

ANTARCTIC

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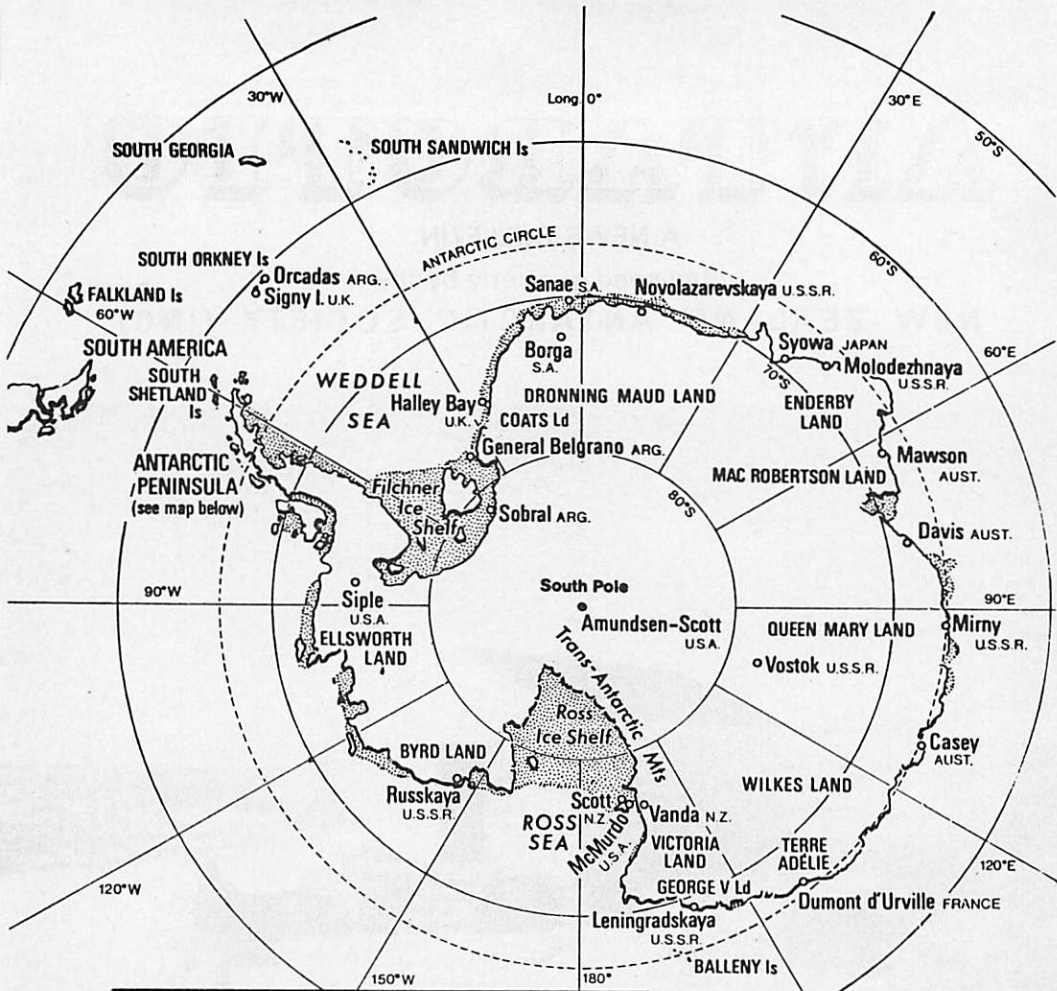
THIS BRITISH ANTARCTIC SURVEY REFUGE HUT IS AT THE DAMOY POINT AIR FACILITY, WHICH IS USED BY THE SURVEY'S TWIN-OTTER AIRCRAFT IN SUMMER OPERATIONS. DAMOY POINT IS THE NORTH ENTRANCE POINT TO POINT LOCKROY ON THE WEST SIDE OF WIENCKE ISLAND.

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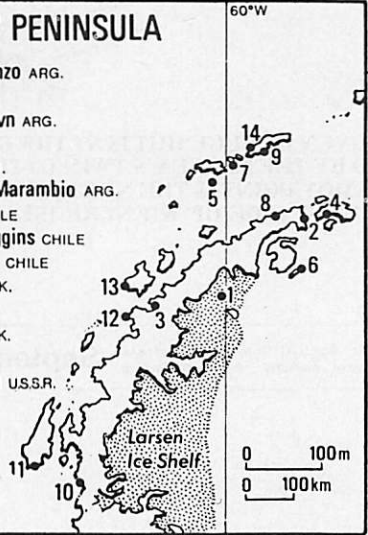
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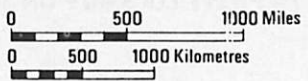


ANTARCTIC PENINSULA

- 1 Teniente Matieho 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. U.K.
- 11 Adelaide I. U.K.
- 12 Argentine Is U.K.
- 13 Palmer U.S.A.
- 14 Bellingshausen U.S.S.R.



ANTARCTICA



ABBREVIATIONS

- ARG. ARGENTINA
- AUST. AUSTRALIA
- N.Z. NEW ZEALAND
- S.A. SOUTH AFRICA
- U.K. UNITED KINGDOM
- U.S.A. UNITED STATES OF AMERICA
- U.S.S.R. UNION OF SOVIET SOCIALIST REPUBLICS

"ANTARCTIC"

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NEW ZEALAND LINKS WITH AUSTRALIA

Closer co-operation between New Zealand and Australia in Antarctic research and logistics is proposed in the New Zealand Antarctic research programme for 1977-78. This summer a Royal Australian Air Force air crew will fly with the Royal New Zealand Air Force on its support flights between Christchurch and McMurdo Station, an Australian glaciologist will work with New Zealanders in the dry valleys, and officers of the Australian Antarctic Division will visit Antarctica to discuss future programmes, including a New Zealand-Australian survey in North Victoria Land for three seasons from 1978-79.

Once again New Zealand will participate in several international programmes. Marine biologists and oceanographers will work with United States scientists on the Ross Ice Shelf Project, and four men will take part in the meteorological programme at the Amundsen-Scott South Pole Station. Support will also be given to French and Japanese parties which will work on Ross Island and in Victoria Land.

Two scientists from the University of Waikato, Professor A. T. Wilson, director of the university's Antarctic research unit, and Dr C. Hendy, a geochemist, will work at the Soviet Station, Vostok, which is 3300m above sea level, and 1110km from McMurdo Station. They will fly there in a United States Navy VXE6 Squadron Hercules to carry out geochemistry and isotope geochemistry of snow samples.

NO CUTBACKS

Economic constraints reduced the scope of the New Zealand programme last season, and there were some cutbacks. But summer scientific activity this season will be about 30 per cent above last season's. This brings it back to the level of the 1974-75 programme.

This summer the normal scientific programme at Vanda Station will be resumed, and also the Ministry of Works

glaciological and hydrological studies in the dry valleys, which were cancelled last year. Geological Survey and Soil Bureau field parties which were also withdrawn will return this season.

Vanda Station's programme will cover geophysics, earth sciences, and upper air physics, including meteorology. Its staff will also support the Ministry of Works hydrologists' monitoring of selected dry valley glaciers, the flow of the Onyx River, and the levels of Lake Vanda and other major dry valley lakes.

MAPPING SURVEY

One of the main field events will be detailed mapping by the Geological Survey of the region between the Koettlitz and Blue Glaciers. This work is a continuation of the work done by Dr D. N. B. Skinner's party in the 1975-76 season. Dr Skinner will lead the Geological Survey team this season, and the other geologists are R. Findlay, Margaret Clark, and Anne Wright.

With helicopter support, and using motor toboggans, the party will cover some 1000 square kilometres among the foothills and ridges east of the Royal Society Range. It expects to spend about 80 days in the field, starting from the Skelton Glacier at a site north of the Baronick Glacier early in November and finishing in the area of the Hobbs

and Blue Glaciers in January.

Scientific aims of the project will be to map in detail selected rock sections between the Koettlitz and Blue Glaciers, to study the structural features, investigate the change from low to high grade metamorphic rocks, and to collect samples for age dating. In their field work the geologists will cover the unmapped massif between the Foster and Renegar Glaciers, the rocks of Heald Island, and the rocks in the Chancellor Lakes area. They will also work at Lake Miers, in the Hobbs-Glacier-Blackwelder Glacier divide, and the Hobbs-Blue Glacier divide east of the Hobbs Peak.

Four scientists from the Soil Bureau will study old weathered soils in the Wright and Taylor Valleys, and in the Asgaard Range region to assist in the preparation of a book on polar soils. Two scientists from the Geophysics Division will make a gravimetric survey across the mouth of the Taylor Valley at New Harbour, and across the valley near Lake Fryxell to tie in with the old Dry Valley Drilling Project holes.

ROSS ICE SHELF

Last season because of technical drilling problems the Ross Ice Shelf Project did not complete the hole through the ice shelf, and New Zealanders taking part in this major international event could not complete their work. This season three scientists from the New Zealand Oceanographic Institute will be attached to the Ross Ice Shelf Project, and two will work in McMurdo Sound.

Temperature measurements at varying depths down the drill hole through the ice shelf will be taken by Mr N. J. Day. Mr W. Whitley will carry out benthic biota studies (echinoderms etc.) on the sea floor under the ice shelf. Dr Janet Bradford will sample pelagic copepods from under the shelf. She and Mr Whitley worked with the project last season.

MARINE BIOLOGY

With Mr J. S. Oliver, of the Scripps

Institution of Oceanography, who spent last winter diving beneath the ice of McMurdo Sound to study its benthic communities, Dr Bradford will do additional marine biological work in the area. The scientists will define further the recently-discovered microscopic animals living at the ice-water interface.

Messrs J. S. Mitchell and P. Anderson will study the composition and transport dynamics of suspended and bedload sediment beneath the seasonal ice of McMurdo Sound. They will measure concentration of suspended sediment over a tidal cycle at eight different stations, and monitor water temperature, salinity, and current velocity.

POOL DEATHS

As part of a distribution study by the Department of Health of the amoebae which cause "hot pool" meningitis, two microbiologists from Massey University, Dr T. J. Brown, and Mr R. T. M. Cursons, will sample Antarctic soil, water, and ice, and study what environmental factors are important in determining the distribution. They will work in the dry valleys, at Cape Royds, Scott Base, and in the McMurdo Sound area.

An international group will resume observations on the summit area of Mt Erebus this season. A French vulcanologist, Dr Haroun Tazieff, who worked on Erebus in the 1974-75 season, and three other vulcanologists, will spend up to three weeks with a New Zealand team making geochemical, geophysical, and geological studies. The group will sample gases from the inner crater, analyse snow and ice layers, and map warm ground areas.

A New Zealand geologist, Dr P. R. Kyle, now at Ohio State University, also plans to work on Erebus this season. He has been awarded a grant by the United States National Science Foundation to continue his studies of the volcano which began several years ago. Dr Kyle, who worked with Victoria University of Wellington expeditions for a number of seasons, was a member of the New Zealand-French-United States expedition on Erebus in the 1974-75 season.

OTHER PROJECTS

Some New Zealand support will be provided for a Japanese Antarctic Research Expedition party led by Dr T. Torii, which will work in the dry valleys, and use Vanda Station. Other members of the party will be Dr T. Cho, and Messrs. A. Yamada, and T. Yukawa. Japanese scientists, particularly Dr Torii, have worked in the dry valleys for several seasons in co-operation with New Zealand scientists.

