaille Island (Loubet Coast), Horseshoe Island and Stonington Island were visited, and the Stonington party also called at the Argentine station, San Martin. In October, two men from Rothera visited the old Adelaide station, and spent one night with Jerome and Sally Poncet who are wintering with their yacht, Damien II, at Avian Island off the south coast of Adelaide Island.

### BAD WEATHER

Three men who left Halley on August 20 to repair experiment VLF equipment 80km inland on the Polar Plateau, were caught in exceptionally bad weather, and two of their tents disintegrated. Fortunately, they were able to shelter in a third tent which they had been using to protect their motor toboggans from drift.

Two relief parties set out to help the three men as soon as the weather improved, both were held up by white-out, and one by mechanical trouble. All three groups were out of radio contact with Halley for a time because of snow static and magnetic storms. One relief party then succeeded in reaching the VLF party, and together they travelled back to the heavily crevassed "hinge zone" from which they were escorted by the second relief party. All arrived back safely on September 5.

Better weather in October allowed parties to make short recreational trips to the Low Shelf, 64km to the north-east. The VLF party succeeded in reaching the Polar Plateau in mid-November.

Three B.A.S. geologists stranded in February at the Argentine base, General Belgrano, spent the winter helping the 20 Argentinians with the maintenance of the buildings and equipment. The latter includes a sno-cat in which an Argentine party led by Colonel Jorge Leal travelled to the South Pole in 1965.

### FROST SMOKE

With the return of daylight the three men were able to enjoy local trips, the most popular excursion being to the ice front where a lead of open water has produced the spectacular sight of frost smoke rising to about 304m. There is a dearth of wildlife in the area for most of the year so the appearance of two seals, an Antarctic petrel, and an Emperor penguin, were exciting events.

Most exciting of all for both the Englishmen and the Argentinians was the arrival of a B.A.S. Twin Otter. It flew the three marooned men to Halley on November 20.

As usual, several members of the administrative staff at the B.A.S. headquarters in Cambridge are spending the summer at the Antarctic stations, and a number of scientists is carrying out field work. Dr C.W.M. Swinbank, head of B.A.S. earth sciences, has returned to the other side of the continent. He is with a United States glaciological party on the Byrd Glacier.

# West Germany's plans for permanent base

West Germany is now committed to active research in the Antarctic. A permanent base will be established in the 1979-80 summer on the Filchner Ice Shelf at a latitude of nearly 80deg S, and next year a supply ship will be commissioned. In addition a polar research institute has been set up. The Ministry of Research and Technology estimates that the cost of the institute, the base, and the ship will be about DM100m, and annual expenditure on Antarctic research will be about DM30m.

Establishment of a polar research institute and an Antarctic base will be the Government's initial contribution now that the Federal Republic has decided to join the Scientific Committee for Antarctic Research. Last January the Cabinet decided on the recommendation of the Minister of Research and Technology, Hans Matthofer, now the Minister of Finance, to join the Antarctic Treaty as an ordinary member.

This decision has been approved by both houses of the West German Parliament, and West Germany will probably take up membership before the end of this year. In mid-September the new Minister of Research and Technology, Volker Hauff, circulated a Cabinet minute recommending that West Germany should apply for an increase in status to consultative membership of the Antarctic Treaty.

This entails a commitment to active research in the Antarctic. It is expected that West Germany's application will be approved before the meeting of the consultative members of the Antarctic Treaty next year.

When Mr Hauff christened the Alfred Wegener Polar Research Institute early in October he announced that as an active member of SCAR, West Germany would, as a civilised country, play its part in exploring an as yet largely unknown continent. New scientific equipment and procedures would be tested in the extreme cold of the Antarctic, and there would be research into marine resources, particularly krill.

West Germany's base on the Filchner Ice Shelf will be accessible to icegoing vessels, and will have an airstrip for supply aircraft. Thirty scientists and technologists will work there in summer, and during the winter the base will be manned by a team of six or seven.

Four universities — Kiel, Hamburg, Bremen, and Munster, have offered the Alfred Wegener Polar Research Institute, but no decision has been made yet on its location. Mr Hauff says that a decision will be made before the end of this year in consultation with the Max Planck Institute, the German Research Association and the universities.

One of Germany's most distinguished Arctic explorers has been remembered in the naming of the Alfred Wegener Polar Research Institute. Professor Wegener was associated with the Danish explorers who discovered and charted the north-east corner of Greenland. He was a member of the Danmark Expedition of 1906-08 led by Mylius-Erichsen, and after the death of the leader, was associated with other Danish explorers — J.P. Koch, Ejnar Mikkelsen, and Knud Rasmussen.

During the Danmark Expedition Wegener discovered Dronning Louise Land, a peculiar ice-free nunatak region inland from the east coast of Greenland. In 1913 he and J.P. Koch crossed the northern ice sheet from east to west. They made a 1126km journey from Dronning Louise Land to Upernavik on the west coast. This was a remarkable journey because the explorers' five sledges were drawn not by dogs but



ponies, the last of which was killed just as the party reached the western edge of the ice sheet.

In 1930 Wegener, then 51, returned to Greenland as leader of the German Greenland Expedition. In its use of motor-sledges and new instruments to measure the thickness of the ice cover by seismic methods this expedition was most advanced technologically, and was also most productive scientifically.

A central weather station was built on the 71st parallel, some 400km from the west coast. But in November, 1930 Wegener and a companion died of exhaustion and exposure on a necessary but dangerous journey at the onset of winter, from the weather station to the coast.

Two West German scientists will work with the New Zealand Antarctic research programme this season. They are Dr Hans C. Hoefle, a glacial geologist, and Mr Dieter Grund, an electronics technician, who flew south last month. Both men are sponsored by the West German Institute for Geosciences and Natural Resources, and were invited by the New Zealand Government under its science and technology agreement with the Federal Republic.

Dr Hoefle and Mr Grund will work in the Antarctic until the middle of January, and will be associated with scientists from the Geophysics Division of the Department of Scientific and Industrial Research, Victoria University of Wellington, and the University of Waikato. They will visit Lakes Fryxell and Bonney in the dry valleys — Dr Hoefle is interested in glacial deposits and the composition of old and new glacial sediments — and will work at Scott Base.

West German scientists have worked in past seasons with the United States Antarctic research programme, particularly on the Ross Ice Shelf. This is the first time they have been associated with the New Zealand programme.

A second West German research expedition also worked in Antarctic waters last season. Scientists from the West German Institute for Geosciences

and National Resources, led by Professor K. Hinz, made geophysical studies in the Weddell Sea and the South Atlantic from the motor-ship *Explora*. The three projects in the programme were described as: Weddell Sea, Pre-site Survey, and Walvis Ridge.

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## Most southerly voters

New Zealand's most southerly voters in last month's General Election were the men and women at Scott Base, in the dry valleys of Victoria Land, and in McMurdo Sound. Most of the electors in the Ross Dependency, including those working with the United States research programme at McMurdo Station, voted at the Scott Base polling booth.

Before the day of the election, November 25, the officer-in-charge at Scott Base, John Presland, who was the returning officer, made a special trip by helicopter to collect votes from New Zealanders in the field. He flew to Vanda Station in the Wright Valley. From Vanda Station he flew to Mt Bastion at the edge of the Polar Plateau where a party from Victoria University of Wellington was at work.

