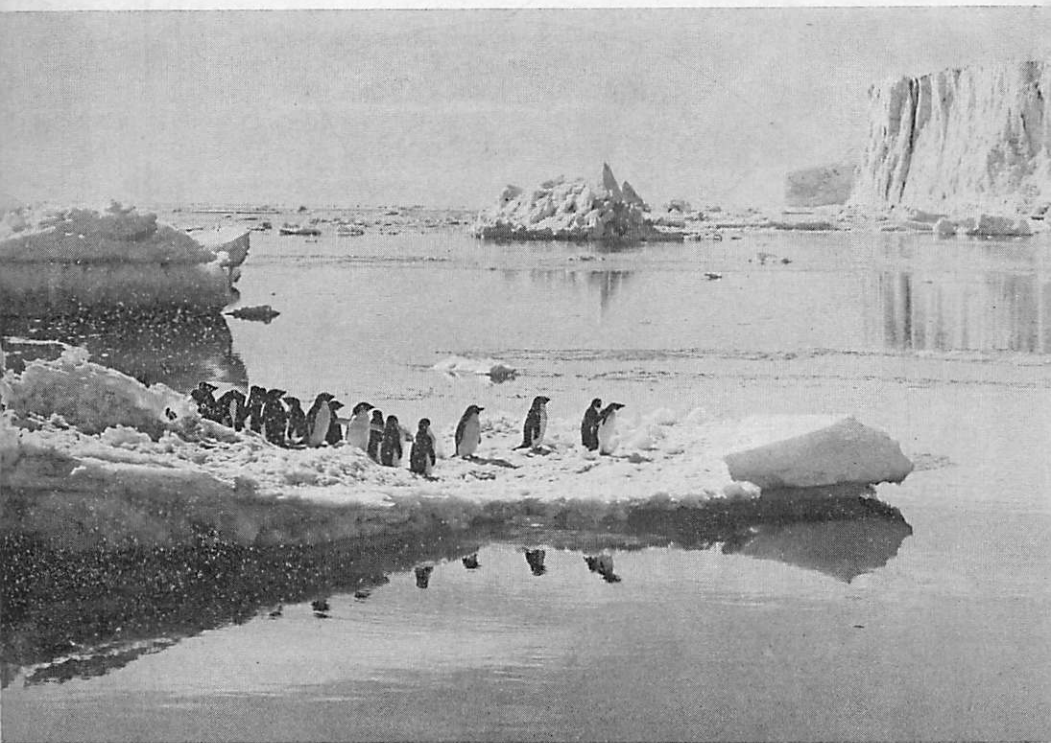


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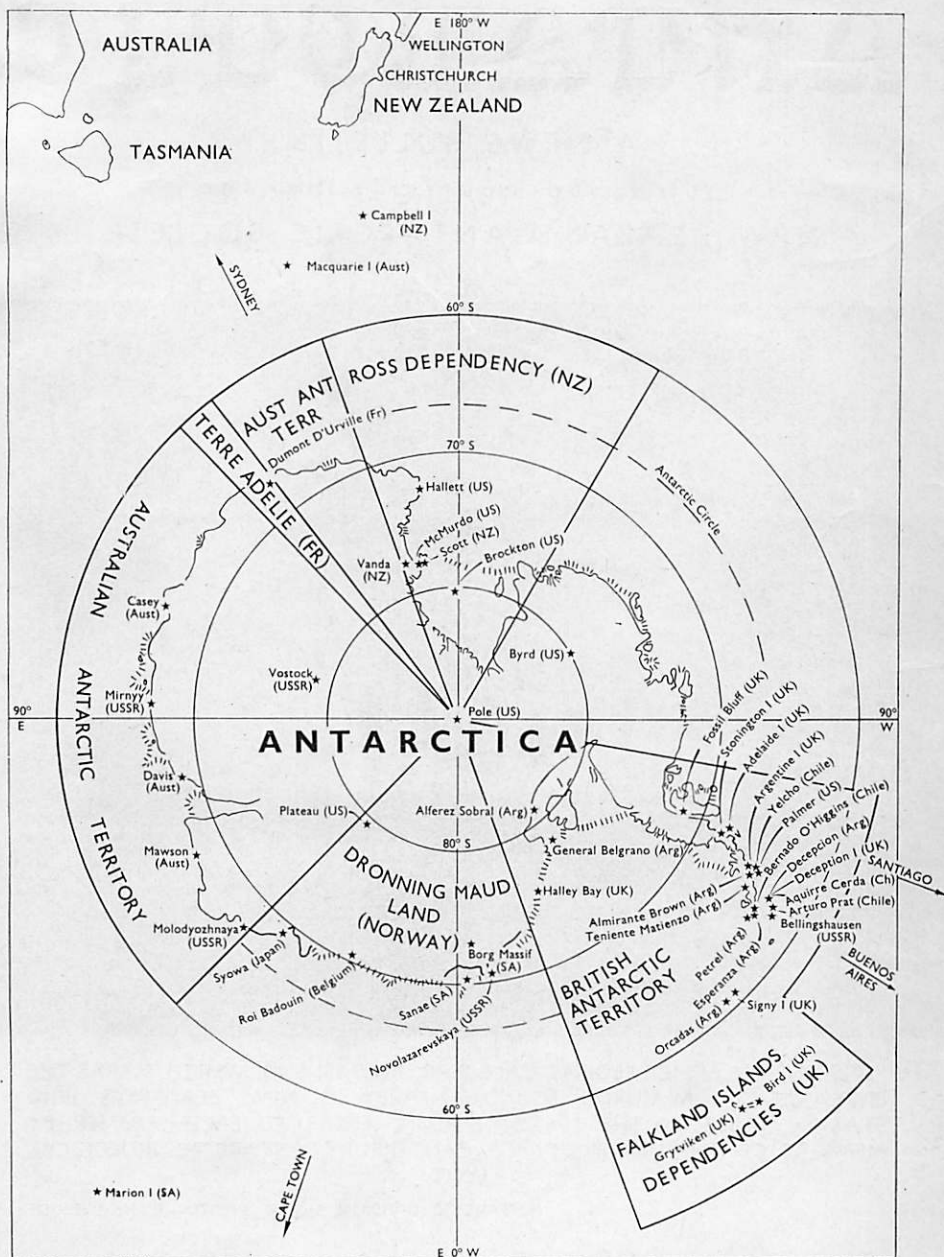
A NEWS BULLETIN

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NEW ZEALAND ANTARCTIC SOCIETY



PENGUINS ON AN ICE FLOE AT CAPE BIRD, ROSS ISLAND, WHICH MARKS THE ENTRANCE TO McMurDO SOUND. NEARBY IS NEW ZEALAND'S BIRD STATION, BUILT IN THE 1965-66 SEASON, AND USED EACH SUMMER BY MEMBERS OF THE UNIVERSITY OF CANTERBURY ANTARCTIC BIOLOGICAL UNIT.

ANTARCTIC DIVISION, D.S.I.R. PHOTO—R. K. McBRIDE



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CONTENTS

ARTICLES

SCOTT BASE LEADER'S YEAR	274, 275
FLOATING LABORATORY	278, 279

POLAR ACTIVITIES

NEW ZEALAND	262, 263, 264, 265, 277, 289, 291
UNITED STATES	266, 267, 268, 273, 296
BELGIUM	267
UNITED KINGDOM	269, 273, 280, 281, 282, 283
AUSTRALIA	283
JAPAN	284, 285
FRANCE	286
SOUTH AFRICA	288
SOVIET UNION	290
INTERNATIONAL PROJECTS	268, 276

SUB-ANTARCTIC

AUCKLAND ISLANDS	272
MACQUARIE ISLAND	289

GENERAL

TREATY NATIONS MEETING	270, 271
TOURISM	287
ANTARCTIC WEEK	291
THE READER WRITES	293
ANTARCTIC BOOKSHELF	294, 295, 296

Once again we have reached the end of another year, and the 68th issue of "Antarctic," which has faithfully chronicled the story of Antarctic exploration and research since 1956.