For the third year New Zealand will co-operate with the United States in the meteorological programme at the Pole Station. Two men from the Meteorological Service will spend a full year there conducting routine upper air and surface observations, and two observers will work there for the summer.

New Zealand's men at the Pole next winter will be J. M. H. Waller (34), a computer programmer in the Meteorological Service, Wellington. The technician will be K. T. Bisset (21) a New Zealand Army technician from Trentham. This summer the observers will be K. F. Herrick (28), who works at Invercargill Airport, and T. J. Hurst (29), a meteorological trainee, who comes from Masterton.

NINE FLIGHTS

New Zealand will join with the United States again to provide logistic support for their respective programmes. This season R.N.Z.A.F. Hercules aircraft of No. 40 Squadron will make nine flights, two more than last season, between New Zealand and McMurdo Station. Air crews to load aircraft will be provided, and Army cargo handlers will work at Williams Field near McMurdo Station.

As in past seasons New Zealand will provide courses in basic snowcraft and survival techniques for United States Navy air crews, United States Coast Guard icebreaker crews, and American and New Zealand research staff. Three Antarctic Division field assistants will conduct the courses, and two R.N.Z.A.F. physical training instructors and a Royal New Zealand Army Medical Corps orderly will assist them.

Apolotok to be Preserved

Apolotok, the big Scott Base husky which lived and died in the Antarctic, will be preserved in the Antarctic centre of the Canterbury Museum. The body of the six-year-old dog was flown from Scott Base to Christchurch early this month.

To enable the dog to be prepared and mounted the New Zealand advisory committee of the Trans-Antarctic Association has granted \$1800 to the museum. It has stipulated that \$600 be used for a specific display illustrating the role of the husky in Antarctica.

Contributions to the cost of the display are being made also by the Christchurch artist, Mr Maurice Conly, who has made two Antarctic visits to work for the Antarctic Division, and the Royal New Zealand Air Force, and Mr Neville Peate, information officer at Scott Base for the last two seasons.

Mr Peate has a particular interest in Apolotok because he has written a book, "Snow Dogs", about the huskies at Scott Base. Mr Conly has drawn several sketches for the book.



Another New Zealand has been honoured for his service to the United States Antarctic research programme by having an Antarctic feature named after him. He is Mr W. J. Heaphy, who worked for the National Science Foundation at Christchurch Airport for nine years.

Heaphy Spur has been approved by the United States Board on Geographic Names as the name of a geographic feature at 77deg 14min S/161deg 15min E in the southern Clare Range area of Victoria Land.

WINTER TEAM AT SCOTT BASE

A retired New Zealand Army officer who was actively associated with the establishment of New Zealand's first embassy in Peking will be in charge of the New Zealand Antarctic research programme for the 1977-78 summer. He is Mr R. S. Straight, aged 50, who retired from the Army in 1974 with the rank of lieutenant-colonel after 21 years' service.

Mr Straight, who was born and educated in England, lives near Nelson. His service career began in 1945 with the British Army. He joined the New Zealand in 1953, and he served for three years in Israel and Syria as senior operations officer with the United Nations forces. In 1974 he joined the Department of Internal Affairs, and assisted in planning that year's Royal tour. Then he served for two years in Peking with the Ministry of Foreign Affairs, retiring in 1976.

Mr J. R. Lythgoe, aged 32, of Wellington, will be deputy-leader at Scott Base for the summer. He was an assistant maintenance officer at the base in the 1967-68 season.

Ten men have been selected to winter at Scott Base through 1978. Nine members of the team are New Zealand-born, and one is an Australian. There is one 19-year-old, and other ages range from 21 to 38.

Members of the winter team are:

J. R. Lythgoe (32), Wellington. He is a senior ranger with the Mt Aspiring National Park Board.

J. R. Thomson (25), Temuka. Base engineer. He is a former Royal New Zealand Air Force fitter-mechanic, and served at Scott Base in the 1975-76 season.

B. D. Hiscock (28), Temuka. Fitter-mechanic. He is a motor mechanic in Temuka.

M. G. Lord (38), Howick. Fitter-electrician. He is an electrician in Howick.

W. H. Williams (29), Revesby, New South Wales. Senior science technician.



MR STRAIGHT

He teaches physics at a technical college in Revesby.

W. C. Kimber (30), Otorohonga. Science technician. He is a television serviceman.

D. C. Drake (23), Hawera. Science technician. He is a technician with Radio New Zealand in New Plymouth.

R. N. Arnott (21), Queenstown. Cook. He is an R.N.Z.A.F. cook at Wigram.

R. W. Waller (19), Dunedin. Postmaster. He is a senior clerk in the Chief Post Office, Dunedin.

W. P. Dennison (33), Wellington. Post Office radio technician. He is a senior radio technician in Wellington.



SUMMER FIELD PROJECTS

Two New Zealand scientists from the University of Waikato will work at the Soviet station, Vostok, 1110km from McMurdo Station on the Polar Plateau, this season. Oceanographers will work on the Ross Ice Shelf, and two meteorologists will winter at the Amundsen-Scott South Pole Station again. They are members of the support staff of 130, including eight women, who will take part in the Antarctic research programme for 1977-78.

Scientists from six New Zealand universities will conduct research projects, and the programme will draw on staff from the Antarctic Division, the Geological Survey, the Soil Bureau, Geophysics Division, Oceanographic Institute, Institute of Nuclear Sciences, Chemistry Division, Physics and Engineering Laboratory, Meteorological Service, Health Department, Ministry of Works and Development, Lands and Survey Department, and Post Office. The programme will also include guest scientists from France, Japan, Israel, and Australia, and other workers from England, and Canada.

Men and women in the programme will work at or from Scott Base, Cape Bird, in the dry valleys of Victoria Land, and in McMurdo Sound. New Zealanders will work with Americans at the South Pole and on the Ross Ice Shelf. They will also work with the French on Mt. Erebus, and with Japanese and Australian scientists in the dry valleys.

Vanda Station, in the Wright Valley, which has been a summer station since 1970, was occupied in the winter of 1974. Last season it was occupied only for short periods to provide operational support for parties working in the dry valleys. This season the normal scientific programme will be continued by a team of four men led by Mr E. J. Saxby, who will spend his third summer in the Antarctic.

Two of the eight women in the programme are geologists, Margaret Clark and Anne Wright, who will work for the Geological Survey in the region between the Koettlitz and Blue Glaciers of

Victoria Land. Another, Jocelyn Lang, will work as a field assistant in McMurdo Sound and the dry valleys with a Victoria University of Wellington team.

Elsbeth Wingham will work for a second season with the University of Canterbury team at Cape Bird, and Roslyn Freeth will take part in the University of Otago parasitological studies of seals and fishes near Scott Base. Patricia Harris will do general duties at Scott Base during the summer, and Dr Janet Bradford, of the Oceanographic Institute, will be working again further from Scott Base than any other New Zealander in the field when she flies to the Ross Ice Shelf in December.

This summer Scott Base will have a chaplain for the first time. He is the Rev. M. H. Brown, vicar of the Christchurch parish of St. Mary's, Merivale, and a Territorial Army chaplain.

Since the 1961-62 season representatives of New Zealand youth organisations have visited Scott Base and assisted with the research programme. This season Peter Stevens (Boys' Brigade), Peter de Jong (Scout Association) and Ross Barnhill (St John Ambulance Brigade) will go south from Wellington in the United States Coast Guard icebreaker Burton Island, and return to Lyttelton in the supply ship Schuyler Otis Bland. Last season's representatives were Ian Landreth (Boys' Brigade), Jim Trotter (Scout Association), and Ian Wilson (St John Ambulance Brigade).

SCOTT BASE

- R.S. Straight**, Nelson. Leader
J. R. Lythgoe, Wellington, Deputy leader.
R. G. O'Donnell, Oakura. Maintenance officer-carpenter.
A. D. MacLeod, Dunedin. Assistant maintenance officer.
S. P. Chambers, Waiouru. Assistant maintenance officer.
W. F. Turnbull, Napier. Storekeeper.
P. M. (Patricia) Harris, Ashburton. General duties.
M. C. Bradstock, Wellington. Information officer-photographer.
E. C. Day, Chatham Islands. Post Office clerk.
D. D. Picard, Wellington. Post Office clerk.
S. D. Cooke-Willis, Auckland. Post Office radio technician.
C. A. Roper, Christchurch. Technician, Physics and Engineering Laboratory.
A. L. Burrows, Christchurch. Technician, Physics and Engineering Laboratory.
T. O'Neill, Christchurch. Technician, Physics and Engineering Laboratory.
M. Gill, Christchurch. Technician, Physics and Engineering Laboratory.
R. Dunkley, Christchurch. Trainee, Physics and Engineering Laboratory.

VANDA STATION

- E. J. Saxby**, Queenstown. Leader. He was an assistant maintenance officer at Scott Base in the 1974-75 season, and a field leader in the 1975-76 season when he worked with the Americans at Dome C in Wilkes Land on the recovery of their crashed Hercules aircraft.
C. K. Longson, Auckland. Technician.
B. J. Scott, Rotorua. Technician.
R. R. Brice, Christchurch. Field assistant.

University projects are outlined elsewhere. Other projects and the participants are:

Ministry of Works and Antarctic Division. Glaciology and hydrology in the dry valley area. **T. J. Chinn**, leader/**T. Omundsen**, hydrologist; **J. Palmer** and **N. Nalder**, Lands and Survey Department surveyors.

Geological Survey. Geological mapping of region between Koettlitz and Blue Glaciers. **Dr D. N. B. Skinner**, leader; **R. Findlay**, **Margaret Clark**, and **Anne Wright**, geologists.

Meteorological Service. Upper air and surface observation programmes at South Pole Station. **J. M. Waller** and **K. T. Bisset** (winter); **K. F. Herrick**, **T. J. Hurst** (summer).

Institute of Nuclear Sciences. Continuation of monitoring programme by Scott Base laboratory staff as part of Southern Hemisphere study of carbon 14 content of the atmosphere.

N.Z. Oceanographic Institute. Marine biological and oceanographic studies in Ross Ice Shelf Project. **Dr Janet Bradford** (marine biologist), **N. J. Day** (oceanographer), **W. Whitley** (oceanographer). Study of sediment beneath seasonal ice of **McMurdo Sound**. **J. S. Mitchell** and **P. Anderson** (oceanographers).

Geophysics Division. Gravimetric survey in Taylor Valley. **S. R. Hicks**, **D. J. Bennett** (geophysicists), **M. J. Wenden** (field assistant).

Physics and Engineering Laboratory. Continuation of upper atmosphere studies, aurora and air glow, earth currents, geomagnetism, and recording of ionospheric absorption at Arrival Heights with University of California.

Antarctic Division. Adelie penguin census at Cape Royds rookery, now designated by the Scientific Committee on Antarctic Research and the Antarctic Treaty nations as a site of special scientific interest. New Zealand is now required to provide annual reports to the committee and the 13 nations from this southernmost rookery. Continuation of the Weddell seal population census in **McMurdo Sound-Ross Island** region.

Snowcraft and survival training for United States and New Zealand staff. **P. Farrell** (field leader), **B. Carter**, **J. Horsley** (field assistants), **A. Waugh**, **J. Allan** (R.N.Z.A.F.), **S. Sluce** (R.N.Z. Army Medical Corps).

Scott Base staff will continue the aluminium corrosion project which was begun for the University of Canterbury in the 1974-75 season.

Antarctic Division, Victoria University of Wellington, and University of Canterbury. Physiological and psychological studies of winter teams at Scott Base (1977 and 1978). Professor A. J. W. Taylor, professor of clinical psychology, Victoria University of Wellington. Professor R. A. M. Gregson, Dr A. Barabasz, J. Barton (technician), psychology department, University of Canterbury.