About 130 men and women in the field and at Scott Base cast their special votes, which were sent by mail to New Zealand. Because of distance and lack of transport a small number of New Zealanders in remote field parties were unable to vote. One party — the Geological Survey's expedition to Marie Byrd Land — particularly wanted to vote, but this was not possible because it was about 1500km from Scott Base.

Voting papers were also collected from New Zealanders in the sub-Antarctic. H.M.N.Z.S. *Waikato*, on her way south to pick up scientists from the Bounty and Antipodes Islands, made a brief call at Campbell Island, and sent a returning officer ashore by helicopter to receive the votes of the staff at the weather station on the island.



# South Africa to replace Sanae base.

South Africa will build a new base in Queen Maud Land to replace the present base, Sanae, which was built in January, 1971. After seven years Sanae is now under 10m of snow and ice, and the buildings are too deeply buried for safe living.

Planning for a new base is already at an advanced stage. Sanae III will be built on the same pattern as the British Antarctic Survey's base at Halley Bay, which was rebuilt in the 1972-73 season. Buildings will be placed in tunnels under metal arches covering trenches 2m deep. The first two Sanae bases, built in 1961 and 1971, were both wood.

This season South Africa's new research and supply ship *Agulhas* will make her maiden voyage to Sanae with members of the 20th South African National Antarctic Expedition (SANAE 20). She left Cape Town early this month, and is expected to return early in April next year. The *Agulhas* replaces the *RSA* which made her first Antarctic voyage in 1962 when she took the third South African expedition south to construct Sanae I.

After a winter marked by extremely cold temperatures — the average in June was one of the lowest ever recorded — the 15 men of SANAE 19 are now looking forward to the arrival of the *Agulhas*. Early in September they began preparations for the earth sciences programme which will be resumed this season. A party of six travelled to Borga Base, the wintering station 380km south of Sanae, established in 1969 at a height of 2414m in the Borg Massif. There they did a comprehensive stock-taking for future geological research parties.

Led by Stan Roberts SANAE 19 arrived at Sanae in the early hours of January 17. After a call at Bouvet Island the *RSA* encountered virtually no pack ice on her final voyage, and docked at Polarbjorn Bukta. Because Sanae is 16km inland all the freight had to be unloaded speedily so that the *RSA* could proceed on an oceanographic survey. All supplies were then transported from the

bukta depot to the base by tractor. The *RSA*'s cargo included four Muskeg tractors built in South Africa at a cost of R80,000.

Before the takeover of all scientific and logistic programmes began the men of SANAE 18 were able to enjoy their letters and parcels from home, and fresh fruit. Basic repairs were done in and around the base by the Public Works Department team, and the *RSA* sailed for Cape Town on February 6.

Research at Sanae is conducted in the fields of geomagnetism, whistlers and micro-pulsations, cosmic rays, ionospherics, and meteorology. A continuous geomagnetic programme was conducted this winter for the Hermanus Magnetic Observatory by Paul Griffin. Variometers are used to monitor automatically variations in the magnetic field at Sanae. A proton precision magnetometer gives daily field strength readings.

Scientific programmes this winter included an all-sky camera which automatically takes exposures at either one or five-minute periods during auroral displays. An H. Beta photometer detects and records radiation on a wavelength of 4681 angstroms. Exciting records have been obtained with the latter instrument, which is calibrated by regular absolute observations using QHM, BMZ, and declinometers. Sun and star observations are performed when possible to determine azimuth.

Cosmic ray research, Potchefstroom University's project, has been conducted this year by Koos Byleveld. On May 7 the time and duration of a proton flame were recorded on the neutron monitor. Three high-altitude balloon flights were made during the winter, and others were planned later this year. Pulses recorded by three neutron counter tubes, and atmospheric pressure readings, are transmitted back to earth. Radio noises of different frequencies originating from the sun and the stars are measured by three riometers.

The Natal University project run by Chris Smart and Wiets Roos has been diversified somewhat. The projects run this year are as follows: A low light level TV system for recording auroral data. Broad band ground-based VLF receivers and a direction tracking unit for VLF emission; satellite tracking receiver for reception of broad band data measured in situ and retransmitted by the ISIS I. and ISIS II Satellites; measurement of atmospheric electric field gradient using a field mill.

Together with integrated elf measurements (as a measure of global thunder-storm incidence) the association with solar effects has also been studied. The magnetic micropulsations system measures very small variations in the earth's magnetic field.

The ionospheric research programme (Rhodes University) conducted by Errol de Kock. At present the ionosonde in use is a vertichirp sounder, and in addition to the routine vertical incidence soundings at 15 - minute intervals, oblique incidence transmissions are made to Grahamstown also at 15 - minute intervals. Extra soundings were made during a solar eclipse earlier this year, and during the return voyage the RSA.

At times, during the year vertical incidence soundings have been made at a fixed frequency to determine doppler shifts and hence changes in the ionosphere. The results so far are promising but difficult to interpret. Airglow lines are monitored at 5577, 6300, 3914 angstroms, and results obtained so far are interesting.

There are three meteorologists from

the South African Weather Bureau at Sanae. They are Riaan Lourens, senior meteorologist, Hannes Kruger, and John Shearman.

In a report on the weather for the first eight months of 1978, they say that the year so far has been one of contrasts with extreme calm periods causing very cold temperatures. But the winds have picked up and gusts of 100 knots have been measured.

Some difficulty has been experienced with balloon releases for upper air data, because of the depth of Sanae under the ice, and the method employed for hydrogen generation (caustic soda, aluminium chips). With the building of the new base next year these difficulties will be alleviated and the generation of hydrogen will be done electrolytically. Apart from its forecasting value, the upper air data is being used by the United States for the G.A.R.P. project to determine whether the earth's average temperature is dropping.

To support the scientific programmes there are six other members of SANAE 19, excluding the base leader. They are: Willem Kotze (radio technician), Dr Johan Steyn (medical officer), Logan Surgeson (electronics), Julius Marschal (diesel mechanic), Alfie Dalton (communicator), Lee Hall (communicator).

## Christmas gifts

New Zealand men and women at Scott Base, and with scientific parties in the field, will share gifts of Christmas cakes and home-made biscuits from the Canterbury branch of the New Zealand Antarctic Society again this year. For the last 14 years branch members have sent biscuits and Christmas cakes to New Zealanders working in the Antarctic.

A consignment of nine Christmas cakes and 40 dozen biscuits was flown south from Christchurch this month. About 40 to 45 men and women are expected to celebrate Christmas at Scott Base. The six parties in the field will have their cake and biscuits delivered by air, weather permitting, and the gifts will arrive on Christmas Day or New Year's Day if there is any delay.

## NARE REPORT

# Surveys begin on Bouvet Island

Norway's second independent scientific expedition to Antarctica since 1960 began the first part of its programme this month at and near isolated Bouvet Island in the South Atlantic. Scientific observations and surveys are being made on and around the island, which has an area of 58 square kilometres, and it will be subjected to the most thorough scientific examinations to date. The second part of the programme will begin in mid-January, and will be carried out in Queen Maud Land and the eastern and southern Weddell Sea.

