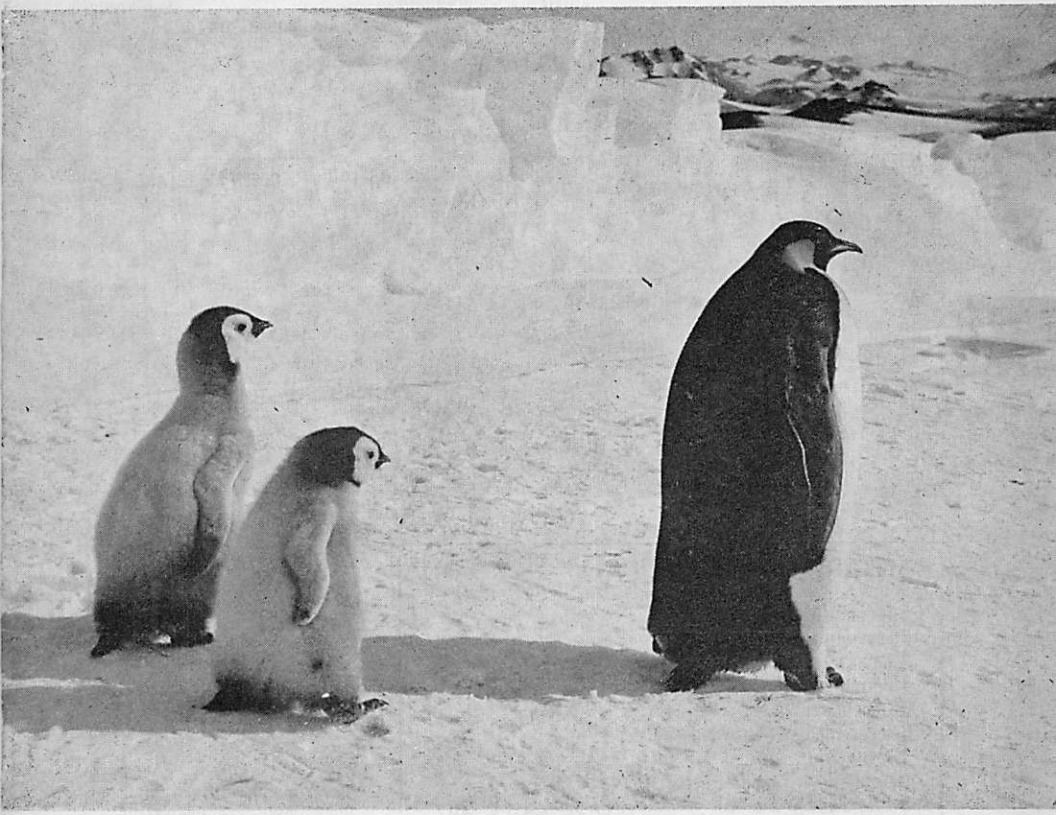
ANTARCTIC

A NEWS BULLETIN

published quarterly by the

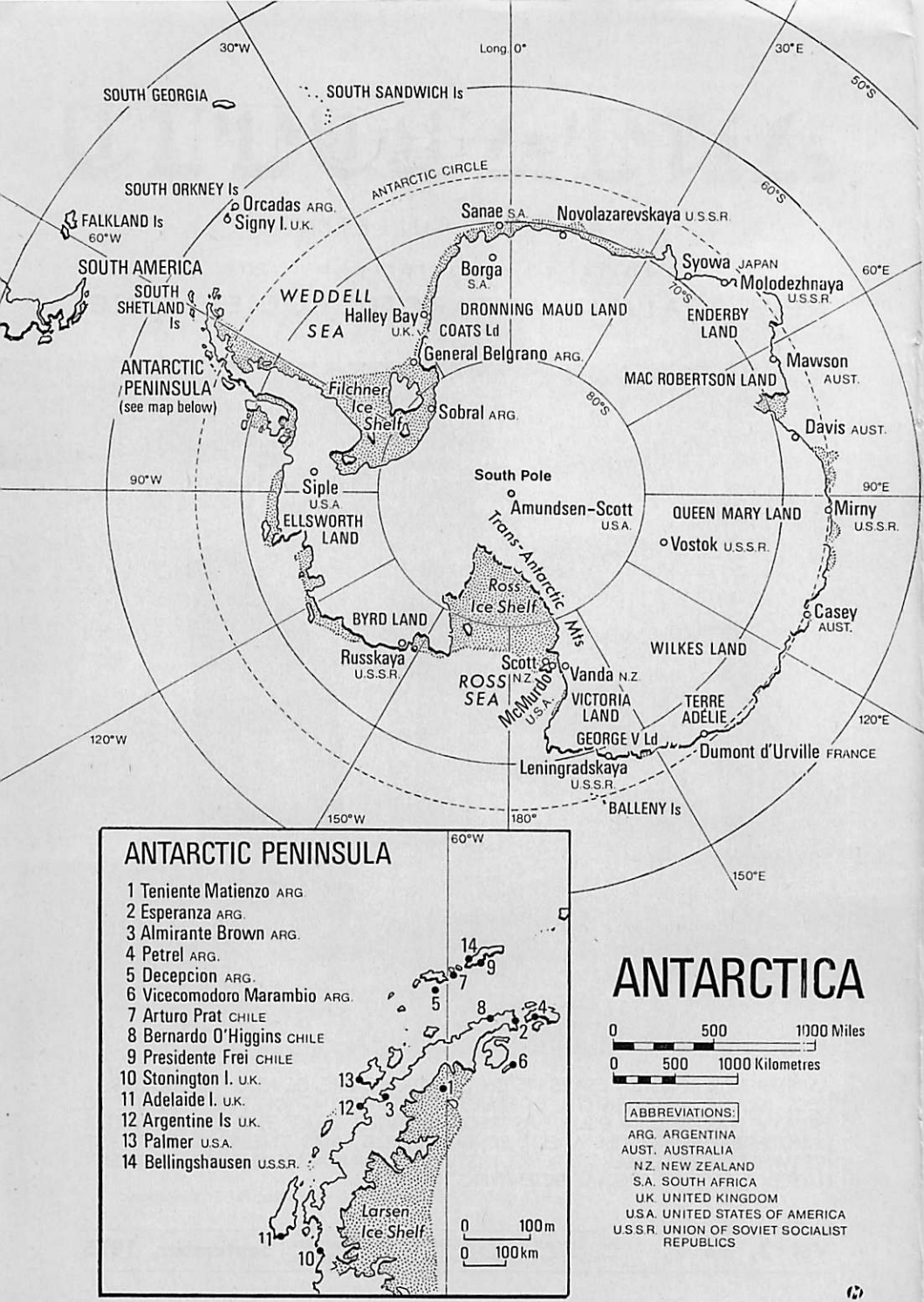
NEW ZEALAND ANTARCTIC SOCIETY (INC)



AN EMPEROR PENGUIN LEADS ITS CHICKS ALONG THE ICE AT CAPE CROZIER, ROSS ISLAND. THE EIGHTH CONSULTATIVE MEETING OF THE ANTARCTIC TREATY NATIONS IN OSLO HAS RECOMMENDED THAT THE CAPE CROZIER LAND AREA WHERE THE ADELIE PENGUINS NEST, AND THE ADJACENT FAST ICE WHERE THE EMPEROR PENGUINS BREED ANNUALLY SHOULD BE DESIGNATED A SITE OF SPECIAL SCIENTIFIC INTEREST.

Photo: R. C. Kingsbury.

Vol. 7, No. 7 Registered at Post Office Headquarters. Wellington, New Zealand, as a magazine. **September, 1975**



ANTARCTICA

0 500 1000 Miles

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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"

(Successor to "Antarctic News Bulletin")

Vol. 7, No. 7 **79th ISSUE** **September, 1975**

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CONTENTS

Antarctic mineral and natural resources have been discussed at international meetings in recent months.

In London the International Whaling Commission agreed on important new measures for the rational management and conservation of whale stocks.

In Oslo representatives of the 12 Antarctic Treaty nations recognised the need to protect Antarctica's environment from the effects of exploitation of its mineral resources, and the marine resources of the surrounding waters, and for international consideration of the problem.

But in Rome an informal international consultation, convened by the Food and Agriculture Organisation, was chiefly concerned with ways to facilitate the eventual commercial exploitation of Antarctic krill. The meeting did acknowledge the need to look at the Antarctic marine ecosystem as a whole.

NEW ZEALAND PART IN DRILLING PROJECT

One major international project—drilling through the annual sea ice into the bed of McMurdo Sound—is included in New Zealand's Antarctic research programme for 1975-76. This operation is the final stage of the Dry Valley Drilling Project, a three-year programme developed by scientific organisations of the United States, Japan, and New Zealand.

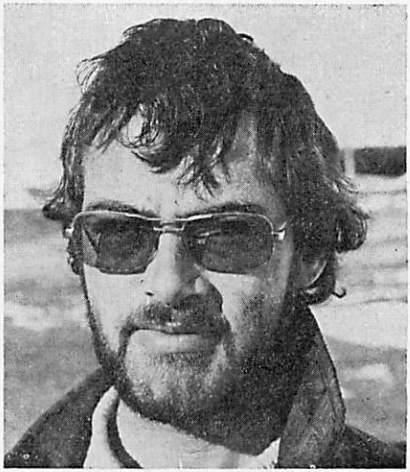
This season New Zealand has been invited to participate in the meteorological programme at the Amundsen-Scott South Pole Station. A meteorological team will conduct routine upper air and surface observation programmes at the station. One member, Mr B. V. Maguire, will be the first New Zealander to winter at the Pole next year.

Because of restricted support by United States Navy Hercules aircraft, New Zealand field projects this season have been limited to those within helicopter range. But the 1975-76 programme is at a similar level to last year's. Emphasis has been given to the continuance of atmospheric and earth sciences projects at Scott Base, the operation of Vanda Station for summer only, and 32 other events. These include field activities, international programmes, and short-term projects.

AIRCRAFT SALVAGE

New Zealanders will be involved this season with a United States team in one of the most difficult projects ever attempted in Antarctica—the recovery of two Hercules ski-equipped aircraft damaged in take-off accidents on January 15 near Dome C, an ice dome in Wilkes Land. A salvage camp and skiway will be built at Dome C, which is between the main French base, Dumont d'Urville, and the Soviet station, Vostok, and is about 756 miles from McMurdo Station.

Men, supplies, and equipment will be flown to the area from McMurdo Station. New Zealand will assist the United States team by the provision of men experienced in snow and ice work.



B. V. MAGUIRE

Later the Antarctic Division, Department of Scientific and Industrial Research, will provide experienced mechanics to work on the repairs to the two aircraft so they can be flown to McMurdo Station.

Since the Dry Valley Drilling Project began New Zealand has been responsible for all drilling operations needed. Last season the last stage of the project—drilling through the ice into the seabed—had to be abandoned because winter storms and high tides in McMurdo Sound broke up the ice, leaving no drilling platform.

Next month a drilling team, led by the drilling superintendent, Mr J. Hoffman, will begin the task of drilling two holes in McMurdo Sound. An advance

party flew south early this month to prepare for the operation. It will work with a survey team from Scott Base which will mark the drilling sites and measure the currents at various depths. Both sites are above deep water, and at one the water is 900ft deep. Drilling is planned where the deepest sediments lie.

Vulcanological studies of Mount Erebus, one of Antarctica's two known active volcanoes, will be made again this season for the Antarctic Division. Dr W. F. Giggenbach, geochemist, of the Chemistry Division, D.S.I.R., Messrs P. R. Kyle, geologist, C. C. Monteath, field officer, and J. F. Williams, surveyor, will start their observations late in November.

Last season a New Zealand-French-United States expedition spent more than three weeks on the mountain, and made detailed measurements and observations. This season the New Zealand party will study any changes in volcanic activity that may have occurred since then, and any alteration in the topography of the volcano as a result of eruptions in the active inner crater.

Dr Giggenbach, Mr Kyle, who has been a member of Victoria University of Wellington expeditions for several seasons, and Mr Williams, of the Lands and Survey Department, all worked on the mountain last year. This time the party hopes to be able to monitor seismic activity on Erebus.

SEAL STUDIES

Scientists from five universities will be involved in events in this season's programme. Teams from the four universities, Antarctic Division, Ministry of Works, Lands and Survey Department, Geological Survey, and the Physics and Engineering Laboratory, will work on geological and glaciological projects in the dry valleys, biological and marine sciences in the McMurdo Sound area, and a joint upper atmosphere project with the United States at Siple Station in Ellsworth Land.

again with the United States in providing the logistic support required by their respective programmes. Its main contribution will be seven flights by Royal New Zealand Air Force Hercules aircraft between New Zealand and Anarctica. It will also provide air crews and load planners, and Army cargo handlers, who will work at Williams Field, near McMurdo Station.

Caretakers for huts

A family association with Antarctica which began 65 years ago will be renewed in December. Mr A. W. Burton will fly south to the continent his father Mr W. Burton, saw as a member of the crew of the Terra Nova on Scott's last expedition in 1910-1913.

As one of the New Zealand Antarctic Society's caretakers for the historic huts on Ross Island this season, Mr Burton will work on Scott's hut at Cape Royds, and Shackleton's hut at Cape Royds, which his father knew 65 years ago.