International projects. Dr H. Tazieff and three other French volcanologists will work with scientists from the Chemistry Division, D.S.I.R., and the Institute of Nuclear Sciences, and make geochemical, geophysical and geological studies on the summer area of Mt. Erebus.

A Japanese Antarctic Research Expedition party will work in the dry valleys with New Zealand support. Dr T. Torii, Dr T. Cho, A. Yamada, T. Yukawa.

Antarctic TV Team

Aspects of New Zealand's Antarctic research programme will be filmed for television this season. A team of four men from TV1 will fly south in November to gather material for three or four documentaries which will be screened in the "Sunday's World" programme.

Members of the team are Messrs R. Harley (science reporter), G. Smith (environmental reporter), A. Hutton (cameraman), and D. Anderson (sound recordist). They will visit Scott Base and Vanda Station, and the historic huts at Cape Evans and Cape Royds, and film the wildlife.



Work on Historic Huts

An inventory and pictorial record of relics in the historic huts on Ross Island will be made for the Canterbury Museum's records by one of the New Zealand Antarctic Society's two caretakers this season. The caretakers, both from the Canterbury branch of the society, are Messrs. D. Harrowfield and C. Buckley.

Messrs. Harrowfield and Buckley will fly south in December. They will spend several weeks on Ross Island, and will continue the restoration and maintenance work at Scott's huts at Cape Evans and Hut Point, and Shackleton's hut at Cape Royds. Caretakers nominated by the society have worked at the huts every season since 1969 with a break in the 1975-76 summer when the project was cancelled because the New Zealand research programme was reduced because of lack of air transport.

Mr Harrowfield, who is 36, will make the inventory and pictorial record. He is the museum's Antarctic curator. He spent 10 days on Ross Island in the 1974-75 season when he worked with Dr R. M. Kirk, of the University of Canterbury, studying the beach formation and the recent glacial history of a small coastal landform at Cape Bird.

Mr Buckley, who will celebrate his 21st birthday in Antarctica, is a port agricultural officer with the Ministry of Agriculture and Fisheries. He has been a member of the Antarctic Society for 11 years, starting as a junior member, and has been interested in Antarctic history since he was a schoolboy.

A special mail drop was made by the Royal Australian Air Force early this month to the winter party on Macquarie Island in the sub-Antarctic. An Orion long-range marine reconnaissance aircraft on a training flight from an airfield in South Australia carried more than 200kg of mail for the 18 men and two women at the base, and dropped it by parachute on September 7.

SIX UNIVERSITIES IN PROGRAMME

Two Massey University microbiologists will sample Antarctic soil, water, and ice this summer as part of a distribution study by the Health Department to determine the distribution and sources of amoebae which cause primary meningo-encephalitis (more popularly known as "hot pool" meningitis), and what environmental factors are important in determining this distribution. The study is one of the main projects which university scientists will carry out during the Antarctic research programme this season.

Six universities — Auckland, Waikato, Massey, Victoria, Canterbury and Otago — will contribute teams to the programme. Field parties will work on the ice-free valleys west of Scott Base in Victoria Land, scientists from Auckland University will study polar fishes and marine invertebrates in McMurdo Sound, and a Waikato University team will fly to the Soviet station, Vostok, to survey salt accumulation in the snow of the Antarctic ice-cap.

THERMAL WATERS

Massey University's project, which will be carried out by Dr T. J. Brown and Mr R. T. M. Cursons, is part of a programme, "Epidemiology, environmental physiology, and occurrence of the aetiological agents of primary amoebic meningo-encephalitis". Research in these aspects of the disease, known as "hot pool" meningitis because New Zealand victims contracted it in mineral pools, is now being carried out in and round New Zealand's thermal waters. A complementary study has been carried out in frozen swimming areas in Oslo with the Norwegian Institute of Water Research to determine the absence or presence of both pathogenic and non-pathogenic forms of the amoebae and their ability to withstand low temperatures.

Amoebae were isolated from Antarctic lakes in 1970, but detailed studies of pathogenic free-living amoebae (PFLA) were not carried out.

The Antarctic environment, particularly the ice-free regions, provides a unique natural environment for the study of specialised micro-organisms such as PFLA, and it is intended to correlate distribution with factors which determine the distribution of PFLA.

FIELD STUDIES

These field studies will provide the basis for complementary laboratory studies later. More specifically, Dr Brown and Mr Cursons hope to determine the temperature range which the amoebae can withstand, and find out whether the pathogens evolved from the non-pathogens or have always been a separate species. This may be reflected in their environmental preferences.

Although primary amoebic meningo-encephalitis (PAM) is usually contracted in waters above ambient temperature, the Norwegian studies have shown that both pathogens and non-pathogens can be isolated from temperatures of 0 to 2 deg Celsius. In Antarctica Dr Brown and Mr Cursons will be able to sample areas which have been subjected to much lower temperatures, and which have been very little disturbed or contaminated.

For their active state (trophozoite) to develop, the amoebae require water, but they readily form cysts which can exist dry for long periods. Dr Brown and Mr Cursons hope to sample the dry

Antarctic soils and attempt to isolate amoebae cysts. If they exist in such an environment it seems likely that they would be almost permanent cysts.

STERILE SOIL

Previous studies on samples collected in 1970, and those of other workers, have shown that there are indeed areas of sterile soil in Antarctica. Bacteria and organic detritus constitute the food of PFLA, and a comparison between sterile and non-sterile Antarctica soil will provide a readymade experiment to correlate the importance of bacteria as against temperature and moisture.

Salt has been shown to be a selective factor in experimental conditions for some species of amoebae. The very high salt levels in the dry valley lakes will undoubtedly have a marked selective effect on the amoebae present. Preliminary isolation work on water samples from the Taylor Valley has shown that there are a number of species of amoeba present.

DRY VALLEYS

This summer the seven members of Victoria University's 22nd expedition will make three separate studies of a glaciological, geological, and geochemical nature. One team will work in the dry valleys surrounding the Taylor Glacier, another at Capes Barne, Evans, and Royds, on the Taylor Glacier, in the Wright Valley, and at Vanda Station, and the third will work in the Kennar Valley.

During the last three field seasons Victoria University field parties have been making a continuous study of the Taylor Glacier and its surrounds. A general reconnaissance of the glacier snout and the drift surrounding Lake Bonney (1974-75) was followed in 1975-76 by a detailed study of till sheets and moraines round the snout. Last season's programme involved an investigation of the dynamic thermal and chemical properties of Taylor Glacier, using measurements of ice thickness, temperature, velocity and ablation. Debris from within, on, and around the glacier were also sampled.

ICE TEMPERATURES

This season the monitoring of ice temperatures, velocity and ablation will be continued in conjunction with mapping the extent of the glacial drift associated with advances of the glacier. This mapping will be carried out in the dry valleys surrounding the Taylor Glacier by Paul Robinson, who will be continuing a Ph.D. study. The team will include an Antarctic Division field leader, W. Fowlie, Alan Hull, a V.U.W. honours student, and two surveyors, J. Palmer and N. F. Nalder. They will spend three months in the field from late October to early January.

Dr J. Johnston will undertake the geochemical study, assisted by N. Logan and J. Metson, and a field assistant, Jocelyn Lang. The party will spend between five weeks and two months from early November to early January investigating weathering of rocks. Particular study will be made of iron oxides and oxy-hydroxides which may prove to be sensitive indicators of the nature and extent of chemical weathering and processes in the Antarctic climate. The party will visit areas such as Capes Barne, Evans, and Royds, the Taylor Glacier, Wright Valley, and Vanda Station to collect and study weathering effects.

GLACIAL BEDS

Dr Barrie McKelvey, assisted by A. Pyne, a third-year student from V.U.W., will attempt a reconstruction of the Permian glacial landscape over an area of 35 square kilometres in the Kennar Valley. A brief reconnaissance in 1969 indicated that the Maya Erosion Surface, which underlies the glacial beds, may be plotted by careful mapping. The sediments which overlay the Maya Erosion Surface, and which were formed by the Permian ice sheets, will also be studied.

This party may also study the effect of geological time, burial and palaeohydrology on the sandstones, siltstones, shales and coals of the Beacon Supergroup. It will spend about eight weeks in the field from early December to late January.



Summer in the dry valleys leaves little ice in Lake Bonney, and raises its level almost to the doorstep of the hut build for science programmes in the Taylor Valley. Lake Bonney was named in 1911 by Griffith Taylor's western party.

Antarctic Division photo:
Neville Peat

As in previous years the Waikato University Antarctic research unit will have a multi-discipline team of six in the New Zealand programme this season. Professor Alex Wilson will lead the party, and with him will be Dr Chris Hendy (geochemist), Professor Wallace Broecker, a geochemist from Columbia University, New York, Dr Benno Meyer-Rochow (zoologist), Keith Thomson (botanist) and Don Cowan (post-graduate student).

GLACIAL ADVANCES

Several projects will be undertaken, but the prime one is the consolidation of some five years' work in the identification and radiometric dating of glacial advances in the dry valleys of the McMurdo Oasis. The University of

Waikato has developed a uranium-thorium dating laboratory, and has been dating and studying the isotope abundances of lake sediments in the valleys.

These have shown the presence of expanded lakes during interglacial periods (0-10,000; 90,000-125,000; 190,000-210,000-300,000 years ago). Many of these lakes appear to have resulted from expansions of the Taylor Glacier down the Taylor Valley, and probably indicate that the East Antarctic ice sheet, which contains about 80 per cent of the world's fresh water, grows to a maximum in interglacial periods such as the present. This growth is probably sufficient to cause the world-wide sea level to drop noticeably during the course of the interglacial.

In this study the University of Waikato team will combine with a party from the University of Maine. This party has been studying the Antarctic glacial history, but has used completely different techniques.

LAKE SURVEY

In addition to the glacial history the Waikato team plans to continue its survey of present lakes and their sedimentary record by doing a bathymetric and sediment survey of Lake Fryxell. Keith Thomson, in particular, will study the accumulation of the organic-rich sediments which occur in shallow lake waters and small ponds, often forming peat-like deposits.

Two members of the team, Professor Wilson and Dr Hendy, plan to spend a few days at the Soviet station, Vostok, where they expect to continue a survey of the accumulation of salts in the snow of the Antarctic ice-caps. These studies are particularly useful in determining the extent of sublimation (direct evaporation) of the snow fall, and hence the material balance of snow accumulation on the ice-caps.

Dr Mayer-Rochow will study a number of benthic forms which, because of low temperatures and rich nutrient supply, occur in unusual abundance in McMurdo Sound. Therefore, unlike his five colleagues, he will spend most of his time working out of Scott Base.

COLD ADAPTATION

Marine cold-blooded animals (poikilotherms) have body temperatures nearly identical to that of the environment, and therefore are particularly suited for experiments on cold adaptation. Because of their nearly constant temperature of minus 1.85deg Celsius, the waters of McMurdo Sound can serve as a natural laboratory for the study of biological adaptations to cold environments.

Work by United States scientists on the metabolism of Antarctic fishes has revealed that they respire at a higher rate than tropical fishes reduced to the same temperature, enzymes extracted

from their tissues show maximum activity at very low temperatures, and their blood contains unique glycoprotein molecules which serve as a biological antifreeze. The object of the Auckland University project carried out by Dr J. A. Macdonald and Dr R. M. Wells, of the department of zoology, will be to determine how constant low temperature affects the function of two key physiological processes: the conduction of the nervous impulse, and the transport of oxygen by the blood.