More than 40 scientists are taking part in the Norwegian Antarctic Research Expedition (NARE), which has been organised by the Norwegian Polar Institute, and is expected to cost about six million Norwegian kroner (NZ\$1,121,495). The ice-strengthened research ship *Polarsirkel*, which took the 1976-77 expedition south, has been chartered again, and is equipped with two Bell 206B helicopters.

In mid-November the *Polarsirkel* sailed from Bergen for Cape Town where the expedition members joined her on December 15. She reached Bouvet Island later this month. Early next month she will return to Cape Town to prepare for the second stage of the expedition.

This month about 20 scientists will carry out a wide range of scientific investigations on Bouvet Island and in the surrounding waters. The island will be charted and photographed, and its exact position will be ascertained by satellited navigation. Marine charts will be made, and surveys of the surrounding seabed.

### ISLAND SURVEYS

After the first stage of the expedition ends, five men will remain on the island from late December to early March to operate an upper air station, using the NAVAID system. Two automatic weather stations, with battery capacities for one and two years, will also be established.

Four biologists will investigate the botany, the invertebrate fauna, the birds and the seals, and the fauna in the beach zone of Bouvet Island, and two geologists will study the volcanic rocks. Four seismic stations will be operated ashore to record micro-seismic activity.

Three marine biologists will conduct various scientific krill studies, and also investigate the benthic biology. Sampling will be conducted at various localities up to 150km from the island, and down to a water depth of 4000m. Single channel seismic reflection, magnetometric, and gravimetric registrations will be done at numerous profiles up to 150km from the island.

Tidal measurements will be conducted for three months, and possibly integrated with an automatic weather station to cover longer periods. A wave-rider system and current meters will be operated for three months in the offshore waters. The near shore waters will be charted by small boat with echo sounder and a mini-range positioning system.

### SECOND CRUISE

In mid-January the *Polarsirkel* will leave Cape Town again with members of the expedition on its second cruise, which will last for two months, and will mostly take place near western Queen Maud Land and in the Weddell Sea. But geologists and glaciologists will also work ashore during the expedition.

Four scientists will work on the Riiser-Larsen Ice Shelf from a base established by the 1976-77 expedition, located at 72deg 19S/16deg 14min W, and named Camp Norway 3. They will resurvey stakes placed to measure ice movements and accumulation on the first expedition. The elevation and position of ice shelf fronts will be measured throughout the cruise.

Thickness of ice shelves and icebergs will be measured by two sets of Scott Polar Research Institute radio echo sounding systems flown by the Polarsirkel's helicopters. Airborne magnetometry will be done over several ice shelves, and a number of gravimetric stations occupied. Seismic reflection and refraction studies will be done at a few localities.

In the 1976-77 season four scientists worked in Vestfjella, establishing their base, Camp Norway 4, at 73deg 44min S/14deg 46min W, about 160km inland from Camp Norway 3. This season two geologists will work in Vestfjella to complete investigations made during the Norwegian expeditions of 1968-69 and 1976-77.

## MARINE STUDIES

During the oceanographic programme aboard the Polarsirkel current measurements will be made between Cape Town and Bouvet Island, and in the Weddell Sea. It is planned to retrieve 10 current meters and two tide gauges left in the south central Weddell Sea during the first expedition.

A group of six scientists will conduct a series of marine geophysics programmes, including deep seismic reflection and refraction studies. Two scientists will sample the seabed at about 100 stations. They will study suspended material and undertake bottom photography.

On both cruises by the Polarsirkel navigation is by an integrated two-channel satellite system. Upper air soundings will be done from the ship on both cruises, and also on the crossings in the Atlantic Ocean south of the Equator,

as part of the Global Atmospheric Research Programme. Bathymetric recordings down to a water depth of 8000, will be done continuously. During the crossing of the South Atlantic about 40 drifting buoys will be deployed, mostly at sea, but some also at icebergs, as part of the First GARP Global Experiment (FGGE).

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## Film teams go south

Three documentary films about the Antarctic and the Arctic, entitled "Poles Together," will be made next year by the New Zealand National Film Unit in association with the National Film Board of Canada. The films, which will run for 60 minutes, will emphasise the differences and similarities of the two polar regions.

To prepare for next season's major filming effort a National Film Unit team spent two weeks working from Scott Base last month. Messrs Linton Diggle (director-cameraman) and Kerry Coe (sound recorder) also did preliminary work on the future production of a half-hour film for the Antarctic Division, Department of Scientific and Industrial Research. This film will be used as a training film for new members of the research programme, and for information purposes.

New Zealand's work in Antarctica will also be seen by millions of Japanese television viewers early next year during the screening of an eight-hour series entitled "Antarctica in the Future." A television team from the Japanese Broadcasting Corporation (NHK) flew south last month to film at Scott Base, Vanda Station, Cape Bird, Cape Evans, Cape Royds, and other locations, for the series, which will start on January 1, and will cost \$1.5m.

NHK's team is led by Mr J. Kawakami, who is the director-producer. With him are Messrs T. Minamoto (technician), and A. Ohashi (sound recorder).





## BAAS EXPEDITION

# Survey of Antipodes and Bounty Islands

For the first time in more than a century New Zealand, Australian, and American scientists have been able to study the flora and fauna of one of the world's most inhospitable island groups — the barren, wind-swept sub-Antarctic Bounty Islands — for more than a few hours. A party landed there last month was the first since 1950 to spend more than a day on the granite rocks of the group, which are the refuge of vast numbers of marine birds.

This visit to the Bounty Island (47deg 41min S/179deg 30min E) was part of an extensive wildlife survey of New Zealand's most desolate sub-Antarctic islands. The main party of the BAAS Expedition spent several weeks on another barren group — the Antipodes Islands, which have had no lengthy scientific visits since the University of Canterbury's expedition in 1969. Visits were made also to the Snares Islands and the Auckland Islands to inspect huts and occupy magnetic stations.

Organised by the Wildlife Service, Department of Internal Affairs, the expedition, which was transported to the islands by H.M.N.Z.S. Waikato in the course of her fisheries patrol of sub-Antarctic waters, included scientists and field officers from the Wildlife Service, the Department of Lands and Survey, the New Zealand Oceanographic Institute, the Physics and Engineering Laboratory and the Ecology Division, Department of Scientific and Industrial Research. One of the scientists aboard the Waikato was the distinguished New Zealand ornithologist, Sir Robert Falla, who spent a day on the Bounty Islands with a privately-organised expedition in 1950.

### TWO PARAKEETS

One purpose of the visit to the Antipodes Islands was to study the breeding biology of the group's two parakeets — *Cyanoramphus unicolor*,

and *C. novaezelandiae hochstetteri*, and bring back up to 10 live specimens. Since 1970 both species have nested and reared young successfully at the Wildlife Service's native bird reserve at Mt Bruce.

A live specimen of *C. unicolor* probably collected by sealers, reached the Zoological Gardens in London in 1831. Live parakeets have been brought back to New Zealand since 1890, and some were liberated on Kapiti Island, near Wellington in 1907.

Three pairs of each specimen were brought back in 1969 from the University of Canterbury expedition, and two more of each species were obtained by the Royal New Zealand Navy's Antarctic supply ship Endeavour in 1970. The specimens collected this summer are for breeding stock improvement, and as part of a programme to introduce *C. unicolor* to Mana Island.