Mr W. Burton, who returned to Ross Island in 1963 as a guest of the United States Navy's Antarctic support force, is a life member of the Canterbury branch of the Antarctic Society. His son, who was nominated as a caretaker by the branch, has been a member of its committee for three years. He is an engineer.

The other caretaker, Mr P. G. Poppleton, who was nominated by the Wellington branch, has had experience of sub-Antarctic winters and summers. He was leader of the meteorological teams on Campbell Island from 1958 to 1960.

Mr Poppleton, who was trained as a carpenter, served for three years with the Army in South Korea. For 12 years he was a fire control officer for one of New Zealand's largest forest products companies.

WINTER TEAM AT SCOTT BASE

This season there will be a Royal New Zealand Air Force leader at Scott Base for the first time. He is Flight Lieutenant H. D. Raynham, a 36-year-old Englishman, who is an operations officer at R.N.Z.A.F. Base, Wigram, Christchurch. The Navy and Army have provided leaders in past seasons, but there has been no Air Force officer in charge since the 1957-58 season when Wing Commander J. R. Claydon acted while Sir Edmund Hillary was in the field.

Ten men have been selected to winter at Scott Base through 1976 under the leadership of Flight Lieutenant Raynham. They include a cook and a fitter-mechanic from the R.N.Z.A.F. This time six are from the South Island, and five from the North Island. Their ages range from 22 to 42.

Flight Lieutenant Raynham served as a transport pilot in the Royal Air Force for 12 years. He was awarded the Air Force Cross while based at Aden. After he left the R.A.F. he spent a year flying for the Sheikh of Abu Dhabi, and then was a contract pilot for three years in the Air Force of the Sultanate of Oman.

Members of the winter party are

E. G. R. Ramsbotham (42), Atiamuri. Base engineer. He is station electrician at Atiamuri for the New Zealand Electricity Department.

C. G. Mills (23), Auckland. Technician. He is an electronics technician from the University of Auckland

C. B. Davis (22), Wanganui. Technician. He is a Post Office technician

R. A. Jones (24), Gore. Technician. He is a scientific officer at the University of Otago.

J. R. Thomson (23), Temuka. Fitter-mechanic. He joined the R.N.Z.A.F. in 1970 and is an engine fitter at Wigram.

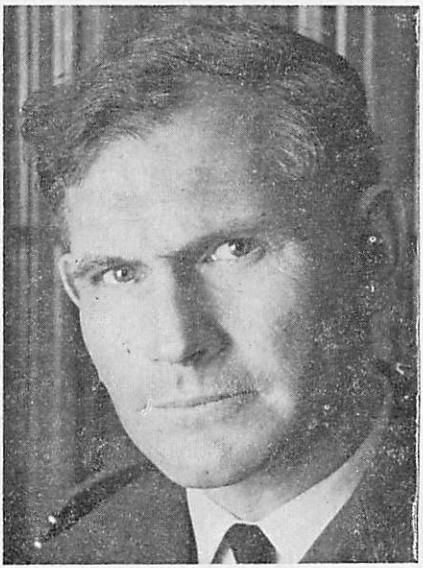
A. MacGibbon (23), Christchurch. Fitter-mechanic. He is a soldier in the New Zealand Army.

I. D. McLeod (25), Christchurch. Cook. He is a cook in the R.N.Z.A.F at Wigram.

C. S. Chapman (27), New Plymouth. Field assistant.

B. J. Scannell (22), Wellington. Postmaster.

A. J. Dawrant (24), Christchurch. Senior radio technician. He wintered at Scott Base in 1973.



HAMISH RAYNHAM

A 25-year-old Australian surveyor, Mr I. E. Paterson, has been appointed information officer for the Antarctic Division, Department of Scientific and Industrial Research. He gained a Bachelor of Surveying degree with honours at the University of New South Wales.

Mr Paterson worked recently for the Mount Cook National Park Board. He is a keen mountaineer.

Field projects for summer

New Zealand meteorologists will work at the South Pole this season. They are members of the support staff of more than 130 men—and eight women—who will carry out the Antarctic research programme in the 1975-76 season. Research will be conducted by scientists from four New Zealand universities, the Ministry of Works, the Physics and Engineering Laboratory, the Meteorological Service, and the Antarctic Division, Department of Scientific and Industrial Research. The programme will include guest scientists from two countries, and men and women from England, Wales, Canada, and Australia.

These men and women will work at or from Scott Base, Vanda Station, and Cape Bird, in the dry valleys of Victoria Land, and in McMurdo Sound. New Zealanders will work with the Americans at the Amundsen-Scott South Pole Station, on a joint upper atmosphere programme at Siple Station, and in the recovery of two damaged Hercules aircraft from Wilkes Land.

There will be a woman meteorologist, Miss Edith Farkas, at Scott Base this summer. Two biologists, Misses Elspeth Wingham and Corinna Jamin, will work with the University of Canterbury party at Cape Bird, and Misses Vicky Cameron and Debbie Teale, will study the parasitology of Weddell seals with the University of Otago biology team.

A Welsh geologist, Dr Susan West, will take part in the collection of geological samples from the dry valleys and McMurdo Sound. The other collector for the Canterbury Museum will be its geologist, Mrs Margaret Bradshaw.

One of the main field events will be a regional study by a party of four from the Geological Survey of the unmapped southern Royal Society Range. The aim will be to investigate the apparent change from low to high grade meta-sediments of the Skelton Glacier group. A further aim will be to study the McMurdo volcanics on both sides of the Koettlitz Glacier.

Vanda Station, in the Wright Valley, which has been a summer station since 1970, was occupied in the winter of 1974. It was used for summer operations only last season. This season it will meet the needs of field parties working in the dry valleys, and the station staff will carry out programmes of meteorology, geomagnetism, hydrology, and geochemistry.

Twelve men and one woman will work at Scott Base during the summer. They will continue the research programmes, which include meteorology, geomagnetism, ionospheric physics, and seismology. Research will also be conducted at Arrival Heights into geomagnetism and the aurora.

SCOTT BASE

W. B. MacDonald, Wakapuaka. Deputy leader. He is a plumber in the Nelson district, and has had mountaineering experience as a member of the New Zealand Alpine Club. In 1969 he was a member of the snowcraft training team at Scott Base.

B. L. Doughty, Wanganui. Maintenance officer-carpenter.

M. D. Bird, Trentham. Storekeeper.

M. J. W. Otway, Waihi. Assistant maintenance officer.

G. S. R. Eames, Lake Ohau. Assistant maintenance officer.

N. D. Peat, Dunedin. Information officer.

R. B. Stark, Christchurch. Chief radio technician.

B. J. Potter, Foxton. Radio technician.

Miss Edith Farkas, Wellington. Meteorologist.

R. L. Park, Christchurch. Senior Post Office lineman.

J. C. Francis, Christchurch. Skilled lineman.

M. D. Lee, Christchurch. Senior Post Office clerk.

J. M. Reinke, Kaikoura. Post Office clerk.

VANDA STATION

H. P. Lowe, Gore. Leader. He was leader at Vanda in the 1969-70 season, and field leader at Scott Base in the 1972-73 season.

P. R. Braggins, Masterton. Technician.

P. Ingram, Wellington. Meteorologist.

S. J. Woods, Geraldine. 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; P. W. Mason, G. R. Craig, hydrologists; S. C. Chatwin, field assistant; W. F. Wicks and J. F. Williams, surveyors.

Geological Survey. Regional study of the unmapped southern Royal Society Range and study of McMurdo volcanics in Koettlitz Glacier area. Drs D. N. B. Skinner (leader and B. C. Waterhouse, geologists; G. G. Brehaut (field leader) and K. R. Sullivan, field assistant.

Dry Valley Drilling Project. J. Hoffman and L. W. J. Oliver, drilling superintendents; J. H. Gupwell, M. W. Williams, J. W. Barclay, drilling supervisors; J. R. Oldridge, T. R. Quigley, shift bosses; N. J. Stephenson, T. Griffith, drillers; D. F. C. Murray, M. R. Wing, J. M. Meehan, D. J. Dickson, W. J. Champion, drillers' assistants; O. R. Lloyd, cook; M. A. MacLeod, camp assistant.

Physics and Engineering Laboratory. Continuation of upper atmosphere programme with United States at Siple Station. E. W. Stringer, J. Dyer, M. I. T. Savage.

Meteorological Service. Upper air and surface observation programmes at South Pole Station. B. V. Maguire (winter), R. D. Stainer (summer).

Institute of Nuclear Sciences. Continuation of monitoring programme by technical staff at Scott Base to determine increase in carbon dioxide concentration in the atmosphere.

Commonwealth Scientific and Industrial Research Organisation, Australia. Collection of air samples from aircraft flying to and in the Antarctic for the C.S.I.R.O. Data collected will help to describe vertical and horizontal distribution of carbon dioxide.

Antarctic Division. Continuation of annual population study of the Weddell seal in the McMurdo Sound area, including an isolated group near White Island. Population study of Adelie penguins at Cape Royds will also be continued.

Snowcraft and survival training for United States and New Zealand staff. B. J. Chalmers; D. R. J. McNulty, M. J. Wendon, R. A. Strong, field assistants.

Bright orange timber cargons containing first-aid and survival equipment will be installed at the refuge huts at Cape Royds, Cape Evans, Cape Bird and Lake Vanda, and in the Asgaard Range and the lower Wright Valley.

Experienced field and mechanical staff will assist the United States team to recover two Hercules aircraft damaged in Wilkes Land. E. J. Saxby, field leader, D. M. King, field assistant.

A geologist, Dr Susan West, will assist the Canterbury Museum's geologist, Mrs M. Bradshaw, to collect geological samples from the dry valleys and McMurdo Sound for a future display in the museum's Antarctic centre.

Antarctic Division and Victoria University of Wellington. Physiological and psychological studies of winter team at Scott Base. Professor A. J. W. Taylor, professor of clinical psychology, Victoria University of Wellington.

Four universities involved in N.Z. field projects

Field work in the dry valleys west of Scott Base, and studies of the sediments in the bed of McMurdo Sound, are included in the projects which will be carried out by university scientists during the New Zealand Antarctic research programme this summer. Four universities—Waikato, Victoria, Canterbury, and Otago—will contribute teams to this season's programme, and field parties will study glacial deposits in the dry valleys, the parasitology of the Weddell seal, and marine and fresh-water ecosystems. Some scientists will take part in United States projects, others will be involved in the international Dry Valley Drilling Project.

This summer the seven members of Victoria University's 20th expedition will investigate the early history of the Antarctic ice sheet.

A party of four, Paul Robinson, geology graduate student and leader, John Collen, senior lecturer, and Alan Palmer and Alan Eggers, third-year geology students, will map and sample ancient glacial moraines in Taylor Valley, one of the ice-free valleys 100km west of Scott Base. The classic U-shape of the valley and the moraine plastered on the valley floor indicate that Taylor Valley was eroded by glaciers in the past, and once formed an important outlet for ice from the East Antarctic ice sheet, although the Taylor Glacier extends less than a quarter of the way down the 50km long valley.

ICE ADVANCE

The party will also spend a month studying terraces on Black Island and Brown Peninsula 50km south of Scott Base to determine whether they are of glacial or marine origin. Samples from the terrace surfaces are expected to yield microfossils from which the age of the terrace can be estimated. Whatever the origin of the terraces, the ages will be useful in establishing a chronology for sea level changes and glacial advance and retreat in the McMurdo Sound region over the last five million years.

The other three members of the expedition will be working with Japanese and United States scientists as part of the Dry Valley Drilling Project. This final season, which follows three spent drilling on land around McMurdo Sound, the project will be coring 300m or more into the floor of the sound itself.

Dr Peter Barrett, director of Victoria University's Antarctic Research Centre, is project geologist for the season. Miss Katherine Sillars, a geology graduate student, will help to describe the core and sample for laboratory analyses.

Paul Froggatt, a third-year geology student, will determine sonic velocities on the core. This is to enable the sequences to be more precisely correlated with the seismic profiles across the sound obtained last summer by Victoria University and Northern Illinois University physicists.

NATURAL GAS

One aim of the drilling is to core through the glacial sequence and reach the sedimentary layers that formed the floor of McMurdo Sound before there was ice on East Antarctica. Sea floor drilling by the Glomar Challenger 400 km to the east showed that West Antarctica ice first reached sea level about 25 million years ago, and the present project in McMurdo Sound is expected to reveal when the East

Antarctic ice sheet began calving into the Ross Sea.

The Glomar Challenger drilling also revealed traces of natural gas in the sediments beneath the Ross Sea. Similar traces may be encountered during the McMurdo Sound drilling, but significant amounts are not expected.

An Otago University biology team led by Dr D. W. Featherston will study the host-parasite relationship in Antarctic animals with special reference to Weddell seals. The other members of the team are Misses A. V. Cameron and D. M. Teale.

The main objective is to begin a research programme which will investigate various marine and terrestrial hosts with a view to compiling life cycles of helminth parasites as well as examining the response elicited in the host by the presence of the parasite.

THIRD VISIT

Dr Featherston will be returning to the Antarctic for the third time. He began his study of the intestinal parasites which infect Weddell seals in the 1961-62 season at Cape Royds as a member of the University of Canterbury biological research unit led by Dr Bernard Stonehouse. In 1962-63 he returned to continue his research.