NERVE IMPULSES

When Dr Macdonald worked with a United States scientist, Dr Art deVries, in 1974, he conducted preliminary experiments to determine conduction velocities over a range of temperatures for spinal nerves and lateral line nerves of the Antarctic cod (*Dissostichus mawsoni*) and for leg nerves from an isopod crustacean (*Glyptnotus antarcticus*), and a sea spider, (*Colloseis robusta*). All of these nerves conducted impulses at temperatures below minus 2deg Celsius, and showed no sign of nerve block. The effect of changing temperature was much less pronounced in the nerves of Antarctic fishes than in those from warmer waters.

Dr Macdonald will make further determinations of nerve impulse conduction velocity, working from Scott Base, to confirm his earlier findings. He will also try to determine the biochemical basis of neural cold adaptation.

Dr Wells will investigate oxygen transport in the blood of Antarctic fishes. Certain aspects of respiratory physiology in Antarctic marine animals may be investigated with some precision since the previous thermal history of the animal under study is constant and accurately known. Thus the effect of temperature on red blood cell metabolism and haemoglobin function might provide an insight into mechanism for the control of the blood's affinity for oxygen under circumstances not easily obtained in tempered conditions.

It is possible that information obtained about the role of the red cell in oxygen transport may be helpful in understanding problems associated with the storage of human blood at low temperatures before transfusion. Also the knowledge may be helpful in understanding the physiological effects of hypothermia.

PENGUIN STUDIES

This season the University of Canterbury's biological research unit will be unable to continue the study of an isolated Weddell seal population at White Island, which it began last season. But one member of the 16th expedition, Miss Elspeth Wingham, will return to White Island by dog sledge from Scott Base to take tide crack samples of the benthic community before she continues her work with epontic copepods on the sea ice edge at Cape Bird and Turk's Head.

An Antarctic Division field assistant, Max Wenden, will fly south next month to open the Cape Bird station. He and L. Davis will be there until Paul Ensor, leader of the team, Miss Wingham, and Dr Y. Yom-Tov, from the University of Tel Aviv, arrive in November.

During their stay at Cape Bird the team will continue the annual studies of the Adelie penguin rookeries, and the penguin and skua census, mapping of territories and band recoveries. They will also carry out marine physiological studies on selected invertebrates. Dr Yom-Tov will study the effect of interference on penguin breeding success.

SEAL PARASITES

This year the University of Otago's project will extend the work started last season on culture studies of parasites found in nototheniid fish which develop into adult tapeworms of the Weddell seal. Dr Warren Featherston, who will be returning to the Antarctic for a fifth season, began this research first in the 1961-62 season as a member of the University of Canterbury research unit, and continued it in 1962-63. Then he returned as leader of the University of Otago biology team in the 1975-76 and

1976-77 seasons.

In addition to the culture study of parasites this year's team will study the host response to the tapeworm larvae which invade the gut wall of nototheniid fish. The fish will be collected from a hole drilled in the sea ice in McMurdo Sound, and Dr Featherston's assistants, Miss Roslyn Freeth and Mr Craig Ellison, will work with him in a fish hut with a hole in the floor over the ice hole.

Another Auckland University project will be carried out by a final year medical student, Mr A. Young. He will work at Scott Base with Antarctic Division staff in a study of the physiological responses of human subjects to different modes of insulation employed in Antarctica.

A 23-year-old assistant advisory officer in the Department of Trade and Industry, Miss Margaret Cullen, has been appointed information officer for the Antarctic Division, Department of Scientific and Industrial Research. She gained a master's degree in history at the University of Canterbury.

New Research Post

After 27 months as director of the United States National Science Foundation's Division of Polar Programmes, Dr Robert H. Rutford has been appointed vice-chancellor for research and advanced studies at the University of Nebraska-Lincoln. Dr Rutford has had a long association with Antarctic research; it began in 1959 when he man-hauled a sledge around the shores of McMurdo Sound.

Dr Rutford led the University of Minnesota research team to the Antarctic in 1963, after having been south twice before. After several years teaching geology at the University of South Dakota he went to the University of Nebraska-Lincoln in 1972. Later he was director of the international Ross Ice Shelf Project until he went to the Division of Polar Programmes.

Spring and Sunshine on Ross Island

Mail, fresh fruit and vegetables, and the sun appearing over Mt. Erebus, made September 1 a real spring day for 78 Americans and 10 New Zealanders on Ross Island when two ski-equipped Hercules aircraft arrived from New Zealand. Six flights were made in the first week of this month by United States Navy VXE-6 Squadron aircraft to prepare for the United States scientific programme for the 1977-78 season.

Men — and one woman who also wintered on Ross Island — realised their winter isolation had ended when they were able to enjoy the scent and colour of spring flowers, and the taste of fresh fruit, and read all their letters from home. They had been isolated except for radio and telephone calls for more than six months, and had waited more than four months for their first sight of the sun.

This year all the flights of the operation known to the United States naval support force as Winfly were completed in the first days of the southern spring which begins officially on September 1. The first aircraft, leaving Christchurch in the early hours of the morning, reached Williams Field, McMurdo Station, on a clear, cold, and almost windless day. The temperature was no lower than minus 30deg Celsius, several degrees higher than the temperatures just before the sun rose again for the first time on August 20.

FOOD AND MAIL

In their six flights south the Hercules aircraft carried 18,143kg of cargo. This included 2037kg of mail, and 2891kg of fresh food. Among the 147 passengers were scientists who will make an early start on summer research projects, and technicians, construction workers, and others, who will prepare the annual ice runway in McMurdo Sound for the major airlift by Hercules and Starlifter aircraft which begins next month. The first flights brought the spring population to more than 200 at Scott Base and

McMurdo Station.

Captain C. H. Nordhill, commander of the United States Navy's support force, flew the first Hercules south to meet the winter party at McMurdo Station, and prepare for a busy summer. Also on the flights were 13 New Zealanders — Mr N. C. McPherson, executive officer, Antarctic Division, Mr C. Monteath, field operations officer, and two men of the Scott Base summer staff, Messrs S. P. Chambers (assistant maintenance officer) and R. G. O'Donnell (carpenter). Mr V. G. Erridge led a Ministry of Works construction team which will complete the interior work on the new accommodation block built last season.

Although the sun appeared over the horizon on August 20 it could not be seen from McMurdo Station for more than a week because of cloud. And Mt. Erebus and Hut Point Peninsula kept the New Zealanders at Scott Base from seeing it at first. But they saw it for the first time on September 1 when it came up over Mt. Erebus.

After six months of isolation mail from home has first place ahead of the sun with the winter parties on Ross Island. Next comes fresh food, particularly fruit. This year the cargo on the first flights included not only fruit but also 179kg of yoghurt and 943kg of eggs.

FRESH FRUIT

For the New Zealanders at Scott Base the first aircraft brought 158kg of fresh fruit and vegetables — apples, oranges,

lemons, bananas, lettuce, cabbages, and cucumbers. To remind the men of warm, sunny days at home there was a special treat — two large water melons and 9kg of Californian grapes.

Most welcome of all at Scott Base were the spring flowers — daffodils, violets, carnations, freesias — and even some orchids. They were given a place of honour in the messroom — the first flowers the men have seen for nearly a year. The tomato plants in the science

laboratory, now more than 45cm high, had no flowers to match the spring offering. They have had no sun, only artificial light.

After reading all their letters and enjoying their first fresh food the winter residents at McMurdo Station and the new arrivals settled down to prepare for the summer influx. Their neighbours over the hill continued their preparations for the New Zealand summer contingent.

Winter Dives in Chilly Waters

Working 18m beneath thick ice in the dark, chilly waters of McMurdo Sound, two American marine biologists made 41 dives during last winter from McMurdo Station. Messrs John Oliver and Peter Slattery, of the Scripps Institution of Oceanography, began their scuba diving studies of shallow-water benthic communities in McMurdo Sound last December, and continued the work in the winter darkness.

Messrs Oliver and Slattery wore foam-insulated suits while working in a water temperature of minus 2deg Celsius, and their gloves were filled with heated water before each dive. They dive through holes .68m square cut through ice 1.7m thick with explosives and a drill. Each dive lasted 30 to 40 minutes, and although the water was only just above freezing point, it became a little warmer as the divers neared the seabed.

Conditions on the ice in winter were unpleasant for the divers' helpers, John Oliver's wife, Donna, and Dan Watson. They had to wait for the divers in temperatures that dropped as low as minus 51deg C., including the wind chill factor. Donna Oliver, a biological technician, acted as a safety tender while John Oliver and Peter Slattery were under the ice, and helped to analyse the specimens they brought up. Dan Watson assisted the men with their air bottles, filled their gloves with heated water, and kept the hole free of mush ice while waiting to assist the men

from the dark depths of the sound.

Beneath the ice the scientists had an array of mesh-enclosed areas containing or excluding sea bottom dwellers. It was bounded by a post-supported safety rope to prevent the divers from straying from the vicinity of the entry hole. All winter Weddell seals took an inquisitive interest in the activities of the human intruders sharing their habitat. Messrs Oliver and Slattery believe that equipment left behind on the seabed was disturbed by the seals investigating the experimental sites in their absence.

Messrs Oliver and Slattery made their last and 41st dive of the season on August 19 in the waters of Winter Quarters Bay. Peter Slattery's two previous dives had been particularly unpleasant because zip sealing problems with his suit allowed the chilly water to soak into the lower portion.

Observers of the last dive had to wait for 35 minutes in a chilling wind which was accompanied by light driving snow. But even the wintry weather seemed more attractive than what lay beneath the ice in the dark depths of the sound.

Early this month John and Donna Oliver left the Antarctic for the warmth and sunshine of the Great Barrier Reef. On Lizard Island they will compare tropical benthic organisms with polar and temperate water species. Next month they will fly back to McMurdo Station to complete their studies.

SPRING AND SUN

EARLY FLIGHTS END WINTER ISOLATION

Men who winter at American and New Zealand bases in Antarctica follow the same living pattern, and have the same experiences as their predecessors of the last 20 years. This winter 109 Americans, New Zealanders, and one Russian exchange scientist, who wintered at McMurdo Station, Scott Base, and the Amundsen-Scott South Pole Station, have shared isolation, darkness, snow storms, cold, and strong winds, and looked forward to the return of the sun.

Usually the men on Ross Island can expect to see the sun towards the end of August. It did arrive, but was hidden behind the clouds, and was not seen until spring began officially on September 1. The first sign of spring, the end of more than six months of isolation, and the arrival of United States Navy Hercules aircraft with welcome mail, fresh food, and New Zealand spring flowers, coincided. So 10 New Zealanders, 78 Americans, including one woman, and the Scott Base huskies, who last saw the sun on April 25, really had something to celebrate.

Eighteen Americans, two New Zealanders, and one Russian, at the Pole Station 1327km to the south will have to wait a little longer for their Antarctic sunshine. They observed the refracted glow of the sun on the horizon from the roof of the skylab on September 2, but their spring visitors, mail, and fresh food, will not arrive until early November. In the first week of this month the temperature was minus 70deg Celsius, and it will have to be much higher before aircraft can return after an absence of nearly nine months.

WINTER PROBLEMS

Now the Pole Station is no longer new. This is the third year it has been occupied. But the winter living problems have not changed for the civilian scientists and support staff since the sun dropped below the horizon

for the last time on March 29. They have had to cope with heating, lighting, and plumbing problems, low temperatures, and spells of hard digging to keep buildings clear of drifting snow and accumulated ice.