Within 20 years of their discovery in 1788 by Lieutenant William Bligh, of H.M.S. Bounty, on an historic cruise which ended in an epic mutiny, the Bounty Islands were exploited for the rich harvest of the New Zealand fur seal (*Arctocephalus forsterii*). The seal rookeries were virtually destroyed in the first two decades of last century.

When the Antipodes Islands (49deg 41min S/178deg 43min E) were discovered in 1800 by Captain Waterhouse, R.N., in H.M.S. Reliance, he noted that the main island was desolate, mountainous,

and barren, but noticed seals in considerable numbers. Soon the sealers arrived, and the islands were exploited for more than 20 years. By then the seals were scarce, and the killing — of elephant seals as well — ended.

## SEAL SURVEY

In the last 25 years the New Zealand fur seal, protected from hunters, has been slowly recovering, although the once enormous herds are part of sub-Antarctica's stormy past. More than 1000 fur seals and 35 elephant seals were counted on the coasts of Antipodes Island by the University of Canterbury expedition in 1969. This summer the Wildlife Service expedition counted the seals on the Bounty Islands, and made a survey of the seal populations of the Antipodes Islands.

H.M.N.Z.S. Waikato sailed from Lyttelton with the expedition on November 6, and landed the first party of three scientists at the Bounty Islands. They were led by Mr C.J.R. Robertson, of the Wildlife Service, and deputy leader of the BAAS Expedition. With him were Dr G.F. Van Tets, of the Division of Wildlife, Commonwealth Scientific and Industrial Research Organisation, who was with the Lands and Survey Department's expedition to Campbell Island in 1975-76, and Dr D.H. Horning, an American now with the Australian Museum, Sydney, who spent seven years in New Zealand, and has made four expeditions to the Snares Islands, one to the Auckland Islands, and one to Macquarie Island.

This party's research included the following projects:

- (1) Breeding biology, behaviour and ecology of the Salvins mollymawk and the Bounty Island shag;
- (2) general bird survey of whole group;
- (3) Limited studies on general breeding biology of other bird species found on the occupied island;
- (4) survey of terrestrial invertebrates;
- (5) study of Bounty Islands carabid beetle larvae;
- (6) bird ectoparasites;
- (7) littoral and subtidal algae and invertebrates.

Studies of the parakeets, marine flora and fauna, sea birds, and the house mouse, the only man-introduced vertebrate in the group, were conducted by the main party of the expedition which landed on Antipodes Island in the second week of November. The leader was Mr B.D. Bell, of the Wildlife Service, who is leader of the expedition, and worked with the University of Canterbury expedition in 1969.

Wildlife Services scientists in the party were Mr P.J. Moors, who was responsible for studying the status and habitat requirements of the mice which are abundant on the main island at all altitudes, and Mr M.J. Imber, who studied the status and breeding biology of all small petrels, and surveyed their distribution. Mr R.H. Taylor, of the Ecology Division, continued the studies of the parakeets, fur seals, and elephant seals which he began in 1969, and Mr C. Hay, of the Oceanographic Institute, worked on inter-tidal and sun-tidal flora and fauna, and made a comparative study of the bull kelp (*Durvillea antarctica*) which densely infests the beach at Stella Bay.

Photographic records of the flora and fauna were made by two Wildlife Service cameramen, Messrs J. Kendrick and M. Soper, and the former also gathered sound recordings for the national sound collection of bird calls. General assistance with various projects was given by a Wildlife Service trainee, Mr A. Cox. Messrs A.L. Burrows and M.M. Gill, of the Physics and Engineering Laboratory, occupied magnetic stations on the island; they had occupied one station earlier on the Bounty Islands.

## OFFSHORE ISLETS

From Antipodes Island the party surveyed Bollons Island to the north of the main island, and all offshore islets, to determine the status of the flora and fauna. Other projects included a census of the Wandering Albatross, banding of its chicks, and studies of its general breeding behaviour and ecological requirements. The status of mollymawks and shags in their groups was also



**Antipodes Island looking south along the west coast with Orde Lees Islet and, beyond, the Windward Island. This photograph was taken by Mr R.J. Stanley, of the Marine Department, who was a member of the University of Canterbury expedition to the island in 1969.**

studied. A new hut was erected on the main island, and repairs were made to the castaway depot in Hut Cove.

Towards the end of November a party led by Mr R. Nilsson, of the Wildlife Service, landed at the Auckland Islands and the Snares Islands. This party included three officers from the Lands and Survey Department, Mr G. Rowan, chairman of the Outlying Islands Coordinating Committee, and Messrs J. Newton and Stewart, who provided general assistance in hut building and repair work.

In the Auckland Islands four magnetic stations on the main island and Adams Island were reoccupied, and the main huts and the cemetery were inspected. Huts were also inspected and a magnetic station reoccupied on the main island of the Snares group. The programme also

included air photography for bird surveys at the southern end of Adams Island, Disappointment Island, Enderby Island, and the northern coast of the main island. At the Snares the programme provided for air photography of the western chain of islets for mollymawk counts.

#### SEABIRD MAPPING

Sir Robert Falla, and Messrs J. Jenkins and N. Cheshire made specific observations of the distribution and habits of birds at sea during the expedition. These were to contribute to the seabird mapping scheme, and were of special importance because most species were breeding. This enabled the observers to assess feeding zones and the possible relationships with foreign fishing fleets operating in sub-Antarctic waters.

Provision was also made in the programme for the collection of small numbers of Erect-crested penguins (*Eudyptes sclateri*) and 17 species of marine and land birds. These collections, which included skeletal material and eggs, were made for scientific study by members of the expedition, and national collection repositories. Seabird food samples, and marine flora and fauna were also collected, and a botanical collection to assist with the identification of food species for parakeets.

Material for documentary films showing aspects of the natural history of the sub-Antarctic was obtained by a team from Television One. Messrs N. Hurray (director) and R. Brown and E. Samuelson, also obtained general and specific film from all the island groups. These covered habitat, flora, and fauna, the operation of the expedition, and H.M.N.Z.S. Waikato's operations on her fisheries patrol.

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## N.Z. frigate aids Soviet trawler

A badly injured seaman aboard a Soviet trawler in sub-Antarctic waters was rescued on November 15 by a Wasp helicopter from the New Zealand frigate Waikato. Rough seas and an icy gale with temperatures down to minus 5deg Celsius made the winching of the seaman from the heaving deck of the trawler Ardatov to the helicopter a hazardous operation.

Before H.M.N.Z.S. Waikato located the Ardatov 260 nautical miles south of the port of Bluff the seaman, Oleg Alexandrovich Abramov, had been lying for 36 hours in the trawler's sick bay. He suffered internal injuries and multiple fractures of the left leg and thigh when he was hit by a ballast weight during a trawl. After his transfer to the Waikato he was flown to hospital in Dunedin early on the morning of November 16 when the frigate was 60 nautical miles off the New Zealand coast.

On November 13 the Waikato sailed from Wellington to pick up scientific parties from the Antipodes and Bounty Islands. She received a call for help from the Ardatov early on the evening of November 14, and made a high-speed dash of 400 nautical miles to rendezvous with the trawler south-east of Campbell Island. Because the Ardatov's radioed position was out one degree of latitude — 60 nautical miles — the Waikato had to make a radar, helicopter, and visual search for the trawler, which took nine hours. Lieutenant J. Tunnicliffe, pilot of the helicopter, spent more than five hours searching in conditions made

almost impossible by minimum visibility, high winds, heavy seas, and, at times, snow.