The Editor would like to be able to wish all readers, wherever they are, unqualified season's greetings, but he is reluctant to have to announce that because of rising costs the price of "Antarctic" will be increased as from the first issue for 1973.

Details of the new subscription rates are given on the inside back cover to which your attention is directed. We regret this increase which is due to circumstances beyond our control.

Other Nations Working With N.Z. Research Programme

Co-operation with scientists of other nations has been a feature of the New Zealand Antarctic research programme this season. Russian and Japanese scientists are working in the dry valley area of the Ross Dependency with New Zealand assistance, New Zealand is taking part in a French experiment to determine the drift of icebergs in the Southern Ocean, and Italian scientists have been studying the New Zealand programme. New Zealand is also involved in drilling projects on Ross Island and in Antarctic waters.

An Italian scientific team may participate in the New Zealand programme next season. Originally the Italian National Research Council had plans to establish its own base in the Antarctic. A survey this season, however, has indicated that this would not be economic.

For several weeks Dr C. Stocchino, chief hydrographer of the Institute of Oceanography, Genoa, and Dr M. Manzoni, a geologist, have studied the NZ programme at Scott Base and outlying stations, and field camps. They will recommend to their National Research Council that a team of six to eight scientists be formed to work from Scott Base next summer.

Because of logistic difficulties Italy could not establish a base in the area where its scientists could work. The problems of transporting men and supplies would be too great. Therefore Drs Stocchino and Manzoni will work out research priorities so they can be incorporated in the 1973-74 New Zealand programme. The plan would be to pay for the use of New Zealand facilities in the Antarctic.

A Soviet micro-biologist will work with the New Zealanders at Lake Vanda this season. He will fly south next month and will remain at Vanda Station for two months. Russian geologists have worked at Vanda Station previously.

Two Japanese scientists will also work in the dry valley area, and two or three others may join them. Another New Zealand party from Waikato Univer-

sity arrived there early this month. The university's fifth expedition to the Antarctic is led by Dr C. H. Hendry, a geochemist.

Other members of the party are Dr P. L. Hosking, of the University of Auckland, Mr T. I. Oliver, and Mr A. Hogg.

The Waikato scientists will make a short visit to the Victoria, Wright, and Taylor Valleys. They will work in the Victoria Valley for three weeks examining rock degradation and salt deposits. Then they will move to the other valleys for separate studies.

New Zealand participation in the French iceberg drift experiment involves the placing of a transponder on an iceberg in the Ross Sea. A transponder is an electronic device which will receive specific signals by satellite and transmit replies automatically. Members of Expeditions Polaires Francaises placed a transponder on a large iceberg in March this year soon after the relief ship *Thala Dan* left Dumomnt d'Urville for Hobart ("Antarctic" June, p. 197). In seven months this berg drifted about 1000 miles.

The French will use three of the transponders this summer on icebergs at various latitudes off Adelie Land, and up to 10 will be used by scientists of other Antarctic Treaty nations. Measurements will be taken daily, barring accidents, until June 30 next year.

The E.O.L.E. satellite which interrogates the transponder can determine the

location of an iceberg to within one kilometre three to five times a day. Information will be transmitted from the transponder by the satellite to ground receiving stations, particularly to those of the National Space Research Centre in Brittany.

Mr R. B. Thomson, superintendent of the Antarctic Division, D.S.I.R., says that one of the main attractions of the experiment is that it will continue long enough to show what movement of icebergs takes place in winter. Satellite pictures and observations from ships have given this information in summer, but there are no satellite pictures in the winter darkness. Now, for the first time, says Mr Thomson, there will be accurate details of winds and ocean currents during the winter.

PROJECTS STOPPED

While a new project has been added to the New Zealand research programme this season, two others have not proceeded. The loss of the University of Canterbury marine biology unit's trimaran when it was blown away from Cape Bird and abandoned has stopped this season's research. Another project in the Bowers Mountains of Northern Victoria Land was cancelled last month because damage to one of the United States Navy's three Hercules aircraft meant that air support could not be provided.