There was one change from the normal pattern before the men settled in for the winter. The last American aircraft departed early in February, but on February 23 a Soviet ski-equipped aircraft flew over the station.

After the unexpected "heat wave" at the end of May when the temperature reached a near record of 33deg C, the bite of winter began in June when temperatures dropped to the minus 60s, and remained there. Mid-winter's Day, the half-way point, was celebrated by a four-day festival, christened Amundsen Days. Special events included a champagne breakfast, the traditional formal dinner, a barbecue, volleyball inside the geodesic dome, a costume party, and a treasure hunt.

WINDY WEATHER

Cold and windy weather followed in July, and drifting snow piled up round the station buildings. Temperatures remained between minus 67deg and minus 69deg. The first week of August began with a slight rise in temperature, and the weather was still cool and windy. But in the second week a very faint glow was sighted on the horizon.

Then on the weekend of August 13-14 the mercury plummeted to minus 73.39deg or minus 101.1deg Fahrenheit. When the century mark is exceeded it is time for station staff to seek membership of the South Pole's unique Club 300. To qualify each man sits in the station sauna at a temperature of plus 200deg F for about 15 minutes, and then dashes out bare to be photographed in minus 100deg F or lower temperatures.

This time the ceremonial pole site was marked in advance with lanterns so no man would lose the way. Sixteen hardy souls dashed out into the darkness, and the event was recorded by a fully-clothed photographer. On August 24 the club gained four more members. They exposed themselves in a temperature of minus 75deg C (minus 103deg F), which made the week the coldest of the year.

SNOW SHOWERS

Before winter began in earnest McMurdo Station had a spell of warm weather at the end of May. Snow showers left the ground coated to a depth of 5.3in. But June brought the customary winds with one gust rising to 52 knots on June 14. There was more snow with falls ranging from .8in to 7.3in. Temperatures were high by Antarctic winter standards, the thermometer recording minus 24.5deg Celsius on June 16, and the wind speed reaching 43 knots.

Mid-winter's Day, celebrated on June 21, was marked by a sharp drop in temperature to minus 35.6deg. But the sun, which departed late in April, gave a hit of its return when the northern sky was lightened for an hour or so.

Like all the winter parties in the Antarctic those at McMurdo Station celebrated the shortest day of the year in traditional fashion. Everyone enjoyed an elaborate dinner, which included lobster tails and fillet steaks, and some hardy souls still had enough appetite to take part in a pie-eating contest.

After the excitement of the shortest day, the winter party settled down to weeks of high winds and low temperatures. On June 29 the wind reached a

peak of 44 knots, and then July arrived with more snow, strong winds, and real winter temperatures.

On July 1 there was a full moon; it was at its southernmost declination for the season. But the temperature dropped to minus 36.1deg, and the northerly winds kept on blowing. There was a peak gust of 56 knots in the first week, a temperature of minus 37.9deg in the third week, and the last week was marked by the heaviest storm of the season.

HIGH WINDS

High winds averaging 54 knots and reaching a peak of 75 knots on July 27 blew out several heaters in station buildings. The weather improved minimally on July 29 when the temperature rose to minus 25.6deg, and there was less than an inch of snow. July ended with a colder day — the temperature was minus 30deg.

There was some relief in August with a succession of mild, cloudy days. But then came high winds, blowing snow, and fog. On August 10 the wind peaked to 56 knots. In the third week the wind dropped slightly, and the strongest gust was 40 knots. There was another sharp drop in temperature to minus 37.8deg on August 16 and 17.

Even 4.9in of snow, and low temperatures of minus 46.7deg and 42.2deg on August 18 and 19 did not reduce the spring feeling. The sun was welcomed sight unseen on August 20 under bleak and cloudy skies, and the station's flag was hoisted in a bitter north-east wind which whipped fresh snow from the slopes of Crater Hill across the 193cm-thick sea ice of Winter Quarters Bay. Then on the first day of official spring the sun and the first aircraft arrived almost together.

WINTER WORK

Like their neighbours over the hill the New Zealanders at Scott Base were kept busy in June with jobs inside and outside the buildings. Richard Wills, the dog handler, moved the huskies to their winter quarters — a miniature town of kennels and street lights — and

repairing equipment, painting jobs, and preparations for the coming season left the rest of the team little time to reflect on the rigours of an Antarctic winter.

Although June was the darkest time of the winter, on clear days a red glow could be seen on the horizon from Arrival Heights. And the weather was fairly normal with a maximum temperature of minus 11deg (much warmer than at McMurdo Station) and a minimum of minus 45deg. The strongest gust of wind was 54 knots.

After experiencing the Mid-winter's Day hospitality of the Americans on June 21 the New Zealanders said goodbye to the first half of the winter the next day. June 22 began with a champagne breakfast, and Roel Keizer excelled himself with a magnificent menu of five courses, which included turkey, ham, chicken, and lamb, plum pudding, strawberries, raspberries, and ice-cream. The traditional exchange of home-made gifts followed, and the day ended with a party to which all the Americans were invited.

HINT OF SUN

As July went by the noonday skies grew steadily lighter, and beautiful red glows to the north indicated that the sun was definitely on the way up again. The first good glow with red and purple tints was observed above the mountains to the west of the base on July 23, and the hint that the sun and the first aircraft could be expected in just over a month brought an increase in activity by the winter team.

Work around the buildings and preparations for the new season kept everyone busy during the month, but there was time for social and individual activities. On July 4 the Americans celebrated their Independence Day, and were reminded of the fighting two centuries ago when the New Zealanders launched a raid to capture Mrs Donna Oliver, the only woman at McMurdo Station.

A cheerful battle was fought with the New Zealanders using fire crackers and

flour bombs, and the Americans calling out the station fire brigade in their defence. The New Zealanders were supported by four of the biggest and most ferocious looking huskies from their base, each carrying the New Zealand flag into battle. After the fun was over everyone enjoyed a cake specially baked by the Americans, and the liquid supplies brought by the New Zealanders.

Ross Dependency Day was celebrated on July 30 with a barbecue in the garage to which the Americans were invited, and the month ended with an arts and crafts exhibition at McMurdo Station. Scott Base was well-represented with model aeroplanes, trucks, sledges, and a real ice yacht.

LOW TEMPERATURE

Extensive ionospheric disturbance and auroras caused some communications trouble about the middle of the month; it did not stop one of the science technicians, Ian Minchington, from ringing a friend in England to celebrate his birthday. The average temperature for the month was minus 25deg C, and the lowest was minus 45deg. On July 27 the wind gusted up to 68 knots.

August was notable for the steady return of daylight, from a couple of hours a day at the beginning of the month to almost a normal ration by the end. Rumours that the sun had been peeping over the horizon at noon since August 20 were not accepted because the intervention of Mt Erebus and Hut Point Peninsula does not allow it to be observed from Scott Base until later in the month.

But the Americans acted on the rumour, and raised their flag for the season on August 20 to mark the return of the sun. Their ceremony, attended by some New Zealanders, was preceded by temperatures of minus 46.7deg and minus 42.2deg on August 18 and 19, and was marked by a bitter north-east wind. There was not the slightest sign of sunshine, and the view up McMurdo Sound at noon consisted entirely of cloud.

FLAG RAISED

Two days later in similar weather the base cook, Roel Keizer, ran up the flag first flown at the Scott Base 20th anniversary celebrations in January. But the winter party and a small American contingent did not wait for the sun to appear; they hastily retired to the warmth and security of the mess for tea and sausage rolls. Later in the month Kevin Weatherall, the senior science technician, and Howard Richards went to Arrival Heights and claimed to have seen the sun from there, but the report was dismissed as just another traveller's tale.

In the last two weeks everybody was too busy to waste time trying to locate the elusive sun which had not been sighted since April 25. One of the busiest was the postmaster, Ian Johnstone, who had to deal with a rush of stamp sales, and a flood of mail to be flown back to New Zealand by the first aircraft in September.

Maintenance of the transmitters, overhauling toboggans ready for the summer, and keeping the base vehicles in running order, kept the winter team busy both inside and outside the base. And the weather did not make some tasks any easier as the Post Office radio technician, George Money, found when he had to fix a broken stay wire on an aerial mast. The job involved climbing 9m up the mast to the accompaniment of a 20-knot wind and a temperature of minus 30deg.

DOMESTIC TOUCH

To end the official winter the thermometer recorded the lowest temperature of the year so far — a bracing minus 47deg. The strongest wind for the month, though not the highest for the year, was a respectable 60 knots. And during the month the base seismograph in the laboratory identified the strongest earthquake ever recorded (8.9 on the Richter scale) somewhere in the Indian Ocean.

A nice domestic touch during the month was the celebration of sunrise in

the own fashion by two of the base huskies, Teia and Betty. The results of their union are expected towards the end of October.

87 Men and One Woman

One woman lived and worked on Ross Island last winter. Mrs Donna Oliver, who was also the only woman to winter in the Antarctic this year, will return next month to McMurdo Station where she will help her marine biologist husband in his studies of benthic communities in McMurdo Sound.

Life on Ross Island, where she was the only woman among 87 men (including her husband) at McMurdo Station and Scott Base, was a happy experience for Donna Oliver although she did not see the sun until the day she flew to Christchurch on her way for some weeks of sunshine on the Great Barrier Reef, Queensland. She was quickly accepted as one of the winter team — a scientist with a job to do.

John and Donna Oliver went south in December last year. During the winter he made 41 dives in the waters of McMurdo Sound through holes in the sea ice, and she was a safety tender in freezing temperatures above each time. When off duty as a scientist Donna took her turn with the men on the mess duties roster. In her leisure time she did about 20 minutes transcendental meditation twice a day. This reduced tensions, and helped her keep to a regular sleep and work pattern during the winter night.

Donna also did daily exercises — in spite of them she put on 5lbs extra weight — and spent one hour and a half each day writing a diary. She believes it will be helpful when she does her dissertation for a doctorate in psychology.

When Donna left McMurdo Station this month she still had masses of untouched wool which she had intended to knit and crochet during the winter. But she did manage to do a needlepoint rug and a wall hanging.

Australia to Increase Operations

Plans for a major build-up of Australia's operations in the Antarctic have been announced by the Minister for Science (Senator James Webster). These include design and feasibility studies for a ship to transport men, equipment, and supplies south, a major rebuilding programme at the four Australian stations in the Antarctic and sub-Antarctic, and more research in southern waters.

For many years Australia has had to support its Antarctic stations by chartering Danish ice-strengthened polar ships. But the Nella Dan and the Thala Dan will soon reach the end of their useful lives. Australia's own expedition ship would cost between \$15 million and \$20 million, and could be completed in time for service in 1982-83. It would be supported by a chartered cargo ship.

To reduce its dependence on ships and allow more short-term visits to Antarctica by Australian scientists, Australia will co-operate now with the United States and New Zealand in the transport of scientists and support staff, and in science and logistics. This season a Royal Australian Air Force crew will fly, with the Royal New Zealand Air Force on the annual supply flights by Hercules aircraft between Christchurch and McMurdo Station.

NEXT SEASON

Next season the R.A.A.F. will have its Hercules aircraft in the summer airlift by the United States and New Zealand. In return the United States Navy's ski-equipped Hercules aircraft will fly Australian scientists and support staff from McMurdo Station to the Australian station, Casey, more than 2000km away. Eventually Australia will have an airstrip at one of its three continental stations, Davis. Feasibility studies are now being made to enable an airstrip to be built at an estimated cost of \$10 million to \$11 million so that long-range

aircraft will be able to fly between Australia and the Antarctic.