When the Ardatov was finally found in the centre of a storm. Lieutenant Tunnicliffe had the difficult task of landing Chief Medical Petty Officer and Flight Sergeant B. Woodcock on to the pitching trawler. He returned 20 minutes later to pick up the Soviet seaman, strapped in a stretcher, and Flight Sergeant Woodcock. By 6.45 p.m. Abramov was in the ship's sick bay. At three o'clock the next morning he was flown to hospital while the Waikato headed for Port Chalmers in still stormy seas.

In June this year another Soviet trawler, the Akhiles, which was fishing in sub-Antarctic waters, was diverted more than 160 nautical miles to pick up a sick radio operator at the New Zealand meteorological station on Campbell Island. Stewart Hume, who had been suffering from a serious eye infection for three weeks, was picked up late on the afternoon of June 27 and brought to Bluff on June 29 for medical treatment.





SUB — ANTARCTIC

# Fur seal population on Gough Island

Gough Island now has the largest population of Amsterdam Island fur seals (*Arctocephalus tropicalis*) to be found anywhere. In 1955 the population was about 13,000. Scientists from the Mammal Research Institute of the University of Pretoria now report that a conservative estimate of the number of fur seals on the island is 125,000.

Assessment of the fur seal population is part of the field work in the second phase of the Gough Island pinniped research programme started in the 1977-78 summer breeding season. The research team consists of Dr M.N. Bester, who has been responsible for seal research on the island for the last four years, and his assistant, Mr A.F. Seabrook.

Gough Island's 23rd relief team of 10 men arrived in October last year aboard the relief ship RSA after she had made a four-day visit to Tristan da Cunha 400km to the north. The leader, Gustav Goldshagg, reports that a working party from the Public Works Department spent three months on the island before the team's arrival with quite staggering results.

Construction work last year included extensions to the team's headquarters, Gough House, including five bedrooms, a bathroom, a sitting room-film room with a bar, and the installation of cool and deep freeze rooms. Additional storage capacity for diesel fuel was provided by the erection of seven more tanks. The 10 tanks can hold 113,000 litres of fuel. The P.W.D. men also built a large store, and installed two supercharged six-cylinder 80-horsepower diesel engines, each with a 60-kVa alternator.

## WELCOME MAIL

Although Gough Island is 2900km from Cape Town far out in the South Atlantic, the relief team has had some links with civilisation and other South

Africans this year. Letters and parcels from home arrived when a crayfishing vessel from the Tristan Development Company arrived to fish around the island, and Mid-winter's Day on June 21 was celebrated with a most successful concert over the air waves with Sanae, the South African base in western Queen Maud Land. Passing oil tankers and fishing vessels provided another link with the outside world.

In his report Gustav Goldshagg says that the team was fortunate to have an amateur radio station ZD9GG on the island. Ean Retief's call sign was actually ZSiPR, and he was able to add ham operators in 111 countries to his DX log. Some of his contacts were made through communications satellites.

## WINTER STORM

One feature of the winter weather recorded by the senior meteorologist, J. Ferreira, and his three assistants, was a storm from the east in June. It lashed mountainous waves over the 50m-high escarpment, and one spectator was hit in the face by a small fish while he stood in the magnificent spray.

Heavy rain fell, and 130mm were recorded within 24 hours. This mass of water changed the landscape, causing landslides on the steep slopes all over the island. The first snow of the year — a novelty for most of the team — fell on July 19. Other weather phenomena were the rainbows at night with a bright moon and partly misty weather.

Comparisons of meteorological data with that of previous years revealed that the island experienced a little less unshine and rainfall than usual. There were 1356.1 hours of sunshine against a mean of 1432.6 hours a year, and 3325mm of rain against a mean of 3396 a year. Pressure and temperature means correlated well with the figures of previous years. They were 1014.9 MBS and 11.5deg Celsius respectively.

## SEAL RESEARCH

Seal studies this year have concentrated on the population dynamics, reproductive physiology, and trophic relationships of the Amsterdam Island fur seal. These studies complement the first phase of the research programme which dealt with the seals' habitat selection, seasonal population changes, and some aspects of their behaviour.

Incidental to the fur seal work, attention is being paid to the small colony of southern elephant seals (*Mirounga leonina*), which also breed on the island. In this case emphasis is on the assessment of the population size, local distribution, and seasonal haulout pattern.

Both pinniped species are subjected to a programme of tagging. This is to provide a reservoir of known aged seals for life history studies, and to provide information on local and possible long distance movement.

Perhaps the most outstanding feature of the fur seal population is the remarkable recovery in numbers since 1829. Sealers reported then that the fur seals, which abounded on the island, had abandoned it. By the 1955-56 summer breeding season the Gough Island Scientific Survey Expedition found that population had increased to above 13,000.

## SEASONAL COUNT

At present, the accurate assessment of the fur seal population during the time of the seals' maximal haulout has been thwarted by the inaccessibility of some of the beaches in the absence of

motorised sea transport. The present practice of swimming to those leeward east coast beaches which are inaccessible overland, in part solved the problem.

The part of the coastline covered so far produced an unadjusted count of 57,000 fur seals, pups of the season included. Extrapolation of this count to estimate the total population produced a figure of 125,000. This is considered an under estimate.

The Gough Island population of *A. tropicalis* therefore is the largest of its kind found anywhere. Furthermore, the growth of the population which is measured by the increase in the number of births since recent counts, is by no means complete. However, a decrease in the population growth rate is manifesting itself.

The Gough Island elephant seal population is, however, very small in comparison. It consists of an estimated 200 individuals, and therefore has remained the same, if not declined to some extent, during the last 22 years since the first documented count of less than 300 elephant seals was made.

During the last five years the pup yield has remained at below 40 annually. Careful monitoring of the elephant seal population is necessary to determine the future trend in its numerical status.

## VAGRANT BIRDS

Gough Island's bird population is numbered in millions, which include 21 species of seabirds known to breed in the island, and two species of resident land birds. But vagrant land birds and visiting seabirds excite more interest from the ornithologists.

Pintado petrels (*Daption capensis*) are regarded as rare visitors, but numbers of them became a common sight in offshore waters from June onwards. They were seen feeding on offal from seal carcasses disposed of during culling operations.

While the northern giant petrel (*Macronectes halli*) is commonly accepted as breeding on the island, the southern giant petrel (*M. giganteus*) is at least a winter visitor. A beautiful white speci-

men with asymmetrical black spots was seen scavenging on a seal carcass in June.

Visiting seabirds seen ashore were restricted to a few sightings of what appeared to be an immature kelp gull (*Larus dominicanus*). Unfortunately, the ardent bird watchers were not rewarded by another visit from the King Penguin (*Aptenodytes patagonicus*) which came ashore in February, 1974, and was found loitering around on Seal Beach, dwarfing the local rockhopper penguins.

### ALBATROSSES SIGHTED

There has been no record of the presence of a black-browed albatross (*Diomedea melanophris*) around Gough Island since April 21, 1904. The sighting was discovered later as doubtful, and a probable confusion with a juvenile yellow-nosed albatross (*D. chlororhynchus*).