Six scientists from Waikato University will continue geomorphological research in the dry valleys. The emphasis will be on the study of ice cored moraines. Dr T. R. Healy will lead the party, and the others are Messrs J. Mabbutt, J. Shaw, N. Rogers, D. Cowan, and G. Spiers.

A joint New Zealand and United States microbiological study of the resistance to infection of isolated groups working in the Antarctic will be continued this season. It is an Oklahoma Medical School-Otago University project in which the Scott Base and South Pole Station winter parties are participating. The project was begun last season, and is expected to continue for at least two more years.

Professor J. A. R. Miles, professor of microbiology at Otago University, is involved in the project because he has made similar studies in tropical areas. Comparisons are being made between the isolated groups in Antarctica and those in the tropics.

Once again the University of Canterbury biological unit will work from the field station at Cape Bird on Ross Island. It will continue the study of the dynamics of near-shore marine and freshwater eco-systems.

An American zoologist, Dr D. S. Horning, who has worked on the sub-Antarctic islands south of New Zealand, will lead the party. Mr P. Sagar is going south for the fourth time, and the other members of the team are Mr R. C. R. Tustian, and Misses Elspeth Wingham and Corinna Jamin.

PHILATELIC MAIL

Philatelic mail will still be cancelled at the South Pole although there is now no military post office at the Amunsden-Scott South Pole Station. The civilian firm which took over operation and management control of the station from the United States Navy on November 3 last year, will provide postal cancellation services.

Collectors will be limited to two covers a person this year. South Pole Station cachets will be affixed to covers only when time and work permit. Covers should be addressed to Philatelic Mail Clerk, South Pole Station, c/o F.P.O., San Francisco, 96692.

All covers addressed to the South Pole Station will be forwarded by the United States Navy Post Office at McMurdo Station, Antarctica. Philatelists who want covers cancelled at McMurdo Station should address them to Philatelic Mail Clerk, United States Naval Support Force, Antarctica, F.P.O., San Francisco, 96692.

BRIGHT HORIZON

Sun and spring flights end winter parties' isolation

Fresh fruit and vegetables, and letters from home, marked the arrival of spring in Antarctica this month for the winter parties at McMurdo Station and Scott Base. The first sign of spring and the end of isolation for 11 New Zealanders, 53 Americans, and one Russian, was the return of the sun towards the end of last month. But they still had to endure low temperatures and bad weather before two United States Navy Hercules aircraft restored the link with civilisation broken more than six months ago.

Seventeen Americans at the Amundsen-Scott South Pole Station 825 miles to the south also celebrated the return of the sun last month after the coldest winter for 17 years. But they will have to wait another two months for their signs of spring. Temperatures at the Pole will have to rise to minus 50deg Fahrenheit before aircraft return after a break of nearly nine months.

This year the winter was a testing time for the new Pole Station and the civilian scientists and support staff who manned it. Living conditions in the complex of buildings under the geodesic dome were more comfortable than those in the old station, but the men had to cope with heating, lighting, and plumbing problems week after week. Most of these were minor, and were the result of operating new mechanical systems and equipment for the first time in temperatures which rarely rose above minus 90deg Fahrenheit.

FROZEN PIPES

In the last three months each weekly report noted frozen pipe-lines, cracked pump fittings, and interruptions in the running of the generators upon which the men relied for heat and light in the winter darkness. Water which leaked from the snow melter pipe rapidly turned to ice, diesel fuel in the storage area froze, and also the rotator on a directional beam antenna. Late in July the use of strainers in the fuel season had to be abandoned because the fuel was too cold and thick to flow through them.

One of the main tasks in June was to remove several tons of ice from the utilidor floor. When the snow melter pump cracked because of the low temperature water seeped into the buildings, and covered the floor to a depth of three to four inches. About 9000lb of ice had to be taken out of the utilidor in temperatures which ranged from minus 90deg F to minus 102deg on June 13.

Mid-winter's Day was celebrated on June 21 with the aid of some Russian vodka obtained from Vostok Station last summer, and carefully hoarded for the occasion. Then the men prepared for the hard month. July 14 gave them a respite from the intense cold with a temperature of only minus 52deg, but three days later it dropped to minus 98deg, and there was more ice to clear because the snow melter pump had been leaking badly again.

THICK FUEL

In the third week of July the thermometer recorded minus 102deg on July 22—the day the diesel fuel was too thick to flow through the strainers. July 25 was observed as Hundredth Day because the men had 100 days more at the Pole to complete a full year. Turkey and wine

were on the table, and also the remaining Fourth of July punch from Midwinter's Day. To finish off the meal one man opened his jar of gourmet popcorn (described as the world's most expensive popcorn).

July was also the month in which Larry Duckett, the world's southernmost cook, responded to the mild complaint two months earlier that his pretzels needed coarser salt. He presented his fellow exiles with what was described as one of their biggest challenges—a huge cream puff filled and covered with vanilla ice cream, strawberries, chocolate sauce, whipped cream, chopped walnuts, and topped with a solitary cherry.

HINT OF SUN

In the second week of August the weather was extremely clear. The station report noted that those with an active imagination could see an extremely faint glow on the horizon. Winter's reply to a hint of the returning sun was a temperature of minus 100dg on August 15. Then on August 20 the drainage system piping for the whole station was blocked for 24 hours because of ice capping on the sewer outfall and several feet of pipe.

With the sun on its way back the Pole team apparently developed a touch of it. That seems the only explanation for a late night party sliding down the geodesic dome. There was a full moon and a dark, velvety blue horizon, and the chill factor—minus 120deg—was considered reasonable.

Storms, high winds, and several inches of snow were the lot of the men at McMurdo Station towards the end of June. Between June 22 and 27 the wind averaged 54 miles an hour, and there was one gust of 61 miles an hour. Nearly five inches of snow fell.

BUSY SCIENTIST

One of the busiest men at the station during the winter was the Russian exchange scientist, who measured the thickness of the sea ice in McMurdo Sound each week. On June 25 he and two other men journeyed over the ice from Hut Point towards Turtle Rock, taking ice cores every 2000yds. They reached a point opposite Castle Rock, and spent the night there in tents. Stronger winds next day delayed their return. The ice was 38 to 43 inches thick along their route.

By the end of the month the station cooks had no more fresh carrots left. The last cases of oranges, grapefruit, and apples were no longer fit to eat. Supplies of onions were maintained by exchanging potatoes for them with the New Zealand neighbours at Scott Base.

Early in July a small amount of "blue" sky was observed for the first time since the winter night began. There was more light every day, but the weather was no warmer. July 24 was the coldest day of the season. South-west winds pumped cold air over Ross Island, and the temperature dropped to minus 38deg Celsius.

COLDEST DAY

Towards the end of the month an American and New Zealand party started flagging and coring the route across McMurdo Sound to Marble Point in preparation for the transport of drilling equipment for the Dry Valley Drilling Project. After covering five miles the party had to abandon the trip because there was not enough light. Three miles out the ice was 58 inches thick.

The last day of July was the coldest for at least two years, a temperature of minus 48deg being recorded at 4.45 a.m. Then on August 3 the record low temperature of August, 1956, was equalled at 6.45 a.m. The drop to minus 57deg caused many fuel lines to freeze because water droplets froze in the fuel. Many pipes burst, and there was flooding, mainly in the galley area.

Although there was an ever-brightening glow on the northern horizon, the cold spell did not end until August 6.

Winds averaging more than 40 miles an hour were recorded on August 9 with a gust of more than 45 miles an hour.

On August 12 Dr Barkov headed another American and New Zealand party on a trip across the sea ice towards Butter Point. They covered 11 miles, spent the night of August 13 on the ice, and continued their journey on August 14.

OPEN WATER

Open water was discovered about 20 miles from McMurdo Station. About 14 miles out very thin ice (12in thick) was encountered all the way to the ice shelf. From the ice shelf towards Butter Point the ice became progressively thinner. It appeared that two of the proposed DVDP drilling sites were open water, and sea fog suggested the same was true for the other two sites.

Snow and gusty winds marked the second week of August. The long-awaited sunrise was observed on August 23, and the weather was comparatively warmer, but there was no glimpse of the sun. Although the almanac indicated that the sun rose for the first time on August 20, this could not be verified because of strong winds and reduced visibility.

HUSKIES WELL

Scott Base had its share of low temperatures and bad weather during the winter, but the small New Zealand community, and the animal population, had few problems. There are about 20 huskies at the base, including several pups born this winter. They came through the winter well. Only Apolotok needed minor repairs after fighting for the attention of a lady.

Scientific programmes, base maintenance, and the overhaul of equipment, kept the New Zealanders busy in June. The weather for the first two weeks was good. High winds and drifting snow created some problems in the last fortnight. Mid-winter's Day was a welcome and international occasion because the official guests were Lieutenant Schultz, the officer in charge at McMurdo Station, and the Soviet exchange scientist, Dr Barkov.

Daylight but not sunlight was the story in July. Jim Newman, the officer in charge, reported in his monthly newsletter that winter's total darkness had been replaced by about four hours of twilight in the middle of the day.

With more light the New Zealanders began outdoor activities. Dogs and sledges were taken out on the ice shelf and the sea ice. Nearly all the base staff went out with the dogs on runs of five to six miles. The exercise had a twofold purpose—to make the dogs fit for the summer season, and restore the men's fitness after winter without much exercise. Everyone had to run to keep warm because the temperature was usually minus 35deg Celsius.

July 29 was the coldest day for five months, the temperature dropping to minus 46deg Celsius. But worse was to come. Early on the morning of August 4 the temperature dropped to minus 56.1deg Celsius—the lowest recorded for the winter.

All the heated waste water outlets froze solid. When a gas torch was taken to them it gave out only a dull, yellow flame and no heat. No vehicles could be driven because the steering gear froze, and they could not be manoeuvred.

If the temperature had dropped another 0.9deg it would have been the lowest ever recorded since 1957. Temperatures of minus 40deg were common in the weeks that followed.

SUN APPEARS

Although the sun made a brief appearance above the Ross Sea horizon in the third week of August, the men at Scott Base did not see it. The only indication of its return was its reflection on the snow of the Royal Society range, south-west of the base. Hopes of seeing the sun were high later in the week, but were dashed by a 70-mile-an-hour southerly gale which restricted visibility to 3ft and confined the men to the base.

Early this month the men at Scott Base were happier. The sun was appearing for about six hours each day, and temperatures were rising slowly. Mail, fresh fruit and vegetables, had arrived, and home did not seem so far away after six months of isolation.

McMurdo Sound flights start U.S. operations

Preparations for the United States Antarctic research programme for the 1975-76 season began early this month when two ski-equipped Hercules aircraft made the first flights of spring to end the winter isolation of 53 Americans, 11 New Zealanders, and one Russian exchange scientist, on Ross Island. The aircraft brought mail, fresh fruit, and vegetables to the men who have been remote from the outside world since late February.

In five flights United States Navy VXE6 Squadron aircraft carried 5518lb of mail, just over 22 tons of cargo, including 3000lb of food, and 147 passengers south. They brought back two Americans and one New Zealander of the winter parties.

Among the passengers were scientists who will make an early start on summer research projects, and technicians, meteorologists, equipment operators, mechanics, construction workers. and air traffic controllers. Three drillers, Messrs L. Oliver, M. Williams and J. Meehan, were the first New Zealanders to fly south for the new season. They will prepare equipment for the Dry Valley Drilling Project which will involve drilling from the McMurdo Sound sea ice to the basement rock in the seabed.

Because the winter party at McMurdo Station this year was smaller than in previous seasons more men were flown south this month to assist in the preparation of the Williams Field ice runway for the major airlift by Starlifters and Hercules aircraft which will take summer support and scientific staffs south. starting next month. Bad weather and low temperatures delayed work on the field camp on the ice last month.

Six projects in the summer research programme will be resumed by 30 scientists this month. They will work on the Dry Valley Drilling and Ross Ice Shelf Projects, cosmic ray measurements, studies of the resistance to freezing of Antarctic fishes, and the development of soft bottom marine life in the McMurdo Sound area. Another continuing project is the study of the resistance to infection of isolated groups working in the Antarctic—the winter parties at McMurdo Station and the Amundsen-Scott South Pole Station.

Fresh food does not last all winter in the Antarctic, and what the men on Ross Island looked forward to more than anything except mail from home was fruit. The Americans at McMurdo Station asked for their apples to be "red, delicious, and large," and the New Zealanders had a craving for cheese. The apples and cheese were sent, and the American consignment included 30lb of New Zealand kiwi fruit (Chinese gooseberries), yoghurt, tinned oysters, and—for the cooks—salad dressing and garlic.

There was one unusual item among the parcels for Scott Base—about $100 worth of contraceptive pills. They were requested by the dog handler, Mr John Stevens. He has looked after the base huskies all winter, and the pills are needed to maintain selective breeding among the dogs.

After the first excitement of mail and the new arrivals, the men at McMurdo Station began the task of preparing roads and runways for the influx of summer residents. Between October 8 and December 16, aircraft will make 40 flights south with men, equipment, and supplies. Most of the flights will be made by United States Air Force Starlifters of the Military Airlift Command. They will be supported by the Royal New Zealand Air Force, which will make seven flights with its Hercules aircraft towards the end of November.