In the past Australian Antarctic research has been confined almost exclusively to the land and ice mass. Senator Webster says that the decision to begin marine research this financial year in waters off Australia's sector is of major significance in view of the potential of Antarctic waters to contribute to the world's supplies of food and minerals. It is also in the national interest to have a sound scientific basis for safeguarding the unique environment from the threats posed by exploitation of the Antarctic oceans.

MAJOR PROGRAMME

Responsibility for the new initiatives in the Antarctic will be in the hands of the Antarctic Division of the Department of Science. As well as being designed to carry the bulk of expedition staff and cargo to Mawson, Casey, and Davis, the ship which the Antarctic Division will operate, will also be equipped to support scientific studies of the marine areas of Antarctica.

A major programme of building reconstruction and replacement at the present stations will be carried out by the Antarctic Division. Expenditure on the first phase during the financial year will be \$1.2 million. A contract has been let already for the prefabrication of a new weather laboratory at Mawson, which will be shipped south in December.

This laboratory is the first of a new design developed to replace the present ageing buildings. A small prototype was tested successfully at Mawson earlier this year. The new design will provide for larger buildings, economies in heating and maintenance, and better accommodation at all stations.

To carry out the new programme the Antarctic Division will need more staff. Approval has been given for the employment of 15 more scientists, technical, and building trades staff.

FUTURE PLANS

Arrangements for co-operation between Australia, New Zealand, and the United States in future Antarctic programmes were discussed by Senator Webster and his Antarctic Division

officers with Mr R. B. Thomson, superintendent of the Antarctic Division, D.S.I.R., in Canberra and Melbourne last month. He suggested the transport of Australian scientists by way of Christchurch and McMurdo Station to Senator Webster when the Australian Minister visited Scott Base and McMurdo Station in January this year.

New Zealanders and Australians will begin their co-operation in scientific research this season. A leading Australian glaciologist, Dr W. F. Budd, of the Antarctic Division, will spend two to three weeks working with New Zealand glaciologists in the dry valleys of Victoria Land. Next season a joint scientific survey of North Victoria Land, extending over three seasons, is planned by the two countries.

Bryan O'Brien Served in Second Byrd Expedition

One of the 36 New Zealanders who helped to crew the ships of Rear Admiral Richard Byrd's second Antarctic Expedition in 1933-35 died in Wellington last month. He was Benjamin Roy O'Brien best known as radio broadcaster under the name of Bryan O'Brien, and served aboard the *Jacob Ruppert* on her first voyage from Wellington to the Bay of Whales.

O'Brien, who was 76, was a former president of the Wellington branch of the New Zealand Antarctic Society. He travelled extensively round the Pacific after the Second World War, and spent two years in Thailand from 1950 when he was public relations officer in the Far East for the United Nations International Children's Emergency Fund. Later he visited the United States, Mexico, Middle East and Japan.

A law graduate from Victoria University of Wellington, O'Brien practised his profession in Wellington from 1926 to 1934. He joined the Wellington commercial radio station 2ZB when it opened in 1937, and became

known for his children's series, "Story-time with Bryan O'Brien", and his travel series. He retired from broadcasting in 1966.

Gardeners at Scott Base

Tomato plants grown this winter from a packet of seeds found on a shelf in the science laboratory are still flourishing at Scott Base. By the end of last month 32 plants had reached a height of 45.7cm.

With the aid of a packet of potting mix also found in the laboratory, Kevin Weatherall, senior science technician, and another science technician, Ian Minchington, managed to germinate their seeds in March. Grown under fluorescent lights, the plants are now in larger pots, and vermiculite obtained from the biological laboratory at McMurdo Station has been added to the original potting mix. But because of the lack of sunshine the leaves on the plants are smaller than usual, and some are showing traces of yellow because of the artificial light.

B.A.S. NEWS

Damaged Aircraft Will Be Replaced

All the British Antarctic Survey bases reported an unusually mild start to the winter, and at Signy Island in the South Orkney Islands persistent northerly winds kept pack ice away until early July. There are 80 men wintering at the five main bases, 46 of them first-year men. They have completed their usual winter routines, and are looking forward to the summer arrivals by the Royal Research Ship John Biscoe, which sailed from Southampton on September 21, and the R.R.S. Bransfield, which sails on October 21.

This season the B.A.S. will be able to resume normal summer activities with adequate air support. In spite of present financial stringencies the National Environmental Research Council has decided to replace the Twin-Otter aircraft which was damaged beyond repair when it flew into a snow slope on January 22 during field operations south of George VI Sound. Last season's field work had to be curtailed, but as the new aircraft will be available this season programmes will not have to be reduced.

Plans have been made for the R.R.S. John Biscoe to be withdrawn for a major refit in 1978-79. She has been in continuous service since she was launched in 1956, and has needed only normal maintenance.

A sum of £750,000 has been included by the N.E.R.C. in its submission to the Advisory Board for Research Councils to cover the cost of the refit. This provides for a new engine, alteration to the superstructure, and accommodation for research facilities. The work should prolong the John Biscoe's period of Antarctic service by 10 to 15 years.

NEW NAMES

New names have been adopted for four B.A.S. bases, and a fifth will also be renamed. The Argentine Island base is now Faraday, and the bases at Rothera Point on Adelaide Island, Signy Island,

and Halley Bay have been abbreviated to Rothera, Signy, and Halley. The last change is an overdue rationalisation as the embayment in the ice front to which the name of Halley Bay was given in 1956 has long since disappeared, although several small creeks remain.

King Edward Point on South Georgia is also to be renamed. It may revert to Grytviken, the name of the nearby disused whaling station by which it was known during the International Geophysical Year.

Trips to various field huts on Signy Island continued through the winter, but lack of ice around the island delayed more extensive travel. Persistent northerly winds kept the area free of pack ice longer than ever before recorded. Its arrival on July 9 was accompanied by the usual sudden drop in temperature to about minus 20deg Celsius, and the sea then froze.

GARDEN CROPS

Although the winter started mildly, fast ice in Borge Bay, Signy Island, enabled winter diving programmes to be resumed in June, and first-year men were initiated into the techniques of diving through holes in the ice. Two land-lubbers who remained ashore concentrated on indoor gardening, producing large quantities of mustard and cress, and bean shoots, and successful crops of tomatoes, strawberries, onions and broad beans.



Buildings under construction in the 1976-77 season at Rothera, the new British Antarctic Survey base on Adelaide Island off the Antarctic Peninsula. The base, originally named Rothera Point, is 64km to the north-east of the old Adelaide Island base.

B.A.S. photo: B. Cane

In July the men at Faraday made recreational excursions from the Argentine Islands to nearby islands, and to the mainland of the Antarctic Peninsula. An Argentine aircraft flew over Faraday en route between Marambio and Palmer stations. On the return flight it dropped unexpected and welcome gifts of food and new magazines.

Thirteen men at the new Rothera base 64km north-east of the old Adelaide Island base, have continued interior work on the new buildings. The kitchen, dining room, bathroom, and drying room, have been in use for several months.

Winter work at Halley Bay included digging an emergency shaft down to the ionospheric hut which is some distance away from the main buildings, and is now buried under 6m of snow. Fortunately the right spot was chosen, and the shaft was completed in 24 hours.

Men at King Edward Point visited their new Maiviken hut during the winter. They had a Polish visitor in June — a trawler fishing for krill, and operating from the new Polish base, Henryk Arctowski, on King George Island in the South Shetlands.

NEW RECRUITS

Staff numbers and activities at the B.A.S. headquarters in Cambridge are now at their summer maximum. New recruits are being trained, scientists back from the Antarctic are writing their reports, and preparations are being completed for the coming season.

Whale and seal research is now concentrated in Cambridge. Several rooms in the B.A.S. headquarters are permanently occupied by the Seals Research Unit of the Institute for Marine Environmental Research, which moved from Lowestoft last year, and the Whales Research Unit of the Institute of Oceanographic Sciences, which moved from London at the end of 1976.

Both units remain separate bodies but augment the B.A.S. Life Sciences Division, and the Whales Research Unit is now under the personal direction of the B.A.S. director, Dr R. M. Laws. The International Whaling Commission secretariat, which has also moved to Cambridge, is in a separate building, and remains part of the Ministry of Agriculture, Fisheries, and Food, entirely separate from B.A.S. and the Scott Polar Research Institute.

JARE-19 PLANS

Rocket Launchings at Syowa Station

Upper atmosphere research projects form the major part of the scientific programme of the 19th Japanese Antarctic Research Expedition (JARE-19) which will be conducted at Syowa Station, and Mizuho Camp about 300km to the south-east on the inland ice, in 1977-79. Next year six sounding rockets will be launched at Syowa Station — two in summer and four in winter — to continue Japan's observations for the International Magnetosphere Study (IMS 1977-79). Geological and biological surveys will be made near Lutz-Holm Bay this summer, and four men will winter at Mizuho Camp to carry out upper atmosphere and meteorological research.

This season's programme will be initiated in November when the ice-breaker *Fuji* sails from Tokyo under the command of Captain Tsunezo Kuramoto, who will be making his fifth Antarctic trip. After a call at Fremantle, the *Fuji* is expected off Syowa Station late in December.

There are 40 men in the JARE-19 winter and summer parties. An Antarctic veteran, Dr Takeo Hirasawa, will lead the winter party of 30. He is an upper atmosphere physicist from the University of Tokyo, and first wintered with JARE-8 in 1967-68. In 1969-70 he went south with JARE-11's summer party to take charge of the sounding rocket programme. Then he returned to lead the 1973-74 winter party.

In February next year Japan's three-year programme for the IMS will continue when the first of six sounding rockets will be launched from Syowa Station. The rocket will be one of the S-310JA type, which has a payload of 40kg, and can reach an altitude of 200km.

SMALLER PAYLOAD

S-210JA rockets, which have a smaller payload, will be launched in March and April. A second S-310JA will be launched between May and June, and the last two S-210JAs in July and between August and September. The smaller rockets

have a peak altitude of 130 km, and carry a payload of 11kg. Equipment carried by both types is designed to obtain information on electron density, auroral particles, VLF radio waves, ozone, and the magnetic field.

Geophysical data transmitted from satellites — ISIS 1 and II, NOAA III and IV, and EXOS-A, will be received by the auto-tracking system installed at Syowa Station in January last year. Other relevant research projects in upper atmosphere physics will include a study of the aurora and the ionosphere, natural VLF emissions, and geomagnetic variations.

Scientific programmes at Syowa Station will also cover various disciplines such as meteorology, seismology, oceanography, geochemistry, and medical science, which will include studies of bacteriological and other contaminations by men in Antarctica. The seismological programme will include the recording of natural earthquakes.

MARINE STUDIES

Biologists will make an ecological survey of land arthropods in ice-free areas along Soya Coast, and study the physiology of marine animals near Syowa Station. Other summer activities in the vicinity of Lutzow-Holm Bay where Syowa Station is located on East

Ongul Island include a geological survey of ice-free areas on the east coast of the bay, and a similar survey of Sinnon Rocks and Ryugu Point on the Prince Olav Coast.

Activities planned at Mizuho Camp between February, 1978 and January, 1979, will include studies of the aurora and airglow, VLF signal measurements, and ionospheric absorption. These will be conducted between March and October next year. The small winter party will also continue the meteorological and geomagnetic programmes.

Marine science programmes and upper atmosphere physics studies will be carried out aboard the Fuji by the JARE-19 summer party. This season marine biological work will include the collection of benthic animals in Lutzow-Holm Bay again, measurement of chlorophyll content in the surface sea water, and ecological study of phytoplankton and zooplankton.