But in December last summer no less than four black-brows were sighted offshore in association with the Tristan Development Company's crayfishing vessel. The time of sighting was curious because the birds would have been expected round the island in winter as the adults would presumably be attentive to their sub-Antarctic nesting sites during summer.

Only two vagrant land birds were sighted ashore during the winter. They were egrets of the Ardeidae family, which visited the island individually. One was found dead a few days later in an emaciated condition.

### BANDING PROJECT

Biological research has not been restricted entirely to the pinnipeds. The resident mammalogists have been banding the Tristan wandering albatross (*Diomedea exulans dabbenena*). This sub-species breeds almost exclusively on Gough Island.

This project was undertaken in response to a request from the secretary of the bird-banding scheme of the Australian Commonwealth Scientific and Industrial Research organisation's Division of Wildlife Research. It was

arranged in collaboration with the University of Cape Town National Unit for Bird-ringing Administration (NUBRA).

Part of the exercise is to see if any of the wandering albatrosses find their way to the coast of Australia between breeding seasons like those on South Georgia, Kerguelen, Marion, and the Auckland Islands. One rewarding result was to find a wandering albatross ringed on location 22 years ago by the Gough Island Scientific Survey.

Dr J.F. Voisin, from the Laboratoire de Zoologie, Ecole Normale Supérieure in Paris, came to the island for a brief visit with the relief ship during October to investigate the giant petrels *Macronectes* sp. for taxonomic purposes. Time and circumstances allowed only a small sample to be investigated. However, giant petrels have been caught, identified, ringed, and body measurements recorded to augment Dr Voisin's information.

Seeds of the island tree, *Phylica arborea* have also been collected on behalf of Dr N.M. Wace, formerly a member of the 1955/56 Gough Island Scientific Survey. Dr Wace is now attached to the Research School of Pacific Studies, Australian National University, Canberra.

## Soya ends sea service

Japan's first Antarctic supply ship has retired after 40 years' service in the Pacific, the Antarctic, and the seas around Japan. The Soya, which carried the first six Japanese Antarctic Research Expeditions south between 1957 and 1962 was decommissioned on October 3 this year, and now will be preserved in the Ship Museum in Tokyo.

Since 1963 the Soya has been active in the seas around Hokkaido for the Japanese Coast Guard. She retired from service on July 29 this year, and made her last voyage around Japan between August 1 and September 3.

# Brian Roberts, authority on polar world

One of the chief architects of the Antarctic Treaty, and a world authority on the birds of the south polar regions, Dr Brian Birley Roberts, died in England on October 9. He was 65. He began his association with the polar regions as ornithologist of the British Graham Land Expedition led by John Rymill in 1934-37, and for more than 30 years played a leading role in the shaping of Britain's Antarctic policy as head of the Polar Regions Section, Joint Research Department, Foreign and Commonwealth Office.

Dr Roberts was not only the Foreign and Commonwealth Office expert on Antarctic problems, he was at the same time a research associate of the Scott Polar Research Institute, Cambridge, and a Fellow of Churchill College. His career was devoted to the expansion and improvement of polar research, and he became the most profoundly knowledgeable specialist on the polar regions in Britain, and perhaps in the world.

His interest in the polar regions began when he was a schoolboy, and during his undergraduate days at Emmanuel College, Cambridge he made his first visits to the Arctic, leading expeditions to Iceland in 1932, and to East Greenland in 1933. As a member of the British Graham Land Expedition, which spent three summers and two winters in the Antarctic, he did detailed work on the birds of Graham Land, South Georgia, and the Falkland Islands.

Because he suffered from recurring appendicitis during the expedition's first winter Dr Roberts sailed in the *Penola* for the Falkland Islands where he was operated on. When the *Penola* went to South Georgia for a refit he remained on the island to continue his studies of south polar birds. He also worked on the Falkland Islands and made a voyage in the Royal Research Ship *Discovery II*. His ornithological work on the expedition earned him a Cambridge Ph.D. when he returned.

After his return Dr Roberts worked at the Scott Polar Research Institute, and during the Second World War he served in naval intelligence. In 1943 he was

borrowed to assist in the organisation of Operation Tabarin, the secret wartime forerunner of the British Antarctic Survey, which established the first British bases in the Antarctic Peninsula area.

Dr Roberts played an active part in the formation of the British Antarctic Survey and several major polar expeditions, in the establishment of the British (now International) Glaciological Society, and in negotiations on the terminology and place names of Antarctica. He also played a large part in the development of the Scott Polar Research Institute's library as a world centre of polar information, and produced a chronological list of Antarctic expeditions, papers on the organisation of polar information and a classification system for polar libraries, and an illustrated glossary of snow and ice with Terence Armstrong and Charles Swithinbank.

In 1967 Dr Roberts edited "Edward Wilson's Birds of the Antarctic", a selection of more than 300 drawings and paintings were from the collection in the Scott Polar Research Institute. Dr Roberts wrote a short memoir of Wilson, an assessment of his abilities and motives as an ornithologist and artist, and an account of his methods.

By bringing his expertise to the polar desk at the Foreign and Commonwealth Office Dr Roberts was able to exert a significant influence on the negotiations that led to the Antarctic Treaty in 1959. As a United Kingdom representative he was a universally respected figure at the consultative meetings of the representat-



ives of the signatory nations. He attended all the meetings up to 1975, the year of his retirement, and played a primary role in the negotiations which resulted in 1972 in the production of the Convention for the Conservation of Antarctic Seals which came into effect on March 11 this year.

In 1969 Dr Roberts was made a Companion of the Order of St Michael and St George, and in 1976 he was awarded the Founders Medal of the Royal Geographical Society. He was elected president of the Antarctic Club in 1963, and of the Arctic Club in 1973.

Dr Roberts was the British observer with the United States Navy expedition which explored the Bellingshausen Sea in the icebreakers *Glacier* and *Staten Island* in 1961. With three men of the expedition flown inland 56km to obtain a final mapping control point from an isolated rock outcropping on the Eights Coast Dr Roberts was caught in a blizzard. The party was rescued after nearly three days in the open without food or water.

## “Herb” Orr in first I.G.Y. party

One of the members of New Zealand's first Antarctic expedition, Reginald Herbert Orr, died in Wellington on July 8 after a long illness. He was 51. Orr, a senior technical officer in the Geophysics Division, Department of Scientific and Industrial Research, went south in 1956 with the winter party for the International Geophysical Year led by Dr Trevor Hatherton, and established the seismological station at Scott Base where he wintered in 1957.

“Herb” Orr worked with the D.S.I.R. for 35 years except for three years when he was engaged in seismic prospecting for oil in the United States, Nigeria, and the Middle East. He was born in Christchurch, and joined the D.S.I.R. radio development laboratory in 1943. In 1946, after a year's service in the Royal New Zealand Air Force, he joined the staff of the Dominion Physical Labor-

In 1972 Dr Roberts was in New Zealand again as a United Kingdom representative at the seventh consultative meeting of the Antarctic Treaty nations in Wellington. He was in a party of representatives from each delegation which visited McMurdo Station, Scott Base, and the Amundsen-Scott South Pole Station. His third visit to the Antarctic was made in 1976 when he returned to the Antarctic Peninsula for the first time since 1934 as the guest of the British Antarctic Survey.