RESTRICTED AIR SUPPORT OF U.S. RESEARCH PROJECTS

United States Antarctic research projects this season will be restricted to areas that can be supported by helicopter flights from McMurdo Station. Summer field parties will not be supported by Hercules ski-equipped aircraft of the United States Navy's VXE6 Squadron.

Last season five Hercules aircraft were available to support the scientific effort. But on January 15 two were damaged in take-off accidents on the Polar Plateau 750 miles from McMurdo Station. The three remaining aircraft will be fully employed ferrying men and materials between Christchurch and McMurdo Station, and on supply flights to the Amundsen-Scott South Pole Station, and Siple Station at the foot of the Sentinel Mountains in Ellesworth Land.

A major operation this season by the National Science Foundation and the Navy's Antarctic support force will be the recovery of the two damaged aircraft. They are near Dome C, an ice dome in Wilkes Land on the line between the French base, Dumont D'Urville, and the Soviet station, Vostok.

A repair crew of 25 men will be flown from McMurdo Station to the accident site at the end of November, and, working from a field camp, it will have about 60 days to repair the aircraft before the weather becomes too cold to continue work. A landing strip will have to be built, and also a workshop and shelter for the repair crew. Everything needed for the operation will have to be flown to the site from McMurdo Station.

Top priority will be given to the recovery of the aircraft with the nose ski section which was damaged when it collapsed on take-off, but work on both aircraft will be done at the same time. A complete lower nose section, including the landing gear assembly, has been fabricated in the United States, and will be fitted to the damaged aircraft so it can be flown to McMurdo Station, and finally to the United States for a complete overhaul.

Three-quarters of the entire wing assembly of the more seriously damaged Hercules will be replaced, and two new engines mounted. This aircraft was damaged when it flew to Dome C to pick up a party of French, American, and Russian scientists. The second aircraft picked up the passengers and crew, and was taking off when the nose ski collapsed.

New Zealanders will take part in the recovery operations. The Antarctic Division, Department of Scientific and Industrial Research, will provide about 12 mechanics, engineers, and field assistants experienced in snow and ice conditions, to assist the salvage operation.

There is another Hercules aircraft in Wilkes Land. It was abandoned nearly four years ago because it was badly damaged on December 4, 1971, when taking off from the ice-cap. To determine the feasibility of salvaging the aircraft a French party may make a traverse to the accident site, 150 miles from Carrefour, a small advance base 25 miles inland from Dumont d'Urville.

A mug found in Scott's hut at Cape Evans has come to rest aboard the 1901-1904 expedition's ship, Discovery, now moored at Victoria Embankment in the Thames. How the mug came to be removed from the hut is not known; it was returned to Rear-Admiral H. Hollins, R.N., late last year by Master Chief Petty Officer W. Weesner, United States Navy.

Pine Island Bay survey deferred

There are no immediate plans for an operating facility for ships and aircraft in the Pine Island Bay area off the Walgreen Coast of Ellsworth Land. A survey was made last summer, but any decision by the United States National Science Foundation will depend on the results of a second investigation, probably in the 1976-77 season, to determine whether the area is suitable for long-term development.

Suggestions that the establishment of an operating facility at Pine Island Bay would reduce the importance of McMurdo Station, and Christchurch, the main departure point for United States Antarctic operations, have been discounted by Mr Walter Seelig, international co-ordinator in the National Science Foundation's Office of Polar Programmes. He said in Washington last month that the United States has a multi-million-dollar interest in McMurdo Station, which will always have prime importance. Christchurch will continue to be the main departure point for operations. It would cost millions to establish anything in Pine Island Bay, and finance is not available now.

Interest in the Pine Island Bay area began several years ago when satellite photographs disclosed an unusual ice-free patch of water between the coast and the 20-mile wide belt of Bellingshausen Sea pack ice. Aerial photographs later revealed a group of islands at the entrance to the bay.

It was suggested that the area might be suitable for ships or aircraft, possibly as a means of supplying Siple Station, 300 miles away at the base of the Sentinel Mountains in Ellsworth Land. At present Siple Station is supplied by Hercules aircraft flying from McMurdo Station 1000 miles away.

A proposed survey by the icebreaker Staten Island had to be cancelled in the 1973-74 season because of delay and heavy ice in the area. Last season the icebreaker Burton Island penetrated the ice for the first time. Aboard were officers of the National Science Foundation and the United States Geological Survey.

Air and ground surveys revealed two partially ice-free islands and adjacent areas. But the results disclosed by the survey were not as encouraging as at first thought. There will be no survey this season, and a final decision depends on the second investigation in the 1976-77 season.

Wilson's South Pole diary

Maori motifs on the title page of Edward Wilson's South Pole diary suggested that it might have been given to him in Christchurch by one of the New Zealand doctors with whom he became friendly a the time of the Discovery expedition (Letter from James Pigg to "Antarctic", March, 1973, page 332).

The correspondent pointed out that the South Pole diary was written in a "Wellcome's Medical Diary and Visiting List". The medical diary was of a kind produced by medical supply firms for use by doctors.

Because of the Maori motifs the suggestion was made that the Wellcome's diary may have been produced for the use of New Zealand doctors. But an exhibition held in London recently provided what is probably the correct explanation.

In the Wellcome Trust's exhibition devoted to its history and the work of its founder, Sir Henry Wellcome, were medical packs prepared for Scott's last expedition by the pharmaceutical firm of Burroughs and Wellcome. Probably the packs included diaries, and the Maori motifs could have been used because of the expedition's association with New Zealand.

BRITISH SURVEY NEWS

Argentine Islands base may be closed after many years

Substantial reductions in the British Antarctic Survey's budget may cause it to close another base as an economy measure. The feasibility of moving geophysical research from the Argentine Islands base to the proposed new base on Adelaide Island would enable B.A.S. to close Argentine Islands, first established in 1947 as Base F of the Falkland Islands Dependencies Survey.

Stonington Island in Marquerite Bay was closed at the end of the 1974-75 summer after 21 years of occupation. This season Fossil Bluff, the small advance base in George VI Sound, will be closed for winter use. But so far, in spite of financial stringencies, all research programmes at the five main bases have been maintained.

Very careful organisation will be needed, however, to make provision for the special programmes planned for the International Magnetosphere Study in 1977-78. In addition to the investigation of gravity waves in the ionosphere, from the bases in the Antarctic Peninsula area ("Antarctic," June, 1975), a major VLF project is being planned in co-operation with Sheffield University. This would involve setting up an unmanned station on the Polar Plateau inland from Halley Bay.

Five main bases are occupied at present by 79 men of the wintering parties. The bases are Adelaide Island and the Argentine Islands on the west coast of the Antarctic Peninsula, Halley Bay, on the south-east coast of the Weddell Sea, Signy Island in the South Orkney Islands, and South Georgia. A Sixth, Fossil Bluff, is also occupied.

SUMMER PLANS

All bases were reported at the end of last month to be maintaining routine programmes, and preparing for summer field work to come. A number of field huts will be occupied again during the 1975-76 summer, including the glaciological hut at Spartan Glacier, Alexander Island, and the biological hut on Bird Island at the north-west extremity of South Georgia. The latter is particularly important as a centre for work on the southern fur seal.

Sea ice has been more solid and reliable this winter than in recent years, so men at island stations, particularly Signy Island and the Argentine Islands, have been able to undertake a number of journeys. Several parties from Signy Island crossed Normanna Strait to visit Coronation Island.

A party from Adelaide Island also travelled overland to Rothera Point, 40 miles to the north-east, which is the proposed new base site. It inspected a depot which had been left there. The air unit will be transferred to Rothera Point in the coming season, and the rest of the present base will follow in 1976-77.

EARLY HISTORY

The Argentine Islands where there has been a British base since 1957 are about 180 in number, and lie some five miles off the west coast of Graham Land. They were discovered by Dr J. B. Charcot during his 1903-05 expedition in Le Francais. He named them in appreciation of the help he had received from the Argentine Government.

Three of the larger islands (Skua, Winter and Galindez) comprise the group where the base is situated. Here the British Graham Land expedition of 1934-37 built a hut on a sheltered spit of Winter Island, close to a tiny cove where the expedition's ship Penola, was moored for the winter.

There is no record of any visitors to the Argentine Islands between 1936 and February, 1942, when a ship of the Argentine Navy called to leave marks of sovereignty. These were found by Surgeon Commander E. W. Bingham, leader of the Falkland Islands Dependencies Survey when he called on February 19, 1946 in the Trepassey to inspect the hut.

In 1946 the hut was in good condition. Almost a year later a party from the Trepassey called at the Argentine Island to establish a base. The old hut had completely disappeared. Signs suggested that it had been washed away by a tidal wave.

F.I.D.S. decided to build a new base on the same site. A few men were left ashore on January 8, 1947, and using timber landed for general use, they built a small shed in which they lived until materials for a small but comfortable hut arrived later in the season. It was named Wordie House after Sir James Wordie, of Shackleton's Endurance expedition.

Base F, as it was then called, remained in existence on the site until 1954. Then, early in the year, a new base was erected on Marina Point, Galindez Island.

PILOT HONOURED

Flight Lieutenant B. Conchie, who served with the British Antarctic Survey for six years, and recently returned to the Royal Air Force as an instructor, was awarded the Air Force Cross in the Queen's Birthday Honours. Notable among his Antarctic exploits was a flight across the continent last season from Adelaide Island to McMurdo Station. He flew by way of Siple and Byrd Stations on November 15, and returned on December 29 to Adelaide Island by way of the South Pole.

One of the two B.A.S. Twin Otter aircraft was used for the flight. It was used for support work in a United States-British glaciological project on the Ross Ice Shelf.

Psychological research laboratory

A psychological and psycho-physical laboratory will be established at Scott Base, probably this season. The laboratory will be used to continue the studies of the psychological effects of isolation on men who winter in the Antarctic, which have been made for the last eight years.

Since 1967 Professor A. J. W. Taylor, professor of clinical psychology at Victoria University of Wellington, has made annual visits to Scott Base. He questions and observes the winter party for Scott Base before the men go south, and after their six months and a half isolation. More data is obtained after the men have been home one month, and again after 12 months.

In five successive years from 1967 Professor Taylor has made a study of 93 New Zealanders in the Antarctic. His paper, "The Adaptation of New Zealand Research Staff in Antarctica," was published in "Polar Human Biology."

Recently the New Zealand Medical Research Council made a grant of $8850 to Professor Taylor and Professor R. A. M. Gregson, of the psychology department, University of Canterbury, who has been associated in the isolation studies, for their research. The grant will enable other research scientists from either university to be associated with the project, and to make short visits to Antarctica by arrangement with the Antarctic Division, Department of Scientific and Industrial Research.

SOVIET NEWS

Filchner ice shelf station major project this season

Establishment of a new station—Druzhnaya—on the northern edge of the Filchner Ice Shelf, will be one of the major projects of the 21st Soviet Antarctic Expedition this season. This will be the seventh coastal station established by the U.S.S.R. The sixth, Russkaya, at Cape Burks, on the Hobbs Coast of Marie Byrd Land, was established in the 1972-73 season.

According to an announcement from Moscow by Tass, the Soviet news agency, the new station will have a staff of 50. Its main purpose will be to prospect for minerals, and its work, which will extend over a five-year period, will cover an area from the Antarctic Peninsula to Queen Maud Land. A team of geologists, geophysicists, and cartographers, led by a veteran Antarctic scientist, Garik Grikuroz, will establish the station, the Soviet Union's first in the Weddell Sea area.

Soviet interest in the mineral resources of the region in which scientists will work from Druzhnaya is indicated in the announcement of plans for the new station.

"The eastern part of the region has many common features with South America, the south is reminiscent of the ore-bearing zones of Siberia, while the west is a continuation of the American (sic) mountains, famous for their deposits of non-ferrous minerals. The most extensive region of the Continental Shelf in Antarctica, a potential natural storehouse of oil and gas extends across the Weddell Sea, and the Filchner Ice Shelf."

CLIMATE CHANGE

Antarctica's climate has undergone no significant change in the last 15,000 years, according to a report in the "Soviet Weekly" earlier this year. This conclusion has been reached after an analysis of ice cores obtained from varying depths down to 520 metres in the drilling programme at the Soviet inland station, Vostok.

Dr Yevgenny Korotkevich, deputy director of the Arctic and Antarctic Research Institute in Leningrad, who was leader of the 17th Soviet Antarctic Expedition, and did the research on the ice cores, says it became clear that climatic changes in Antarctica had occurred simultaneously with similar changes in the Northern Hemisphere. This inference was confirmed by the data from analysis of a core taken through the Greenland ice cap.

The shrinking of icebergs and pack ice in the Antarctic during the summer months is not produced solely by sunlight and warm currents. A Soviet scientist, Victor Buinitsky, who has worked at Mirny for several seasons, has another theory.

In a paper published recently Buinitsky says that the icebergs and pack are literally eaten away by myriads of tiny, single-celled "seaweeds" of more than 100 species, which live and flourish on and beneath the ice, surviving the bitterest cold. Thawing of the ice releases nutrient "soup," which is capable of sustaining many simple forms of life.

ARTIFICIAL AURORA

Soviet and French scientists working in the sub-Antarctic and the Arctic, have created an artificial Aurora Borealis, which lasted several minutes. The "Northern Lights" were produced by the discharge of electrons from Soviet-built miniature accelerator installed in a French rocket launched from Kerguelen Island.