OTHER PROJECTS

Other summer projects planned are a geodetic control survey along the Prince Olav Coast, and an ecological survey of bryophytes in the ice-free areas along the coast. The ecological survey will also be done along the Soya Coast.

Six Japanese scientists will work in the McMurdo Sound area this summer with the United States and New Zealand research programmes. Dr Keizo Yanai and Minoru Funaki, geologists from the National Institute of Polar Research in Tokyo, will continue the search for meteorites and geological studies of dike rocks in the McMurdo Sound region (mainly in the Wright Valley and the Carapace Nunatak areas). Last season 11 meteorites were collected by a United States-Japanese party.

Last season a Japanese team led by Dr Tetsuya Torii worked in the dry valleys of Victoria Land and made limnological studies of lakes in the area. Dr Torii will return this summer, and will work with Dr T. Cho, A. Yamada, and T. Yukawa.

After the relief in February of the

JARE-18 winter party at Syowa Station led by Dr Kou Kusunoki, head of the research division of the National Institute of Polar Research, the Fuji will sail for Port Louis, Mauritius. She is expected in Tokyo in April after a call at Singapore.

SUMMER PARTY 1977-78

Masami Ohse (acting-leader); Masakatsu Nobukuni, Katsuyuki Oda, (oceanographer); Hiroshi Kanda (biologist); Toshio Kunimi (geophysicist-surveyor); Yutaka Nakai, Takashi Kano, Shinichi Yoshikura (geologist); Yukio Suzuki (logistic support); Katsutada Kaminuma (geophysicist).

WINTER PARTY

Takeo Hirasawa (leader); Masahiro Yasuda, Tatsuji Sato, Takashi Matsumoto, Susumu Kaneto (meteorologists); Kiyoshi Igarashi (upper atmosphere physicist); Kazuharu Koike (geophysicist); Masanori Nishino (upper atmosphere physicist); Masasuke Kanemitsu (rocket engineer); Kiichiro Suzuki (upper atmosphere physicist); Takashi Nakayama (rocket engineer); Hisao Yamagishi (upper atmosphere physicist); Osamu Watanabe (rocket engineer); Kenji Ishizawa, Shigehiko Tsuzurahara (upper atmosphere physicists); Tomoyuki Ito (meteorologist); Yoshikuni Ohyama (biologist); Miho Minoaka (human physiologist); Sadao Takeuchi, Mitsuyoshi Suzuki, Keizo Ushiki, Masamichi Ebizawa (mechanics); Michio Akiyama (radio engineer); Tadashi Okuda, Fusao Saito (radio operators); Katsuo Koike, Kazuo Aburaya (cooks); Akira Minami (surgeon); Tatsuo Ohkubo (logistic support); Hiromi Mitsuhashi (architect).



WHALING QUOTAS CUT BY COMMISSION

Once again calls for a 10-year moratorium on all commercial whaling for all species were not accepted by the International Whaling Commission at its 29th annual meeting in Canberra. But it made a cut of 38 per cent in quotas for the 1977-78 and 1978 seasons. As a result the total catch of all species has been reduced to 17,839. Last year's quotas were set at 28,591. The cut is the largest ever made by the commission in one year. A report to the meeting on whaling activities in the 1976-77 Antarctic season, and the 1976 season elsewhere showed that 27,484 whales were caught compared with 32,640 in the previous season.

Hardest hit by the cut are the two major whaling nations, Japan and the Soviet Union, which jointly accounted for 75 per cent of all whales killed last season. This is because the commission reduced the sperm whale quota in the North Pacific this season to 763 females only. Last season's quota was 7200 (4320 males and 2880 females). Lower quotas were set also for Bryde's and minke whales in the North Pacific. The Bryde's whale quota was reduced from 1000 to 524, and minke whale quota from 541 to 400.

Seventeen nations were represented at the meeting — Japan, Britain, Soviet Union, United States, Canada, Australia, Norway, Denmark, Iceland, South Africa, New Zealand, Brazil, Mexico, Argentine, Panama, and the Netherlands. Ten of these — Argentina, Britain, Canada, Denmark, France, Mexico, New Zealand, Panama, United States, and the Netherlands, are non-whaling nations, New Zealand rejoined the commission last year after eight years' absence, and the Netherlands joined this year.

Non-government organisations with observers at the meeting were: International Council for the Exploration of the Sea, International Commission for South-East Atlantic Fisheries, International Union for the Conservation of Nature and National Resources, International Society for the Protection of

Animals, International Transport Workers' Federation, World Federation for the Protection of Animals, World Wildlife Federation, Friends of the Earth, Greenpeace, International Ocean Institute, Sierra Club, Project Jonah.

STIFFER LIMITS

There have been calls for a 10-year moratorium on all commercial whaling since 1972 when the proposal was made first by the United Nations conference on the human environment in Stockholm. Pressure for a moratorium has come from the non-whaling nations on the commission, chiefly the United States, and international conservation groups. The calls have not been accepted by the commission, but it has responded to demands for stiffer limits on whaling to protect existing stocks.

This year no country actually proposed a moratorium at the commission meeting, not even the United States, despite a personal message from President Carter reaffirming American support for a 10-year moratorium, and promising that no whaling would be permitted in the recently-imposed 200-mile fishing zone. Acceptance of a moratorium requires a three-quarters majority of members of the commission, and at present there are seven whaling to 10 non-whaling countries.

New Zealand expressed support for a total moratorium if scientists had any reasonable doubt about the survival of the species. The New Zealand delegate, Mr J. V. Scott, said that quotas had to be clearly seen to err on the side of caution, and fully and firmly enforced. New Zealand's policy was based on the principle of conservation through proper international management of all whale stocks on a global basis.

WHALE STOCKS

Japan and the Soviet Union opposed calls for a 10-year moratorium, and expressed concern about increasing pressure by the majority of the nations of the commission, and international conservation groups to reduce or stop whaling. Both countries criticised the commission's management and conservation policy which has been in operation since 1975, and also questioned the scientific committee's assessment of sperm whale stocks.

Both Japan and the Soviet Union objected strongly to the recommendation by the scientific committee for a reduction of 90 per cent in the quotas for sperm whales in the North Pacific. This recommendation followed calculations by the commission's scientists that the North Pacific sperm whales are being over-exploited. The Soviet Union called for a further scientific analysis of the sperm whale population.

As a result of these objections the commission agreed to a special meeting of the scientific committee in November to reconsider information on North Pacific sperm whale stocks before the start of the 1978 season. Depending on the outcome of these discussions, the chairman of the commission, Mr A. G. Bollen, may call a special meeting of the commission to consider amending the North Pacific sperm whale quotas.

NEW QUOTAS

Sperm whale quotas in the Southern Hemisphere have been increased by the commission to 4538 males and 1370 females, compared with 3894 males and 897 females last year. The sei whale quota has been reduced from 1863 to 771.

Japan and the Soviet Union again objected when the commission accepted a United States resolution to reduce the Southern Hemisphere minke whale quota from 8900 to 5690. The two nations called for a marginal reduction to 8585. Minke whales are relatively small, but have been sought by Japan because they yield meat for human consumption.

Southern Hemisphere sperm whale quotas by country for the 1977-78 season, agreed to after the meeting were: Soviet Union, 3213 males, 950 females; Japan, 772-226; Brazil, 17, 17; Australia, 536, 177. In 1976-77 Australia's quota was 508 males and 116 females.

Catch limits for the North Atlantic in the 1978 season were set at almost the same level as those that applied in 1977. They are (1977 quotas in brackets): minke, 2555 (3024); fin, 459 (455); sperm, 685 (685); sei, 84 (132). Boundaries for most North Atlantic whale stocks were adopted by the commission. There will be seven fin, four minke, and two sei whale stocks.

OTHER NATIONS

Action to reduce the activities of the six non-member whaling nations — Peru, Chile, Spain, Portugal, South Korea, and Somalia, which together account for 10 to 15 per cent of the world catch, was taken by the commission. It adopted a Canadian resolution urging commission members not to import whale products from non-member countries or to transfer vessels, equipment, and technology to them.

This resolution was designed to apply pressure on Japan. Statistics from the Japan Marine Importers' Association show that last year Japan imported 1492 tonnes of whale meat from Peru, and almost equal amounts from Somalia, Spain, and South Korea.

Peru, Spain, and South Korea had observers at the commission's meeting. They made statements of intent to abide by the commission's quotas in their whaling. Another non-member whaling country, Chile, also had an observer.

Two more whale species were added

to the commission's protected stocks. It took steps to bring all medium-sized whales under its control. These include bottlenose, beaked, pilot, and killer whales.

Full protection was given to the bottlenose whale which is found on Norwegian waters. It has been rapidly declining in numbers during the last few years. Catching of the bowhead whale, traditionally hunted by Eskimos in Alaskan waters, was prohibited.

Maintenance of its management and conservation policy was agreed to by the commission. Under this policy all whale stocks throughout the world are classified on the basis of the latest scientific advice into three categories —

protected, sustained management, and initial management — according to their relative abundance.

New procedures were laid down for prior international scientific review of national special permit applications. Under the I.W.C. Convention member nations may issue permits to take whales for scientific study.

A research programme on humane killing of whales will be developed by the commission. It will be based on a comprehensive review of all available information, and whaling nations will be required to report on more humane methods. Australia and Iceland have agreed to participate in such research.

TOURISM

Antarctic Day Trips by Airlines

Two international airlines, Air New Zealand and Qantas, will provide "day trips" to Antarctica again this summer. Last summer the airlines made five flights south from Australia and New Zealand; this time seven flights are planned between October and February.

Air New Zealand, which made two DC10 flights to the McMurdo Sound area on February 15 and 22, will make four on October 18 and November 1, 8, and 15. Qantas flew a Boeing 747B from Sydney to the South Magnetic Pole on February 13 and 20, and a Boeing 707 from Melbourne to Cape Washington in Victoria Land. This summer all the flights by Boeing 747B will be from Sydney, the first to the South Magnetic Pole on December 1, and the others to the Admiralty Range area of Victoria Land on December 8 and February 6.

Each Air New Zealand flight will be made from Auckland to McMurdo Sound or, if weather dictates, to the South Magnetic Pole and along the Antarctic coastline past the Mertz and Ninnis Glaciers — the destination of the first Qantas flight last summer. From

Auckland the DC10s will fly over Invercargill, the Auckland Islands, the Balleny Islands, and Cape Hallett to McMurdo Sound. They will fly over Campbell Island and stop at Christchurch on the return journey.

Qantas flights will be made on special charters for Dick Smith Electronics Pty. Ltd, whose founder organised the first two flights last summer. Three hundred seats will be offered for each flight, and the fares will be A\$305 first class, and A\$249 economy class.

On the flight to the South Magnetic Pole the organisers hope to sight and photograph Sir Douglas Mawson's hut at Cape Denison in Commonwealth Bay, which has been there for 65 years. The flights to the Admiralty Range area will pass over mountains up to 4114m high.

Waste Not Left Behind at Scott Base

By
Colin Monteath

As man's involvement in the Antarctic grows so does the pile of waste left in his wake. To dispose or recycle this waste properly in an ecologically sound and economic fashion, has become an increasing problem to all who work on the continent.

Traditionally most coastal Antarctic stations have dumped tons of unsorted garbage on the sea ice in front of their base, relying upon the annual breakout to remove the pile "out of sight". Scott Base too, from its inception, pushed its unwanted material into the tide crack and pressure ridges in front of Pram Point. Spasmodic and unpredictable ice movement in this area resulted in garbage being constantly regurgitated amongst the pressure ridges.