Like other scientists who have worked in Antarctica Brian Roberts has left his name there. It was given by the British Antarctic Place Names Committee in 1955 to a large ice piedmont which occupies the north-east corner of Alexander I Island. But he will be remembered by the Antarctic community not just by a name on the map. His friends and colleagues will not forget his incisive intelligence, rigorous standards, meticulous attention to detail, and unflagging capacity for work. Even more they will remember his sense of humour and his kindness.

atory, transferring in 1948 to the Geophysics Division.

Between 1951 and 1954 Orr was overseas. When he returned to New Zealand he rejoined the Geophysics Division, and was engaged in seismic observations. These and magnetic work were his responsibility at Scott Base during the I.G.Y. He was in charge of the seismometers for earthquake investigations which were housed in a small hut 182m away from the main base.

About 800 earthquakes were recorded at Scott Base in 1957, including many distant ones. An earthquake of moderate severity in the southern part of the North Island of New Zealand occurred at 5.47 p.m. Orr recorded it on his sensitive instruments only seven minutes later.

In addition to his scientific duties at Scott Base Orr took part in one of several spring journeys made from the base after the winter of 1957. He was in a tractor party led Sir Edmund Hillary which visited the western side of McMurdo Sound on a depot-laying mission. This party was in the field for eight days and travelled 259km in its

three modified Ferguson farm tractors.

Orr also flew as an observer on one of the photographic flights which covered 321km of the Ross Island coastline. He made another flight from Scott Base to the Northern Party's depot on the edge of the Polar Plateau at the head of the MacKay Glacier to make a gravimetric reading.

## Veteran of Terra Nova's crew

One of the three surviving members of Scott's last expedition, William McDonald died in Christchurch on November 17 at the age of 86. McDonald, who joined the Terra Nova as an able seaman at Lyttelton, made two voyages south between 1911 and 1913.

There are now only two survivors of the expedition. They are Major Trygvve Gran, the Norwegian member of the shore party, who is 89, and William Burton a shipmate of McDonald, who was an assistant engineer on the Terra Nova's three voyages. Burton lives in Christchurch, and was 90 in April this year.

Born in Glasgow, McDonald went to sea at the age of 14, sailing in immigrant ships to New York, and later in vessels trading to Australia and New Zealand. There was no vacancy in the crew of the Terra Nova when she sailed from England, but Lieutenant H.L.L. Pennell, the navigating officer, who commanded the ship on her last two voyages, told McDonald there would be a job for him as an able seaman if he could get to Lyttelton.

When McDonald joined the Terra Nova for her second voyage south he had been serving in New Zealand coastal ships. He went to Cardiff with the ship after the expedition, and then returned to New Zealand as bos'n of the Kaiapoi. After serving in several New Zealand ships again he joined the Customs Department in 1914.

McDonald enlisted in the New Zealand forces at the outbreak of the First World War. He was severely wounded on Gallipoli, and later was invalided home. When he recovered he rejoined the

Customs Department in 1917, retiring in 1954.

For his service with the expedition McDonald was awarded the Polar Medal in silver, and also received the Royal Geographical Society's medal. He was an honorary life member of the Canterbury branch of the New Zealand Antarctic Society, and until he was prevented by ill-health in recent years, attended all its functions, and special Antarctic occasions.

In 1963 McDonald and two other members of the crew of the Terra Nova, Mortimer McCarthy, of Lyttelton, who died a few years ago, and William Burton, of Christchurch, were the guests of Rear-Admiral James R. Reedy, the United States naval support force commander, and returned to the Antarctic after 50 years' absence. They sailed from Lyttelton aboard the Arneb, and visited Hallett Station, McMurdo Station, Hut Point, Cape Royds, Cape Evans and Scott Base.

Before the Terra Nova left McMurdo Sound for the last time in 1913 McDonald, McCarthy, and Burton, assisted in the erection of the cross on Observation Hill to the memory of Scott and his companions who died on their return from the South Pole. They were unable to climb Observation Hill in 1963, but they were flown over it in a United States Navy helicopter.



# Scientists and dog driver with Byrd

Three veterans of Rear-Admiral Richard Byrd's first three Antarctic expeditions have died since the beginning of this year. Frederick E. Crockett, who died on January 17 was a dog driver with the 1928-30 expedition. Dr Thomas C. Poulter, second-in-command and chief scientist of the 1933-35 expedition, died on June 14, aged 81, and Dr F. Alton Wade, a geologist with the same expedition, and senior scientist with the United States Antarctic Service Expedition of 1939-41, died on October 1 at the age of 75.

Poulter has been described as "a Renaissance man of the sciences," who found time to explore for meteorites, design an Antarctic snow cruiser, invent seismic methods for oil discovery, and along the way taught physics, chemistry, and biology, and became an expert in geology, meteorology, biophysics, and many fields of engineering. At the time of his death he was exploring yet another new field — the application of engineering methods and electronic implants in the reconstruction of the human ear to aid the deaf.

In Antarctica Poulter pioneered meteor and aurora research, and carried out the first programme of seismic soundings on the Ross Ice Shelf. A man of giant strength in those days, he was not only a theoretical physicist, but one of the most practical men any expedition could hope to have among its staff.

Poulter is remembered for the history of United States Antarctic exploration, as the leader of the tractor party which rescued Byrd from a certain death in the winter of 1934. Byrd spent nearly four months of the winter alone on the Ross Ice Shelf at Advance Base 198km south of Little America. He made regular weather observations, but was gradually poisoned, first by fumes from his stove, and then by carbon monoxide from the petrol-driven generator which provided power for the radio.

When Byrd's messages became erratic the men at Little America suspected that something was wrong. Poulter led three

attempts to reach Advance Base, but all failed because of mechanical difficulties, blizzards, and extremely low temperatures. Then early in August he and two companions reached the tiny base where they remained for two months to nurse Byrd back to health.

When Byrd returned to the Antarctic for the third time as commander of the United States Antarctic Service Expedition Poulter was with him as scientific director. As a director of the Research Foundation of the Armour Institute of Technology in Chicago Poulter had designed the mammoth Snow Cruiser, a vehicle so huge that it was expected to cross Antarctic crevasses unhindered, and as a virtual expedition on wheels make its way to the South Pole.

When fully loaded the Snow Cruiser weighted 33½ tonnes. It was 16.75m long, 6m wide, and 4.5m high. Its wheels, 3m in diameter, weighted three tonnes each. Nestled on the roof was a Beechcraft ski plane for reconnaissance. Inside the vehicle was a miniature base complete with bunks, galley, darkroom, laboratory, and machine shop. The design provided for the carriage of enough fuel for 8000km, plus petrol for the plane and one year's supplies for a crew of four.

Under the command of Wade the Snow Cruiser was to function as an independent roving base. Poulter managed to drive the vehicle from the supply ship North Star on to the ice, but its sheer size



One of the Terra Nova veterans, William McDonald, who died in Christchurch last month, returned to McMurdo Sound 50 years later as a guest of the United States Navy in 1963. Here he looks at a New Zealand illustrated paper dated 1908 in Scott's hut at Cape Evans. On his right is Mortimer McCarthy, who died a few years ago, and on his left is William Burton, of Christchurch, now one of the two surviving members of Scott's last expedition.