SANAE REPORT

Helicopter support planned for remote field parties

After nearly 15 years South Africa has abandoned traditional field expeditions and winter parties at small inland bases for the conduct of its earth sciences programme from Sanae Base. This year will mark the last of the field trips and wintering at Grunehogna or Borga bases.

Earth sciences programmes have now been suspended for two years. The present programmes have been completed, and because South African National Antarctic Expeditions will have a new ship with helicopter support, it was considered wise to start afresh on new programmes. From the summer of 1978 geologists, surveyors, geophysicists, and glaciologists, will be flown to the mountain ranges south of Sanae Base where surveys will be made. Then they will return to South Africa to process their data and samples.

During the 14 years that South Africa has had an active earth sciences programme the research has been directed by the South African Geological Survey. All the field work has been carried out from either of two winter bases in the mountains of the Ahlmann Ridge range, and the Borga Massif. These are Grunehogna, 215km from Sanae, and Borga, 380km from Sanae.

These two bases have made it possible for parties of four to six men to spend the winter near where they work in spring and summer. This has also obviated the need to travel long distances before starting work.

HIGH WINDS

Winter at Sanae Base brought much lower temperatures and high winds in storms that lasted up to 11 days. The sun departed on May 21, leaving the base in soft twilight to await the dark months again. Mid-winter's Day was celebrated in traditional fashion on June 21, and the whole team enjoyed the feast programme arranged by the recreation committee.

There were no spectacular events during the winter, and the depression of darkness soon lifted when the sun made its first appearance again on July 23. At the end of last month preparations were being made for a field trip into the mountains to replenish stocks at several depots.

HUT DEMOLISHED

Meteorological work on Marion Island, one of South Africa's two sub-Antarctic islands, ran smoothly until winter arrived. The first catastrophe occurred late in June when the balloon hut was virtually demolished as the result of a hydrogen-filled balloon exploding in a meteorologist's hand. A spark from static electricity caused the explosion. Fortunately the meteorologist escaped with light injuries.

A temporary hut was erected by the weather team, and the balloon launchings were continued sporadically. The relief ship RSA will bring a team from the Department of Public Works to build a new upper air section and balloon hut.

Plumbers, not builders, were needed at the end of July. A message from the island reported that the water pipes supplying the base had frozen. Water had to be carried in buckets from a nearby pond (200 metres away) across really soggy marsh.

GOUGH ISLAND

Six men on Gough Island, another sub-Antarctic island 200 miles south of Tristan da Cunha, will end their winter isolation next month when the

21st team arrives from Cape Town. The new team began its training on September 8, and the relief expedition will leave for the island on October 2.

Except for several storms which raged over the island in June and July, the men experienced a rather quiet winter. Their numbers were reduced from eight to six because the leader, Mr A. Pretorius, became ill, and Mr M. N. Bester, who had been studying the fur seal population, both returned to South Africa. They were passengers on crayfishing vessels which operate in the Gough Island area.

During the winter storms heavy rains caused mountain streams to turn into turbulent rivers. The base is on the eastern side of the island, and is protected from heavy westerly storms at sea. But when the wind swings round to the south or south-east for a couple of days, massive swells smash against the vertical black basalt cliffs to contribute to the slow process of erosion of the island.

During one of these storms in June the landing stage was washed away. This landing stage, which is an alternative way of getting on to the island if the crane is out of order, is about 30 metres above sea level.

Mr Bester, who left the island because of the fur seal migration, will resume his studies for the Mammal Research Institute of the University of Pretoria next month, and this time will have an assistant. He will be able to make a more detailed study of the breeding colonies along the south coast as he will have a dinghy with outboard motors. The South African Navy will brief and train him in the safe handling of the dinghy before the 21st expedition leaves.

When Mr Bester returns to South Africa in May next year it will mark the end of the one-year research programme of study of the Kerguelen fur seal. If it is found desirable to continue or to expand the programme, further authorisation will have to be obtained because Gough Island is a British possession.

Antarctic conservation trophy

The Antarctic Conservation Trophy has been awarded this year to Mr Eric R. Gibbs, of Taihape, for his work in the restoration of the historic huts on Ross Island between 1960 and 1965. Mr Gibbs is a

The award was announced this month by Mr J. M. Caffin, chairman of the Canterbury branch of the Antarctic Society. The branch has made three previous awards of the trophy—a 17in carving of an Emperor penguin in African walnut. The trophy is awarded to any person or organisation contributing to the conservation of historic buildings or flora and fauna in the Antarctic or sub-Antarctic islands.

Mr Gibbs has had a life-long interest in Antarctica, and has an outstanding collection of Antarctic stamps and covers. He first went south in December, 1960, as one of the unpaid volunteers from the Antarctic Society who took part in the restoration of Scott's hut at Cape Evans, and Shackleton's hut at Cape Royds for the Antarctic Division under the leadership of the late Mr L. B. Quartermain.

In 1963-64 Mr Gibbs returned as leader of another Antarctic Society party of three men to clean up and restore the older hut at Hut Point used as a store and a theatre by Scott's Discovery expedition of 1902-1904. Mr Gibbs went back again in the 1964-65 summer with one companion to complete the structural strengthening of the hut.

MAN'S IMPACT ON ANTARCTICA

Man's impact on the Antarctic environment is still the chief concern of the 12 nations which signed the Antarctic Treaty in 1959. Nearly all the recommendations adopted by the eighth consultative meeting of representatives of the treaty nations held in Oslo from June 9 to 20 were designed to protect the environment from the possible effects of exploration and exploitation of Antarctica's mineral resources, and the marine living resources of the oceans surrounding the continent.

All the countries represented at Oslo opposed any exploitation of Antarctica. But they acknowledged that it held resources which the world might demand eventually. Therefore their representatives urged that States and individuals should refrain from any commercial exploration and exploitation of these resources until the effects on Antarctica's unique environment, and other ecosystems dependent on it, have been studied more closely.

Available scientific information on the environmental effects of mineral exploration and/or exploitation in the Antarctic has been inadequately studied. Also the Antarctic geological structure has not been sufficiently investigated.

The meeting recommended, therefore, that a special preparatory meeting should be held in Paris next year to discuss all aspects of Antarctic resources —and the question of mineral exploration and exploitation—in relation to the Antarctic Treaty.

MARINE RESOURCES

S.C.A.R., the Special Committee on Antarctic Research, should be invited to make an assessment of the probable impact on the environment of the treaty area, and other ecosystems dependent on it. To obtain fundamental scientific data on the geological structure of Antarctica S.C.A.R. should continue to co-ordinate national geological and geophysical research programmes in the area.

Protection and rational use of Antarctica's marine living resources were considered by the meeting in the light of possible commercial exploitation. It agreed on the inadequacy of information about stocks of marine resources, and the need to develop a good scientific foundation for appropriate conservation measures.

The meeting recommended the initiation or expansion in Antarctic scientific programmes of detailed studies of the biology, distribution, bio-mass and population dynamics, and the ecology of marine living resources. Studies which could lead to effective conservation measures were also recommended.

New Zealand suggested to the meeting that the decline of the whale demonstrated the need for effective conservation measures for other living resources. It warned that the Antarctic krill, a small shrimplike crustacean, could suffer the fate of the whale if not protected. Krill exists in huge quantities in Antarctic waters, and is the biggest source of animal protein left in the world today.

S.C.A.R. was urged in the meeting's recommendation to continue its scientific work on marine resources. A meeting of all interested parties to discuss present work, and report on scientific study and conservation programmes will be held in the United States next year as a preliminary to the ninth consultative meeting.

NUCLEAR WASTE

Concern that the Antarctic environment and the surrounding oceans and

atmosphere should not become contaminated by radioactive waste was expressed by the Australian representative. He said that Australia would firmly oppose any move to permit the disposal or storage of radioactive waste in the Antarctic ice sheet.

New Zealand and other representatives associated themselves with the Australian statement. This emphasised that the suggested isolation of radioactive wastes from the biosphere by burial in the ice sheet was expressly forbidden by the Antarctic Treaty.

Safe disposal of radioactive waste in the ice sheet cannot be guaranteed on the basis of existing knowledge. In this regard the statement referred to a resolution of the last meeting of S.C.A.R., and the views of scientific experts who met in Britain in September, 1974, to consider the disposal or storage of radioactive waste in Antarctica.

The meeting recommended to its governments that they continue to exert appropriate efforts to ensure that no-one disposes of nuclear waste in the Antarctic Treaty area.

SPECIAL AREAS

Previous consultative meetings have agreed on measures for the conservation of Antarctic fauna and flora, and have recommended that the treaty nations designate specially protected areas. The Oslo meeting reviewed the present list, adding to it Litchfield Island, off the Antarctic Peninsula and removing Cape Crozier on Ross Island, Byers Peninsula on Livingston Island, and Fildes Peninsula on King George Island, both in the South Shetlands.

There is a need to protect scientific investigations in Antarctica which might suffer from wilful or accidental interference. The meeting therefore decided to recommend the designation of sites of special scientific interest, which may require long-term protection from harmful interference.

Management plans have been prepared for certain sites of special scientific interest. Until the recommendations designating the sites become effective they will be considered as guidelines. The meeting suggested that the preliminary period for the designation of such sites should be until June 30, 1981.

So that experience can be gathered of the practical effect of management plans for sample sites, the meeting recommended that treaty nations voluntarily take account of plans for seven sites—three on Ross Island, one in Victoria Land, two in the South Shetland Islands, and one off the Queen Mary Coast.

PENGUIN COLONY

Cape Royds on Ross Island has been designated because it supports the most southerly Adelie penguin colony known, the survival of which is marginal. It is considered important to continue the population dynamics study begun by New Zealand scientists in 1960, at least until the population has recovered to its estimated normal level before 1956.

Arrival Heights on Hut Point Peninsula, Ross Island, is a site for New Zealand upper atmosphere investigations associated with auroral and geomagnetic studies. The area is an electromagnetically and "natural quiet site" which is ideal for the use of sensitive instruments to record minute signals in the upper atmosphere programmes.

Barwick Valley in Victoria Land is one of the least disturbed and contaminated of the environmentally unique dry valleys. The site is important as a reference base against which to measure changes in comparable ecosystems of the other dry valleys where scientific research has been conducted for the last 10 years.

Cape Crozier includes the land areas where the Adelie penguins nest, and the adjacent fast ice where the Emperor penguins breed annually. The penguin colonies are the subject of long-term studies of population dynamics and social behaviour, and are relatively accessible by air from McMurdo Station and Scott Base.

UNIQUE FOSSILS

Two areas on Fildes Peninsula, King George Island, in the South Shetlands, contain unique fossil ichnolites, which are located close to two permanent scientific stations which have been visited frequently by tourist groups. The areas also contain representative sequences of Tertiary strata. The main object of the research programme is to describe the Tertiary stratigraphic sequences, and to understand the geological evolution of this part of the Antarctic Peninsula.

The Byers Peninsula site on Livingstone Island in the South Shetlands comprises four areas of sedimentary and fossiliferous strata. Fossils found there provide evidence of the former link between Antarctica and the other southern continents. A long-term palaeontological research programme has been in progress since 1964, and it is important to protect these Jurassic and Cretaceous rocks from being used as building materials or as souvenirs.

BREEDING PLACE

Haswell Island is the largest of a group of islands lying close to the Soviet station, Mirny. It is an exceptionally prolific and representative breeding locality for all the species of birds which occur in this part of the Antarctic—five species of petrel (Procellariiformes), one species of skua (Catharacta skua), and one species of penguin (Pygoscelis adeliae). The site provides exceptional opportunities for research, and needs protection because it is close to a large Antarctic station.

Because tourists and persons not sponsored by the treaty nations are visiting the Antarctic Treaty area in increasing numbers, the meeting agreed that the natural development of tourism required regulation. Representatives considered it was necessary to restrict the number of places where large numbers of tourists may land to avoid increasing interference with ecological systems.

Representatives decided to recommend to their governments that they endeavour to ensure that all those who enter the Antarctic Treaty area, sponsored or not sponsored, are aware of the rules for the conduct of visitors. All organisers of tourist groups should be requested, except in an emergency, to visit only those Antarctic stations for which permission has been sought and granted, and to land only in areas of special tourist interest.

TOURIST GROUPS

Another recommendation suggests that when treaty nations allow tourist groups to visit their Antarctic stations, they should require the organisers to report their activities in the treaty area. Reports to be passed on to the next consultative meeting should include the number of tourists on each cruise, and the places and dates at which landings were made in the treaty area, and the number of persons landed on each occasion.

A non-commercial international air transport system for the Antarctic Treaty area was suggested by the United States at the seventh consultative meeting in 1972. The purpose was to provide greater co-operation and flexibility in research.

Since then S.C.A.R. has considered the potential benefits of a co-operative air transport system. The Oslo meeting recommended that S.C.A.R. should be asked to review the available transport resources and the potential requirements of a co-operative system, and inform the treaty nations of its decision. Administrators of Antarctic expeditions should be asked to review their scientific programmes in relation to a co-operative system, and inform S.C.A.R.

Norway's Minister of Foreign Affairs, Mr Knut Frydenlund, formally opened the meeting in Oslo. The Norwegian representative, Dr Edvard Hambro, Ministry of Foreign Affairs, was elected chairman.