By the early 1960s the volume of pollutant was so great that a concentrated campaign was started to clean up the waste. Considerable quantities were sent to the McMurdo Station dump in Winter Quarters Bay where "better breakout occurs".

This was not the complete answer but at least it was a start. Some of this early waste is now permanently frozen into the rolling ice ridges near Scott Base, but Pram Point is at least a reasonably aesthetically appealing area once again.

In the late 1960s an extensive cleaning campaign began in the Dry Valley region. Many old food dumps and unused equipment were removed. Great care is now taken throughout the dry valley system to ensure minimal disturbance of the environment and the removal of unused material.

New Zealand made a series of proposals to the 1972 SCAR meeting in Canberra containing suggestions for the management of waste disposal. These recommendations formed the basis for

the strict measures accepted by the consultative meeting of the Antarctic Treaty nations at Oslo in 1975, and now observed by most of the treaty nations.

DISPOSAL PROBLEM

Each year now New Zealand Antarctic research programme staff are briefed at their training courses on the disposal problem, and the sorting system in use at Scott Base. Separate bulk containers are used at the base for metals, plastics, glass, burnables, acids etc.

Field parties have become very conscious of the need to remove all waste (including human waste) from their camps. They play a significant part in localising potential pollution and increasing its chances for proper disposal or removal from the treaty

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area. Careful sorting of garbage at its source is as yet only a partially-solved problem, individual awareness still being by far the major barrier. When an item is declared "unwanted" the daily Scott Base 'mouse', field assistant or storeman places sorts articles in containers ready for return to New Zealand, generally by ship.

In the 1972/73 season a Harco industrial incinerator was installed near Scott Base's hangar, and with blower and oil burner attachments it

can handle all the base's burnable material. A combination of Antarctic diesel fuel and waste oils is used to fire this incinerator. To my knowledge it is the first operational incinerator in Antarctica.

HUMAN WASTE

Human waste was burnt rather inefficiently and spasmodically for a while, and then most "honey bucket" bags were transported to Winter Quarters Bay, particularly during the winter. But during the 1976-77 season a formaldehyde chemical toilet system was installed in the base so effluent can be piped straight into the tide crack. This is permissible as a result of a recommendation made at the Oslo meeting in 1975.

Since the 1972-73 season increasing quantities of scrap metal, glass, plastic, batteries, and battery acids, have been returned from Scott Base to New Zealand. No records were kept before 1972, but the following figures indicate the quantities each season.

1972-73: Scrap metal, 300kg, glass 60kg.

1973-74: Scrap metal, 500kg, glass 60kg.

1974-75: Scrap metal, 850kg, glass, 320kg, plastic, 190kg, batteries and battery acid, 250kg.

1975-76: Scrap metal 2800kg, glass 700kg, plastic, 160kg, batteries and battery acid, 350kg.

1976-77: Scrap metal, 3280kg, glass 600kg, plastic, 460kg.

RECYCLING PLANTS

Where possible these materials are returned to manufacturers or recycling plants in Canterbury (glass, batteries, acid, some metals). But aluminium, rubber, tin cans and plastics are still dumped locally.

The Antarctic Division does pay attention to the original packaging of the stores purchased. Preference is given to commodities which are sensibly packed in recyclable containers and often wrappers, poor containers etc, are

eliminated in Christchurch to minimise the build up of unwanted material at Scott Base.

We do not pretend to have all the answers yet to the problem of waste disposal in Antarctica. But a conscious effort is being made in New Zealand. Antarctic research each system to combat the growing accumulation of waste materials. Any comment by those concerned with pollution of the Antarctic environment would be welcomed.

References:

(i) Pollution and Conservation of the Antarctic Terrestrial Ecosystem. R. Cameron (pp267-306) in "Conservation Problems in Antarctica", edited by B. Parker. Allen Press, Kansas, 1972.

(ii) Recommendation VIII - 11 of the 8th Antarctic Treaty Consultative Meeting, 1975, Oslo. "Man's Impact on the Antarctic Environment", SCAR Bulletin No 53, May, 1976. Scott Polar Research Institute, England.

Crab Fishing Plan

Japanese interest in exploiting the marine resources around the Auckland Islands, which are 305km south of Stewart Island, was reported last month. A Japanese company, Taiyo Gyogyo Ltd, wants to catch and process large crabs (*Jacquinota edwardsii*) round the islands, which are New Zealand's main crab grounds.

This Japanese project is proposed to employ two mother ships which work the northern waters around Hokkaido during the northern summer. These ships have to be laid up during the winter.

In recent years several surveys have been made of the potential of the crab resources in the waters round the Auckland Islands.



T.A.E. Winter Party Holds First Reunion

Twenty-three men who wintered at Scott Base 20 years ago came together again for the first time since 1956 when they held their first reunion at Mount Cook last month. They were members of New Zealand's first Antarctic expedition — the winter party of the Commonwealth Trans-Antarctic Expedition led by Sir Edmund Hillary, and the International Geophysical year party led by Dr Trevor Hatherton.

Mount Cook was chosen for the first reunion because the 23 men trained for a month in the spring of 1956 in Mount Cook National Park. It was not possible to repeat the Mid-winter's Day celebration at Scott Base on June 21, 1957, but before the reunion some members of the party were guests of honour at Mid-winter's Day functions in other parts of New Zealand.

"Self-elected convenor" of the reunion was Murray Ellis, one of the three members of the winter party who went to the South Pole with Sir Edmund Hillary. The others were Peter Mulgrew and Jim Bates. With the assistance of the British Council the two Englishmen in the party were able to travel to New Zealand for the reunion, and Neil Sandford, a technical officer in the I.G.Y. party, flew from Australia for the occasion.

One of the Englishmen was Dr George Marsh, who was in charge of the New Zealand huskies, and was also the winter party's medical officer. Now a haematologist, Dr Marsh made a remarkable southern survey journey with the deputy leader and senior surveyor, J. Holmes (Bob) Miller, present chairman of the Ross Dependency Research Committee. They sledged 2700km in four months and a half — one of the longest sledge journeys in polar history.

SURVEY JOURNEY

Lieutenant-Commander Richard Brooke, R.N., who now works in indust-

rial relations, was another surveyor in the party. He led a northern survey journey which sledged more than 1600km, climbed 31 mountains, two for pleasure, and made a topographical and geological reconnaissance of 32,186 square kilometres of mountain country between the Mulock and Mawson Glaciers. He added to his experience in the Arctic and Antarctic by climbing in the Himalayas with a British services team after the New Zealand expedition.

One of the two geologists with Richard Brooke was Bernard Gunn. Now Dr Gunn, and a former professor of geochemistry in Montreal, he went back to the Antarctic in 1959. Since then he has been in Australia, India, the United States, and Mexico. He arrived back in New Zealand early this year in a 15.2m yacht he and his family built, and then sailed down the St Lawrence into the Atlantic, and across the Caribbean and the Pacific.

R.N.Z.A.F. FLIGHT

Of the 18 men in the party led by Sir Edmund Hillary three formed the Royal New Zealand Air Force Flight which supported the expedition with its Beaver and Auster aircraft. Like Bernie Gunn, the chief pilot, John Claydon, now a retired wing commander, was drawn to the Himalayas in later years — he spent two years in Nepal. The others in the flight were Bill Cranfield, second pilot, and Sergeant Wally Tarr, aircraft mechanic.

For their reunion the T.A.E. and

I.G.Y. men were not separated from their wives as they were in the winter of 1957. They held an informal function at the Hermitage tourist hotel on the night of August 6, and the next day were the guests of the New Zealand Alpine Club. A formal dinner was held at Glencoe Lodge on the evening of August 7.

This T.A.E. and I.G.Y. reunion was a unique Antarctic occasion. A regular occasion in Antarctica and elsewhere is the celebration of Midwinter's Day, carrying on a tradition established in the early days of the Heroic Age of exploration.

TERRA NOVA MAN

In Christchurch Dr Hatherton was the guest speaker at the dinner arranged by the Canterbury branch of the New Zealand Antarctic Society. The chairman, Mr R. G. McElrea, presided over an attendance of 71. Guests included Bill Burton, one of the two survivors of the crew of the Terra Nova — Bill McDonald could not attend because of ill-health — the president of the society, Mr J. M. Caffin, and the superintendent of the Antarctic Division, D.S.I.R., Mr R. B. Thomson.

Traditional toasts were drunk, and to end the evening the branch provided an Antarctic night-cap. The drink was "moose milk," a mixture of rum, condensed milk and hot water. It was introduced to Scott Base by Richard Brooke, and became popular with the New Zealanders during the 1957 winter.

SEVEN NATIONS

In Wellington the Antarctic Society's branch held its Midwinter's Day function on the Sunday nearest to the day. The chairman, Mr R. M. Heke, who led the construction team which built Scott Base, presided over an attendance of 60. Among the guests were diplomatic representatives of seven of the Antarctic Treaty nations — France, Norway, Australia, South Africa, Argentina, Chile, and the Soviet Union.

As the theme of the occasion was the 20th anniversary of the T.A.E party, it was appropriate that the toast to its

members was proposed by Sir Robert Falla, a veteran of Mawson's British, Australia, New Zealand, Antarctic Research Expedition of 1929-31, who represented the Antarctic Society on the Ross Sea Committee. Bob Miller replied on behalf of the T.A.E. men. One of the first two New Zealanders to winter at the South Pole, Mr B. V. Maguire, proposed the toast of the Antarctic Treaty nations, and the French Ambassador (Mr de Schonen) replied.

CLOSEST TO POLE

Down in the "deep south" five former Antarcticans and their wives organised the biggest of the reunion dinners held to mark Midwinter's Day and bring together men who had worked in the Antarctic. The dinner was held on June 25 in Gore where the five men live, and which is the closest venue to the South Pole for New Zealand Midwinter's Day dinners.

Many of the 98 people present travelled hundreds of miles to attend the dinner, some even from the North Island. Most of the 20 years of New Zealand Antarctic activity were represented, and there was a good mixture of scientists and Scott Base support staff. Guests included Commander R. Moss, commander of the United States naval support force base in Christchurch, and Mr C.W.H. Tripp, of Otarua, a nephew of Mr Leonard Tripp, one of Sir Ernest Shackleton's closest friends in New Zealand. The reunion also brought together two men who had served aboard Antarctic whaling ships, and some who had served on Campbell Island in the sub-Antarctic.

Convenor of what was described as the southern region reunion was Mr Harold Lowe, leader at Vanda Station in the winter of 1970, and field leader in the 1972-73 programme. His associates are Dr Peter Strang, medical officer with Sir Edmund Hillary's expedition to the Cape Hallett area in 1967, Ron Garrick, Maurice Sheehan, and Roger Jones. Their wives planned and presented a five-course candlelight dinner, and coffee was served in mugs specially crafted at a local pottery, and marked "O.A.E." (Old Antarctic Explorer).

“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 world-wide circulation.

Yearly subscription NZ\$4.50, Overseas NZ\$5.50, includes postage (air mail postage extra), single copies \$1.00. 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 \$1.50. Discount of 10 per cent for 20 or more copies.

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

The 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 address, see below. The yearly membership fee is NZ\$3.00 (or equivalent local currency). Membership fee, overseas and local, including “Antarctic”, NZ\$6.50.

New Zealand Secretary

P.O. Box 1223, Christchurch

Branch Secretaries

Canterbury: P.O. Box 404, Christchurch.

Wellington: P.O. Box 2110, Wellington.