U.S. Navy photo

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put paid to the dreams of travel across the ice sheet. By some oddity, the Snow Cruiser sank into the snow, and then could not climb over the kerb of higher snow which formed in front of its wheels.

The idea of independent operation was abandoned, and Wade and his three men, plus their aircraft, remained with the West Base unit of the expedition.

Poulter joined the Research Foundation of the Armour Institute in 1936, and left to go to the Stanford Research Institute, now Stanford Research International, in 1948. He was its scientific director for many years, and after his retirement continued his work as a

research consultant. An active member of the American Polar Society from its inception in 1935, he had been its vice-president since 1945.

Although Wade failed to reach the South Pole in the Snow Cruiser he became internationally known for his geological work in the Antarctic, and was an authority on the geology of Marie Byrd Land. He was the geologist in the Eastern Party of Byrd's second expedition which spent three months exploring and making scientific observations in the virgin unmapped territory of Marie Byrd Land.



This party, led by Dr Paul Siple, made a journey of 1387km (not counting side trips) by dog team, and reached the northern part of the Edsel Ford Ranges. This was the first scientific reconnaissance of land discovered by aircraft, and the party brought back a wealth of geological and biological specimens.

Although Wade did not reach the South Pole by Snow Cruiser, he was able to lead a small geological party to the Rockefeller Mountains to continue the study of these peaks which he had begun during Byrd's second expedition. He also spent much of the winter at West Base studying the ice layers under the camp.

Wade's interest in the geological history of Marie Byrd Land was maintained for more than 35 years after his return from the 1939-40 expedition. He was head of the Texas Technological University's department of geology from 1954 to 1964, and also a professor of geosciences at the university from 1954 to 1973. For the last five years he had been a research associate at the university museum.

In 1962-63 Wade spent two months studying the geology of the Antarctic Horst near the Shackleton Glacier. He returned to Marie Byrd Land in 1967-68 with Dr Wesley E. LeMesurier, of the University of Colorado, and discovered evidence of volcanic activity in the Hal Flood Range and the Executive Committee Range. In 1969 he was one of a party of distinguished Antarctic scientists flown to the Queen Alexandra Range to view the fossil remains of the reptile *Lystrosaurus*.

Wade was best known in the university world for his work in strengthening the graduate geology programme at his university. Another continuing Antarctic interest was the American Polar Society. He became its president in 1969 and held the office at the time of his death.

Frederick Crockett, who was 70 when he died, was among several young Americans who went south in Byrd's

first expedition with no sledging experience, but developed extraordinary skill in dog handling. He was one of three Harvard University students whom Byrd christened the Three Musketeers. The others were Norman Vaughan and Edward E. Goodale.

As a radio operator and dog driver Crockett was a member of the Geological Party led by Dr Laurence M. Gould which sledged more than 2400km in 11 weeks to support Byrd's flight to the South Pole, and explore the Queen Maud Mountains, and the mountains reported by Amundsen to lie east of the Ross Ice Shelf. This party climbed Mt Fridtjof Nansen, and discovered several glaciers flowing into the Ross Ice Shelf.



## THE READER WRITES

Sir,

It has taken two letters already to dispel what is said to have been a legend about the 30-year absence of visitors from McMurdo Sound 1916-1946, so perhaps the editor and readers will tolerate a third comment.

"James Pigg" (June, 1978) draws attention to the exploratory voyage of the whale-chaser *Star I* in January, 1924, and surmises that the details might be hidden away in old whaling records. "Moby Dick" (September) reveals that J. Gordon Hayes devoted a page of his historical survey in 1932 to this voyage, and speculates that reports of Captain G.S. Hooper to the Marine Department might give a fuller description of an historic cruise.

The fuller description was published in 1924 by A.J. Villiers, first in articles in the Hobart "*Mercury*" in May and June, and later in book form ("*To the Frozen South*") in August of the same year.

Yours etc.

RIP VAN WINKLE

## More "Day Trips" to Antarctic

More than 2250 Australians, New Zealanders, Japanese and Americans, made "day trips" to Antarctic by air this summer. This was the third time two international airlines, Qantas and Air New Zealand, made flights from Australia and New Zealand. Qantas operated five charter flights from Sydney with Boeing 747B aircraft, the first on October 28, and the others on November 5, 9, 16 and 23. Air New Zealand's four DC10 flights from Auckland with landings at Christchurch on the way home were made on November 7, 14, 21, and 28.

Each Qantas 747B carried up to 300 passengers, and a crew of 22, including an extra pilot because of the long tour of duty — 11½ hours flight time and two hours on the ground before and after each trip. The aircraft followed a common route from Hobart to the first Antarctic landfall, desolate Cape Hudson at the tip of the Mawson Peninsula in George V Land.

Two sightseeing routes are used for the Antarctic flights, the choice — made before reaching Cape Hudson — depends on the situation at the time. One route follows the coast of George V Land as far as the French base, Dumont d'Urville, in Adelie Land, and then back over the South Magnetic Pole, which is now at sea. The other route is over Oates Land and Victoria Land to Cape Washington at 74deg 30min S. On the return flights the aircraft pass over the former joint United States — New Zealand station at Cape Hallett, and Cape Adare at the north-east tip of Victoria Land.

Air New Zealand's DC10s carried up to 220 passengers on each of the flights last month. There were 34 Japanese on the first flight, 55 on the last, and also 37 Americans. The flights followed the usual route south from New Zealand over the Auckland Islands and the Balleny Islands to the McMurdo Sound area.

There will be competition in the Antarctic tourist cruise business for the Lindblad Explorer this summer. Both the World Discoverer, operated by a West

German travel firm, and the Enrico C, which flies the flag of the Costa Line, of Genoa, will return to the Antarctic Peninsula area this season, making calls at various bases.

Last season both the Enrico C and the Lindblad Explorer encountered very bad ice conditions. The Lindblad Explorer was unable to reach the United States Palmer Station on Anvers Island on any of her three cruises, although she called at other stations. Passengers on the Enrico C were unluckier; they were unable to land at any of the bases.

Two Antarctic cruises were included in the World Discoverer's adventure cruise programme in 1977-78. Both were to the Antarctic Peninsula area, and also to the British Antarctic Survey base, Halley, off the Caird Coast of the Weddell Sea. Because the approaches were blocked by ice the ship could not visit the station on December 26. Ice and weather conditions were still bad on the second visit on January 10, but about 70 passengers were ferried ashore.

Built in 1974, the World Discoverer was designed for adventurous travellers seeking cruises to remote parts of the world. She is 3200 tonnes, 86.8m long, and has a cruising range of 12,875km with 120 passengers. This season her operators have planned one Antarctic cruise, starting early February next year. Calls will be made in the Antarctic Peninsula area at King George Island, Hope Bay, Anvers Island, Port Lockroy, and Deception Island.

There will be no cruise this summer from Australia to Cape Adare and the sub-Antarctic islands. The promoter, Mr Dick Smith, of Sydney, has deferred his plans until the 1980-81 season.



# ANTARCTIC

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

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

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

## NEW ZEALAND ANTARCTIC SOCIETY (INC.)

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

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

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

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

**New Zealand Secretary**

P.O. Box 1223, Christchurch

**Branch Secretaries**

Canterbury: P.O. Box 404, Christchurch.

Wellington: P.O. Box 2110, Wellington.