More nations plan study of Antarctic krill

Growing international interest in the commercial exploitation of Antarctic krill emphasises New Zealand's warning to the eighth consultative meeting of the Antarctic Treaty nations that this small, shrimplike crustacean needs adequate conservation and proper fisheries management if it is not to suffer the fate of the whale. Japan and the Soviet Union, which have been engaged in krill research for several years, plan to expand their present trawling operations; West Germany and Norway will begin research this year, and Chile has shown interest.

Krill is the biggest source of animal protein left in the world today. It is so rich in protein that some regard it as the best yet untapped food source for mankind. Something is needed to fill the gap left by the reduction of the world's harvest of fish in recent years because of overfishing and pollution.

According to Russian estimates krill, the natural food of baleen whales and other marine life such as seals, penguins, and seabirds, could produce an annual catch of 100 million tonnes a year. The United Nations Food and Agriculture Organisation has estimated that, if sensibly fished, krill could yield 50 to 70 million tonnes a year—the equivalent of the present world fish catch.

FIRST RESEARCH

First to investigate the commercial potential of krill was the Soviet Union. It began research in 1962, and sent its first ship (Akademik Kripovich) south to fish for krill in 1964. Since 1970 it has marketed krill products. Last year's catch was estimated at 200,000 tonnes compared with 646 tonnes caught by the Japanese.

Japan began krill research in 1972 when the Government-sponsored Marine Resources Research Centre sent a chartered trawler on an Antarctic cruise. The expedition returned with more than 600 tonnes of krill for further research.

Another expedition went south in 1973, and a third in the 1974-75 season, which lasted from November to March. Surveys were conducted until February this year, and the reported catch target was 1200 tonnes. A private Japanese fishing company also sent a trawler to the Antarctic last year. Its catch target was 1700 tonnes.

Most of the information about krill research and marketing appears in technical publications, and there have been few detailed reports of Russian and Japanese activities in the Antarctic. The latest developments, however, are revealed in a recently-released report of an informal international consultation convened by the Food and Agriculture Organisation in Rome last year. Australia, Denmark, West Germany, Japan, Norway, Spain, Britain, the United States, and the Soviet Union were represented.

BETTER METHODS

Japan and the Soviet Union intend to continue their exploratory and experimental operations. They will extend their fishing area, using larger trawls, installing more sophisticated electronic equipment, and employing improved fishing methods. West Germany will begin krill research in November this year, using two 2000-ton trawlers, and Norway plans to send one vessel south.

Nations represented at the consultation have agreed to provide F.A.O. with information on their activities to increase knowledge of krill resources, and to facilitate eventual commercial

exploitation. Details will be given of future work plans, such as cruise plans, research programmes, and development proposals. Also F.A.O. will approach government institutions, United Nations bodies, and international research bodies to obtain relevant information.

The Soviet Union has had the best fishing results in the Ross and Weddell Seas, using trawlers of 3500 to 4000 tons. In 1973-74 Japanese boats, usually of 1500 tons, found large concentrations of krill off Queen Maud Land. Hourly catch rates during experimental fishing have been one to 10 tonnes, and the highest total production for a season so far has been limited to a few thousand tonnes. The best fishing has been from November to May. Apparent fluctuations in numbers are thought to be caused by shoal formation and distribution rather than actual abundance.

COST OF CATCH

Russian trawlers have relied mainly on visual observation of shoals. Both fleets to date have used nothing but standard electronic detection equipment, although Japan is planning to instal sonar on its vessels. Norway plans to improve detection by the study of light reflection.

Because of the need to use special processing ships, the length of voyages to the Antarctic, and the short season, krill products have a comparatively high unit value, with the exception of meal manufactured from press cakes in the Russian process. Japanese krill catches are valued at $500 to $600 a tonne and prices for krill paste in the Soviet Union are comparable.

The Soviet Union produces a protein paste from krill for human consumption by pressing the krill, heating the body liquids obtained to coagulate the protein, separating this from the liquid, and freezing it in moulds. The product which is 13 to 20 per cent protein is sold at $1.25 a pound. Krill butter and cheese spreads are also marketed.

NEW PRODUCTS

In Japan krill has been boiled and marketed in frozen blocks. The company which chartered its trawler to the Marine Resources Research Centre has developed various new food products from krill which it is promoting. They include krill-mixed dumplings, meat balls, tempura, and the frozen cooked blocks. Now at least five companies are competing to be first on the market with new products. Krill has been tested as a liquid protein flavouring, and as a protein concentrate.

Most of the discussion of krill's commercial potential has been related to the improvement of detection and fishing methods to increase catches and reduce costs. But last year's meeting did agree that study of krill resources and behaviour might benefit by co-ordination with other research programmes in the Antarctic such as those proposed by the International Whaling Commission. Also it was recognised that there was a need to look at the Antarctic marine ecosystem as a whole.

Such programmes would need an internationally co-ordinated research effort. Support might be enlisted from the United Nations funding agencies because of the long-range possibilities of substantially expanding food supplies through exploitation of the various living marine resources of the Antarctic.

NEW PROBLEMS

Exploitation of Antarctica's living marine resources to expand food supplies could produce new ecological problems. Krill are the food of baleen whales, and also of seals, penguins, albatrosses, terns, petrels, and numerous species of fish and squid. Many of these depend almost entirely on krill for food. Nobody knows yet how catches of 50 to 70 million tonnes annually would affect the ecological balance in Antarctic waters.

Sources: "Australian Fisheries," June and August 1975; The Singular Krill. By Patti Horgan. "New York Times Magazine," March 9, 1975. Food and Agriculture Organisation Report No. 153.

WHALING COMMISSION REDUCES CATCH FOR ALL OCEANS

Although the International Whaling Commission did not accept international demands for a 10-year moratorium on all commercial whaling for all species, it made some compromises at its 27th annual meeting in London. For the first time it established quota levels for all the world's oceans. It also agreed on a conservation programme to reduce the total catch from 37,300 last year to 32,450 in the 1975-76 season.

Catch quotas for fin and sei whales were sharply reduced for the new season in line with a recommendation by the commission's technical committee that there should be an automatic cut-off point for the killing of all endangered whale species. Under the new rules, all but one of the species will be automatically protected when stocks fall 10 per cent below the maximum sustainable yield.

For the sei whale in the Antarctic the level will be 20 per cent below the maximum sustainable yield, but only for the coming season. This means that the sei whale catch has been reduced from 4000 to 2230. The fin whale catch has been cut from 1000 to 220.

A total ban was imposed on the hunting of both fin and sei whales in the North Pacific. Last season the quotas were 300 fin whales and 2000 sei whales. There is also a total ban on fin whales off the Faroe Islands, Nova Scotia, and the Norwegian coast. But whalers in waters off Iceland will be allowed to kill up to 275 fin whales, and those off Newfoundland up to 90 fin whales.

For the first time the commission fixed quotas for the minke whale in the North Atlantic. They were 2000 in the north-east, and 550 in the north-west. In the Antarctic the quota will be 6810 against 7500 last season. A quota of 1365 has been fixed for the bryde whale in the North Pacific. Previously it was included in the sei group.

Sperm whales have provided a large proportion of the number hunted in the North Pacific and southern waters. The commission reduced the allowable catch in the Southern Hemisphere from 8000 whales to 5870 and from 5000 females to 4870. In the North Pacific the comparable figures have been reduced from 6000 to 5200 and from 4000 to 3100.

The commission has now classified all whale stocks into three categories. These are: Protection stocks, on which there will be a total moratorium (this category includes all blue, hump back, gray and right whale stocks); sustained management stocks, the hunting of which will stop if stocks fall below agreed danger levels, and initial management stocks, which are deemed to be in no danger of over-depletion, although they are to be regulated carefully.

Under the commission's 90-day rule, its 15 member countries have until September 25 to object to any of the new quotas, in which case they will be exempt from observing them. Objections could come from Japan or the Soviet Union, which account for 80 to 85 per cent of the world's total catch. But the Soviet Union plans to send only two whaling fleets instead of the usual three to the Antarctic this year.

Provided there is no dissent from the decisions, the commission plans to press ahead with further plans for conservation of whales. These include an international decade of cetacean research (whales, dolphins and porpoises) to obtain more information on the behaviour and breeding patterns of the mammals. Another proposal is to review existing international conventions to bring the commission more into line with modern principles of conservation.

HUMANE METHODS

More humane methods of killing whales will be studied by the commission. These include the use of anaesthetics or other chemicals as well as explosives. Previous expert studies have indicated that the present explosive harpoon technique used efficiently by expert whaling gunners is the best available for killing large whales.

The commission also decided that all its member nations should report incidental killings of cetaceans (whales share the biological order Cetacea with a number of other animals, including porpoises and dophins) in tuna purse seine nets. Any other statistics for direct or indirect fisheries for small cetaceans should be reported to the Bureau of International Whaling Statistics.

Reports of the 1974-75 Antarctic whaling season, and the 1974 season outside the Antarctic were reported to the meeting by the Bureau of International Whaling Statistics.

Seven expeditions (four Japanese and three Russian) operated in the Antarctic in 1974-75, the same as in previous seasons. Catch limits for the season were: 1000 fin whales, 4000 sei and Bryde's whales combined, and 7000 minke whales. The actual catch was 979 fin whales, 3859 sei whales, and 7000 minke whales.

SPERM WHALES

These expeditions caught 8930 sperm whales in the Southern Hemisphere, 4768 taken on the way to or from the Antarctic. In the previous season 1288 fin whales and 4392 sei whales were caught, and 8315 sperm whales were taken, 3388 on the way to or from the Antarctic. No whaling operations were carried out by member governments from land stations in the Antarctic during 1974-75.

In the 1974 season outside the Antarctic 11 land stations and factory ships operated, and 14,472 whales were taken, including 717 fin, 2668 sei, and 11,087 sperm whales. Comparable figures for 1973 were 14,762 whales—754 fin, 2741 sei, and 11,267 sperm whales.

Fifteen member nations attended the meeting. In addition observers were present from Korea, New Zealand, the Netherlands, Peru, and Sweden, and representatives of the Food and Agriculture Organisation, the United Nations Environment Programme, the International Union for Conservation of Nature, and eight non-government protection organisations.

"Antarctic" index and back issues

Subscribers to "Antarctic" can now obtain the index for Volume VI (1971-73). They should write to the New Zealand Antarctic Society's secretary, P.O. Box 1223, Christchurch. The price is 75 cents in New Zealand currency or the local equivalent.

Some back issues of "Antarctic" are still available. Subscribers who wish to complete their files can obtain back issues from the New Zealand secretary. Back issues cost 50 cents in New Zealand currency or the local equivalent.

Issues still available are:

Volume I: Nos. 4, 5, 6, 7, 11, 12.

Volume III: Nos. 6, 8, 9, 10, 11, 12.

Volume IV: Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

Volume V: Nos. 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

Volume VI: Nos. 1, 3, 4, 6, 8, 9, 10, 11, 12.

Volume VII: Nos. 1, 2, 4, 5, 6.

Copies of the index for several volumes are still available. They are: Volume I (1956-58), Volume II (1959-61), Volume IV (1965-67), Volume V (1968-70), and Volume VI (1971-73).

Subscribers who have unwanted copies of "Antarctic" not listed here are invited to send them to the New Zealand secretary. The society is endeavouring to assemble additional complete files of the bulletin. Unwanted copies of the index would also be appreciated.

Shackleton's carpenter kept cooker from boat voyage

After nearly 60 years a Primus cooker carried on Shackleton's epic boat journey from Elephant Island to South Georgia in 1916 has come to rest in the Canterbury Museum. It was brought to New Zealand many years ago by Harry McNeish, one of the five men who sailed with Shackleton 800 miles across some of the stormiest seas in the world in the 22½ft whaleboat James Caird.

Another relic of the Heroic Age of Antarctic exploration which will also be placed in the museum's Antarctic centre is a diary kept by James Paton, a seaman aboard the Morning on her second voyage south from Hobart to McMurdo Sound in 1903. Between 1902 and 1917 Paton, who was Scottish-born, and lived in Lyttelton, made more Antarctic voyages than any other sailor in the Scott and Shackleton era.

McNeish, who was the ship's carpenter aboard the Endurance on Shackleton's Imperial Trans-Antarctic Expedition of 1914-17, died in hospital at Wellington on September 24, 1930 after several years in an old men's home. His unmarked grave was located by the New Zealand Antarctic Society, which provided a headstone. After McNeish's death the Primus cooker passed into the hands of one of his friends, Mr Cameron W. G. Jelley, of Wellington, who has now presented it it to the Canterbury Museum.

TWO STOVES

Whether the cooker McNeish brought to New Zealand was the one used to cook "hoosh" from Bovril sledging rations on the boat voyage is not clear. In his book, "South," Shackleton says that the stores taken in the James Caird included two Primus stoves with spare parts and prickers.

In his account of the boat voyage in "Endurance," the New Zealand-born navigator, Frank Worsley, refers frequently to the Primus stove, and how it was used to cook a meal of sledging ration every four hours in the daytime. To keep it on a firm base he and Tom Crean sat opposite each other, and jammed it between their legs.

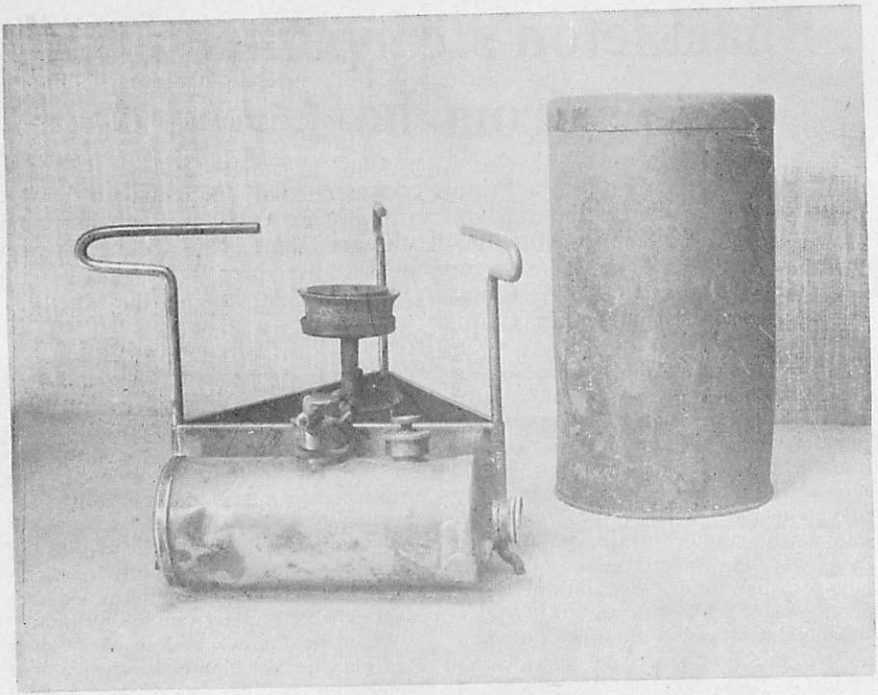
Worsley used to hold the hoosh pot on the Primus so that none of its precious contents would be spilt when the James Caird made wild leaps in the tempestuous seas. The hands of everyone were scarred with frost-bite; Crean's and Worsley's, in addition, were marked with burns from the Primus.

When the James Caird reached South Georgia after its nightmare voyage, and Shackleton, Worsley, and Crean, crossed the mountains to Husvik Bay, they took a Primus stove with them. Worsley describes in "Endurance" how they "cooked a meal over the little Primus" every four hours. Presumably the second Primus was left with McNeish, Vincent, and McCarthy, at Peggotty Camp.

LEFT BEHIND

The Primus stove used in the boat may have been left behind in South Georgia. Shackleton says in "South" that all the crossing party brought from the Antarctic were McNeish's carpenter's adze, used as an ice axe, and the log book. McNeish, Vincent, and McCarthy, were picked up by a whaler from the Stromness station and eventually returned to England. It is possible that McNeish retained the spare Primus.

As for the James Caird, it was brought back to England. When Shackleton's affairs were wound up after his death the James Caird became the property of John Quiller Rowett, his backer for the Quest expedition



One of the two Primus stoves carried on the boat voyage from Elephant Island to South Georgia. Beside it is a 2lb Bournville cocoa tin used to keep the stove dry in the boat.

In 1924 Rowett presented the boat to Dulwich College (his and Shackleton's old school). It remained there until 1968 when the governors of the college presented it on long-term loan to the National Maritime Museum at Greenwich.

ROUGH LOG

James Paton's diary of the Morning's voyage is only 66 pages, but it is of particular interest as a lower deck view of a voyage in Antarctic waters. A view from the bridge was given by Gerald S. Doorly in "The Voyage of the Morning." One small item which does not appear in other accounts of the Morning's voyages is that she carried two young Tasmanian goats to the Antarctic. They were placed ashore on the Auckland Islands when the Morning stopped there early in 1904.

Paton's account is called "Rough Log of the Voyage of H.M.S. Morning from Hobart to the Antarctic Circle and back." H.M.S. Morning is an incorrect description; she was not a warship, and was registered with the Royal Corinthian Yacht Club.

The diary starts on December 5, 1903, the day the Morning sailed from Hobart. It finishes on March 24, 1904, when the ship has taken on ballast at the Auckland Islands, and is ready to sail for Lyttelton. Both the Discovery and the Terra Nova reached the Auckland Islands rendezvous before the Morning. She spent nearly a month fighting adverse gales, and had other troubles such as her ramshackle engines and pumps, and her ill-ballasted condition.

OTHER VOYAGES

Paton's two voyages in the Morning seem to have given him a liking for the Antarctic. He served in the Nimrod and the Terra Nova on the Shackleton and Scott expeditions, and was bosun of the Aurora when she sailed south in 1916 to rescue the Ross Sea shore party survivors of Shackleton's Imperial Trans-Antarctic Expedition. He was still aboard the Aurora when she disappeared in 1917 on a voyage from Newcastle, New South Wales, with a cargo of coal for a Chilean port.

As well as relics of Shackleton's expeditions, the Antarctic centre will have the voice of the explorer himself. An advertisement for an auction sale of antiques led to the purchase of an Edison phonograph cylinder recording of Shackleton telling the story of his 1907-09 expedition.

NORWEGIAN GIFT

Although Roald Amundsen did not make New Zealand his final point of departure like other explorers of the Heroic Age, his bust will be placed in the Antarctic centre with those of Scott, Fuchs, Shackleton, and Hillary. A Norwegian shipowner, Mr T. Wilhelmson, has offered to pay for the bust, which will be the work of Arne Vigeland, a relative of the great Norwegian sculptor, Gustav Vigeland.

A bronze bust of Sir Vivian Fuchs, leader of the Commonwealth Trans-Antarctic Expedition, was acquired recently for the centre. The original was done in 1955 by the English sculptress, Kathleen Parbury. Fuchs gave his last sitting for the bust two days before he sailed in the Theron for the Weddell Sea with the advance party.

There are busts of Scott and Shackleton in the museum, and it is planned to obtain busts of Hillary and Rear-Admiral Richard E. Byrd. Recently the museum received a bust of Murray Ellis, the Dunedin engineer who was one of Hillary's party on the journey to the South Pole. It was made and presented by a New Zealand sculptor, F. C. W. Staub.

UNUSUAL RELIC

Perhaps one of the most unusual Antarctic relics in the centre will be a 16-inch silvered glass ball dropped by parachute at the South Pole 18 years ago. In December, 1956, it was put on top of a symbolic "South Pole" about 1200ft from the geographic pole, and remained there for 11 months.

The ball was presented to the museum early this year by Mrs Ruth Siple, widow of Dr Paul Siple, scientific leader of the team of 18 Americans who, in 1957, were the first men to live at the South Pole. Dr Siple, who took part in the construction of the first Amundsen-Scott South Pole Station, bought two silvered glass balls in Christchurch, and they were dropped from a United States Air Force Globemaster.

Dr Siple decided on December 14 to erect a "South Pole" in an effort to boost the morale of the men building the station. He put one of the balls on the "South Pole," a bamboo pole which had been painted with orange and black stripes in barber pole fashion. The ball was an ornament, and the men hoped that the sunlight flashing on it would help to make the campsite more easily visible from the air.

When Dr Siple left the South Pole on November 30, 1957, he took with him what he called "one last sentimental souvenir." He exchanged the spare silvered ball with the one that had been on top of the flagpole on the garage roof for nearly a year.

NAVY PLAQUES

A relic of the United States Navy's support of scientific research in Antarctica since 1955, has also been added to the museum's collection. It is one of two plaques designed by Walt Disney Productions, and depicting the insignia of Task Force 43, United States Naval Support Force, Antarctica.

From 1955 to 1973 Task Force 43 was a component of the United States Navy's Atlantic Fleet. Now it is a component of the Pacific Fleet, and has been renamed Task Force 199. It is based in California, and continues to provide logistic support for American scientific activity.

Indian scientist worked at Soviet Antarctic station

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

Since the Indian Department of Atomic Energy and the Soviet Hydrometeorological Service signed the agreement in 1970, there have been regular weekly soundings with M-100 meteorological rockets from the main Soviet station, Molodezhnaya, and Thumba, India. Mr Parmjit Singh Sehra, of the Physical Research Laboratory, Ahmedabad, was sent to the Antarctic by the Indian Space Research Organisation.

Mr Sehra spent 18 months in the Antarctic, and participated in the meteorological rocket soundings of the upper atmosphere at Molodezhnaya. He also visited three other Soviet stations, Bellingshausen, Mirny, and Vostok. For his work with the 17th Soviet Antarctic Expedition he was awarded the Soviet Antarctic Medal, and the Soviet Antarctic ribbon.

While Mr Sehra was in Antactica, 60 M-100 meteorological rockets were launched from Molodezhnaya. Sixteen of these carried an additional wind sensor ("chaff") for determining the mesospheric winds. Most of the flights were successful, and the average rocket apogee reached was 86.95km. This was the first meteorological study of the upper mesospheric winds made in Antarctica.

The "chaff" used in this study consisted of cylindrical aluminium-coated glass fibre. It was carried in a special container, and ejected at rocket apogee. A high sensitivity Meteor-2 radar checked the descending chaff cloud, and the data on the drift of its trajectory were used to measure the wind speed and direction in the mesopheric region under study.

Results of this investigation of the Antarctic upper atmosphere indicate that the most active period in south polar regions is the winter and early spring; it is marked by large disruptions in the wind and thermal structure. In a paper printed in "Nature" Mr Sehra says that the rapid shifts in both zonal and meridional components of the upper atmospheric winds, particularly during

PARMJIT SEHRA

the winter period May to July, are accompanied by sudden changes in the temperature distribution.

Stratospheric warming and cooling lead to the intuitive conclusion that the polar winter warmings may be caused both by an increase in the supply of energy in the form of a vertical flux of geopotential energy consisting of very long waves, and by radioactive and photochemical processes taking place in the upper atmosphere.

During September, when the winter westerlies change to the summer easterlies, the upper atmosphere is again disrupted with a warming of 39deg C at 40km which is attributed to the increase in available heat brought about by the return of sunlight. It is thus concluded that sizeable perturbations may occur in the upper atmosphere over Antarctica during the winter regime.

Mr Sehra is not only the first Indian scientist to work in the Antarctic; he is also the first man in Enderby Land to join the New Zealand Antarctic Society, and the only member to wait nearly two years for his copies of "Antarctic".

In 1972 Mr Sehra relayed a request by radio from Molodezhnaya through McMurdo Station and Scott Base to join the Antarctic Society. He asked also that all available issues of "Antarctic" be sent from New Zealand to Moscow by air freight, and then by sea from Leningrad to Molodezhnaya.

Sixty copies of the bulletin were dispatched to Moscow by registered mail. But the parcel missed the Professor Zubov, the first ship to reach Molodezhnaya. It was believed to have been carried to Molodezhnaya by the supply ship Ob, which arrived there when Mr Sehra had left, and then was trapped in heavy pack ice for 90 days off King George V Land.

Eventually, after an exchange of correspondence, the parcel reached Mr Sehra in India in 1974, and payment for the 60 issues of the bulletin was received in October.

Mr Sehra is still a subscriber to "Antarctic." And he hopes to associate himself with the New Zealand Antarctic research programme at a later date.

Captain White, master of Fitzroy

Captain Frederick White, Elder Brother of Trinity House, died recently at the age of 58. He was formerly master of the Fitzroy, which for many years was the sole link between the Falkland Islands and South America, and assisted in the establishment and relief of British Antarctic bases between 1944 and 1948.

Until his retirement from the Falkland Islands he continued to be closely associated with the B.A.S., carrying survey staff and cargo, and meeting B.A.S. ships at Montevideo and Stanley. After he returned to England he maintained his interest in the survey and was always a welcome visitor to the ships while they were at Southampton.

ONE DOZEN PINK ROSES

Red roses sent south last Christmas as a gift for 13 women working at McMurdo Station were not the first ever sent to Antarctica. In January, 1958, Mr Douglas McKenzie, official correspondent with the New Zealand party of the Commonwealth Trans-Antarctic Expedition, received a dozen pink roses from his wife. They survived a sub-zero flight from Christchurch in the baggage compartment of a United States Navy Neptune.

THE READER WRITES

Sidelights of Antarctic Research

Letters, preferably not longer than 5 to 600 words, are invited from readers who have observed some little-known facet of Antarctic life or have reached conclusions of interest on some Antarctic problem — Editor

ANTARCTIC SMOKER

Sir,—Recently I acquired a letter written by Shackleton to Sir Arthur Pearson after his return from the 1908-1909 expedition. Pearson was the Fleet Street newspaper and magazine proprietor who gave Shackleton a job as a sub-editor of the "Royal Magazine" when he returned from the Discovery expedition in 1903. He was appointed in September, and remained with the magazine until he was appointed secretary-treasurer of the Royal Scottish Geographical Society early in December.

In his letter Shackleton says he did not smoke Ashley Dickson's pipe near the Pole, but did at winter quarters. Perhaps some reader of "Antarctic" might be able to identify Ashley Dickson for me. I have been unable to find any reference to him in the Shackleton literature.

Yours etc.,

JAMES PIGG

SHACKLETON'S CAR

Sir,—Since I returned to New Zealand late last year, I have spent some time trying to determine the origin of two wooden sled runners recovered from Pony Lake when Mr G. D. Sylvester and I worked at Cape Royds as caretakers for the New Zealand Antarctic Society. Thanks to an artist's impression of the Arrol-Johnston motor-car used by Shackleton in 1909 I have been able to establish beyond doubt that these runners were fitted to the front of the vehicle, and the cleated wooden wheels (one of which was also recovered from the lake) were fitted to the rear.

From reports in several books on Shackleton's expedition it appears that these runners and wheels did not perform the work expected of them. They were used only when the motor-car was employed in the immediate vicinity of Cape Royds.

The artist's impression of Antarctica's first motor-car appears in the December 4, 1907, issue of the "Weekly Press", an illustrated paper published in Christchurch between 1883 and 1928. Anyone interested in studying Shackleton's expedition can find a considerable amount of background information in the October to December volumes of the paper.

I have also spent some time looking for information about several ventilators found near Scott's hut at Cape Evans. When I was unable to find any photograph of the hut which showed these ventilators in place, I approached Mr H. G. R. King, librarian at the Scott Polar Research Institute. He could not find any pictorial record but is making further inquiries.

The literature of Scott's last expedition contains, apparently, only one reference to ventilators. It is in Apsley Cherry-Garrard's book, "The Worst Journey in the World". In a reference to the loading of supplies in Lyttelton before the expedition sailed south he says: "There were also extensive ventilators which were not a great success. The problem of ventilation in polar regions still remains to be solved."

Yours etc.,

KENNETH J. SMITH,

Caretaker, 1974-75 season.

Ulsterman and Antarctic veteran

An Ulsterman, Surgeon Captain Edward W. Bingham, R.N. (retd), who made a notable contribution to British exploration in Antarctica immediately after the Second World War, has become the second patron of the Northern Ireland Polar Club. Captain Bingham, who succeeds the late Sir Raymond Priestley, began his polar career in the Arctic, served with the British Graham Land Expedition of 1934-37, and was leader of the Falkland Islands Dependencies Survey (now British Antarctic Survey) from 1945 to 1947.

Captain Bingham, who was born in Dungannon, County Tyrone, is remembered by all who served with him for his skilful handling of sledge dogs and men in the Antarctic. Kevin Walton, who was with F.I.D.S. in 1946, says in his book "Two Years in the Antarctic" that "all those who went to the Antarctic in 1946 learned the technique of polar travel soundly and well at his hands."

After he qualified at Trinity College, Dublin, Captain Bingham entered the Royal Navy as a surgeon lieutenant. He was seconded to the British Arctic Air Route expedition led by Gino Watkins in 1932-33, but his first job in Greenland was to handle a dog team. He took part in the exploration of the ice-cap, and helped to establish a weather station there.

After working in the north of Labrador with a winter party of naval surveyors from H.M.S. Challenger, Captain Bingham joined the British Graham Land Expedition led by John Rymill as medical officer, and in charge of dog teams. In three years this privately organised expedition made some notable sledge journeys, and, using aircraft and dogs, surveyed and photographed more than 1000 miles of coastline.

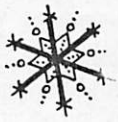
On the last sledge journey of the expedition Rymill and Bingham travelled 535 miles in 72 days from their base on the Debenham Islands south to the Wordie Ice Shelf, and then to the east coast of Graham Land and southwards. This journey proved that Graham Land was part of the continent, and not an archipelago.

In 1937 Captain Bingham returned to the Royal Navy. He served with distinction in the Second World War, and did valuable research on Arctic survival equipment, food, and clothing. Then he went back to the Antarctic after the war to take over Operation Tabarin, the secret wartime naval and scientific expedition sent south in 1944 to hold the Falkland Islands Dependencies against all comers.

As leader of the Falkland Islands Dependencies Survey, the renamed and reorganised Operation Tabarin, Captain Bingham organised the relief of the wartime bases, established others, and made some long sledging journeys. He played a leading part in the development of the long-term programme of scientific and geographical work which has been carried out in the Antarctic Peninsula area for more than 30 years.

In 1950 Captain Bingham's work in polar regions was recognised by the Royal Geographical Society's award of its Murchison Grant. Eight years later he retired and left the polar scene to younger men.

A small, intensely energetic Irishman, Captain Bingham was unsurpassed in his knowledge of the arts of polar travel and dog handling. He remains an outstanding figure in the history of British polar exploration in the years after the Second World War because he provided an active bridge between pre-war and post-war explorers.



Use of seawater temperatures to generate power

Generation of power by the use of the temperature difference between surface and lower ocean waters has been under study recently in the United States. Two designs for seawater power stations have been produced.

This season New Zealanders at Scott Base will continue a thermal power experiment initiated by the Antarctic Division, Department of Scientific and Industrial Research, in the 1973-74 season. The equipment for the experiment has been designed to use the waters of McMurdo Station 35ft deep beneath the pressure ridges near Scott Base to generate power. ("Antarctic", Page 381, September, 1973.)

Last year a design for a seawater power station was put forward by a group at the University of Massachusetts, and recently the Lockheed Corporation produced a design under a National Science Foundation contract. The corporation claims that at 2.7 cents per kWh, the thermal power would be competitive with that from fossil fuel stations.

Temperature differences available in the Gulf Stream in some locations close to the United States coast are around 20deg Celsius. Both the Massachusetts and Lockheed schemes would use ammonia as the working fluid, alternately boiling and condensing it, with the gas driving the turbine.

Both schemes feature a 300m concrete tube extending down from the floating concrete power station to bring cold water up from below. The Lockheed Corporation design was for a 160MW station with a concrete "platform" built to last 100 years, and a power plant with an estimated life of 35 years.

When the Massachusetts design was described in "New Scientist" (September 5, 1974), the economics of such a plant were questioned. The report noted that a 410-MW station would use 21MW to pump the ammonia coolant supply; and that the inherent low thermodynamic efficient meant that capital cost (per KW) becomes a very large factor in the economics of such a plant.

Winter parties at the Soviet stations, Molodezhnaya and Leningradskaya played chess for nearly five months this winter. They competed in the annual triangular Moscow-Arctic-Antarctic radio chess match between some 50 teams. Arctic opponents were winter parties on Dixon and Wrangel Islands, and at Capes Chelyuskin and Schmidt. Moscow's teams came from the Bolshoi Theatre, newspaper offices, the circus, and an atomic energy institute.

SECOND DRILLING SEMINAR

More than 60 scientists, many of them from the United States and Japan, are expected to attend the second meeting of scientists working with and interetsed in the Dry Valley Drilling Project. DVDP Seminar II will be held at Victoria University of Wellington from January 13 to 15 next year.

Some papers will review the scientific achievements of the project; others will report on more detailed and specialised study. A report on the drilling in McMurdo Sound, scheduled for completion on December 15 this year, will be a highlight of the conference.

Those interested in attending are asked to write to Dr D. Seward, DVDP Seminar II, Geology Department, Victoria University of Wellington, Private Bag, Wellington, New Zealand.

Twenty-one women — Americans, New Zealanders, and one Welshwoman —will work in Antarctica this season, not because 1975 is International Women's Year, but because they are needed in the research programmes.

ANTARCTIC BOOKSHELF

POLAR DESERTS AND MODERN MAN

Edited by Terah L. Smiley and James H. Zumberge. University of Arizona Press, Tucson, Arizona, 1974, 173 pp.

The polar deserts of the Earth are amongst the last and most challenging frontiers to both scientific inquiry and economic utilisation and it is with the theme of intensified development that this book is mainly concerned. It examines both the Arctic and the Antarctic with respect to the stresses on physical and biological systems that have already occurred and which may occur in the future with increased scientific and economic effort.

Comparisons and contrasts are drawn between such diverse yet related topics as the development of oil resources on the North Slope of Alaska and in Canada's North-west Territory, the impact of economic development on indigenous peoples of the Arctic, and the significance of systematic scientific exploration in the Antarctic under the umbrella of the Antarctic Treaty.

The editors warn, "experience should teach us that no place on earth is likely to escape the probe of the exploratory drill in search of minerals and fossil fuels", so that there is a great and continuing need for baseline information against which to assess the likely effects of any proposed economic endeavour.

This is a timely note of caution in regard to Antarctica as exploration proceeds, and problems with traditional sources of minerals and fuels grow more complex. Antarctica, "the only continent controlled by international agreement", may be subject to an increased pace of exploration or development in the coming years and the Antarctic Treaty might be "sorely tested", well before its expiry date in 1991.

The editors have thus identified a very large aim and have addressed it on as wide a front as possible by assembling reviews of knowledge in numerous fields by noted experts on polar problems into the 14 chapters of the book. All the contributions were originally presented to a Polar Deserts Symposium held in 1971 and sponsored by the Commitee on Arid Lands of the American Association for the Advancement of Science. The result is a wide-ranging work which embodies much authoritative polar experience but of necessity it can neither be completely definitive nor even exhaustive of polar problems.

The book is structured into three broad sections headed, Natural Environment, Economic Base for Development, and Problems of Immigrants. The introductory material on Natural Environments comprises over half of the book and follows in the customary way through climatology, geology, hydrology, biology, etc.

It begins with a rather restricted definition of the term "polar desert" i.e.: glacier-free terrestrial areas with mean annual precipitation less than 25 cm. and with a mean temperature for the warmest month of 10°C or less. This effectively limits coverage of Antarctica to the narrow relatively ice-free costal strips and similarly excludes much of the Arctic Basin. It also precludes discussion of the very pressing problems related to fisheries management of both the Arctic and Antarctic Oceans.

The second portion on the base for economic development comprises three chapters all concerned with the Arctic. Some fascinating comparative costs between life at high latitudes and more equable regions are presented, and there are brief reviews of the history and problems of High Arctic economic development.

The final section also comprises three chapters. It deals with Arctic transportation, health and sanitation problems, and with ways in which planning may help alleviate difficulties which have occurred.

The book is lavishly illustrated with more than 150 photographs, diagrams and tables and is well-written for the most part. It should make an interesting and informative introduction to polar land problems for those with a newly-acquired interest as well as a valuable addition to the libraries of those already versed in high latitude lore.

DR R. M. KIRK
DEPARTMENT OF GEOGRAPHY
UNIVERSITY OF CANTERBURY

PROFESSOR ON THE ICE

By
Robert E. Feeney

Published by Pacific Portals, Davis, California, 1974. 164 pp. Two maps and 26 illustrations. U.S. price $4.95.

Professor Feeney spent six consecutive summers doing research on penguins and fish in the Antarctic. His projects were undertaken from 1964 to 1970 when great progress was made in the establishment of scientific bases on the Antarctic continent.

Although Professor Feeney's particular interest is biochemistry his book is written in terms which are not beyond the understanding of the interested layman, yet his information is detailed enough to satisfy the most curious of readers. He is concerned mainly with penguin studies at beautiful Cape Crozier and fish beneath the frigid waters of McMurdo Sound; he is also a discerning observer of personalities and places elsewhere in that fascinating land which is Antarctica.

Robert Feeney describes the "bitter and beautiful land" as it really is. Those who have visited it, and experienced for themselves the rapture of the snows which it engenders in the sensitive traveller, will admire his candid writing about the tranquillity of the polar scene, and the contemplation of developing ice formations.

Professor Feeney's Antarctic experiences were not always serious, and he writes most entertainingly of his trials in attempting to discourage opportunist seals from using his scientific fishing holes. Wisely, he decided that co-operation between scientists and seals was the most fruitful policy in the end. The resulting technique raises an interesting possibility for the future relationship of thinking man and these intelligent creatures.

For the Adelie and Emperor penguins —also subjects of his research—Professor Feeney has similar feelings. He describes his work well, and readers will become quite well-informed, intrigued perhaps, about proteins and enzymes, and their mysterious functions.

Field research in Antarctic demands of the determined scientist sheer, painstaking routine whether the task involves handling thousands of eggs or scores of fish. Professor Feeney makes it clear that only the most impossible weather could interrupt the scientists' dogged routine. He is conscious also of his good fortune in having dedicated field assistants and co-researchers.

"Professor on the Ice" is written in a restrained but factual style. It is obvious, however, that Professor Feeney enjoyed every moment of his Antarctic experiences. He is an acute judge of human nature, generous in his praise of bona fide 'Antarcticans", and equally kind to unhelpful and dampening officialdom.

Like other scientists who have worked there, Professor Feeney speculates on the future of Antarctica, and its influence on mankind in a climatically changing, or a developing world.

He writes that "current interest in global and space environment is focusing attention on the way living things perform and survive in extreme environmental conditions, since men, animals, and plants may have to live and grow in much colder climates and under unheard-of conditions in the world of the future. Studies in Antarctica may provide us with knowledge of how it might be done." L.E.K.

"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$3.50. Overseas NZ$4.50, 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.

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 plans to co-operate in securing suitable locations as repositories of Polar material of unique interest.

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

You are invited to become a member, South Island residents should write to the Canterbury secretary, North Islanders should write to the Wellington secretary, and overseas residents to the secretary of the New Zealand Society. For addresses see below. The yearly membership fee is NZ$3.00 (or equivalent local currency). Membership fee, including "Antarctic", NZ$5.00.

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Printed at the Raven Press, 241 Cashel Street, Christchurch