When the aircraft was brought back to Christchurch to have its damaged port undercarriage repaired, Drs M. G. Laird and P. B. Andrews, of the Geological Survey, Mr J. Bradshaw, of the University of Canterbury, and Father M. F. Mahoney, a field assistant, had to come home from Scott Base.

The Northern Victoria Land project involved the mapping, structural interpretation, stratigraphy, photography, and sedimentation of the Bowers Mountains. It had to be removed from last year's summer research programme because of economic cuts. Drs Laird and Andrews were able to spend 13 days in the Bowers Mountains but with the Vic-

toria University party, which discovered marine fossils in the Evans Neve area.

Scott Base was like a miniature United Nations headquarters for a time last month when the New Zealanders were hosts to 14 delegates to the seventh consultative meeting of the Antarctic Treaty nations in Wellington. New Zealand's flag outside the base was joined by those of the 11 other treaty nations.

Before the delegates visited Scott Base they encountered Antarctic ice in their drinks at a reception in Wellington. It was a 150lb block of ice cut from the pressure ridges in front of the base with a chain saw, wrapped in plastic, packed in a wooden box, flown to Christchurch aboard a Military Airlift Command Starlifter, and then on to Wellington.



HISTORIC SITES MARKED

Three bronze plaques marking historic sites in the Ross Dependency were placed in position at Cape Royds, Cape Evans, and Observation Hill, near McMurdo Station, by a team of New Zealanders from Scott Base last month. The marking of seven other historic places in accordance with recommendations made at the sixth consultative meeting of the Antarctic Treaty nations in Tokyo is expected to be completed before the end of next season.

All the plaques, which bear the relevant information in English, French, Spanish, and Russian, have been fixed firmly in rock to prevent storm damage. One has been placed at Scott's hut at Cape Evans, another at Shackleton's hut at Cape Royds, and the third on top of Observation Hill to mark the jarrah cross erected there in 1913 to commemorate Scott and the South Pole party.

Men Drift for Five Days on Ice Floes in McMurdo Sound

For five days four men—an American, two New Zealanders, and an Englishman—drifted helplessly on ice floes in McMurdo Sound when their trimaran was swept into pack ice and had to be abandoned. Starving, frostbitten, and near total exhaustion, the men from the University of Canterbury marine biology unit at Cape Bird, were picked up from a small ice floe by a United States Navy helicopter on the afternoon of December 2 after an aerial search by British and American aircraft for nearly 30 hours.

After they abandoned their 16½ ft trimaran, Clione, Messrs J. K. Lowry, P. M. Sagar, G. D. Fenwick, and R. W. Farrelly, drifted on an ice floe for several days. Huge waves started to break up the ice so they had to leap from floe to floe to survive. A killer whale followed them, an iceberg rammed and splintered their small floe, forcing them to scramble on to the largest piece, and they ate raw penguin flesh when their food ran low. They had no sun glasses, and used pieces of cardboard with holes punched in them to protect their eyes against the burning light.

The leader of the unit at Bird Station, nearly 50 miles from Scott Base at the entrance to McMurdo Sound, was Mr Lowry, who is 30, and was born in Kansas City, Missouri. He is a graduate of the University of Richmond, Virginia, and was spending his fifth summer in the Antarctic. Mr Sagar, who is 22, was born in Burnley, Lancashire, and is a University of Canterbury graduate. Messrs Fenwick, 22, and Farrelly, 22, are students. All three were at Bird Station last season.

On the evening of November 27 the four men launched the trimaran for the first trip of the season. Their last radio communication with Scott Base was on November 25. They were not known to be missing until December 1 when a helicopter made a cargo flight to Cape Bird. The huts were deserted, the trimaran was missing, and the last entry

on the temperature recording graph was dated November 26.

Major P. G. Frazer, leader at Scott Base, who saw the men on November 23 when he flew by helicopter to collect the party's voting papers for the New Zealand General Election, immediately approached Captain A. N. Fowler, the United States Navy support force commander, who ordered a search to be made. Hercules aircraft from the Royal Air Force and the United States Navy, helicopters, and a Military Airlift Command Starlifter took part in the mission.

SPOTTED ON FLOE

Nearly 24 hours after the search began the missing men were spotted by a trained ice observer, Chief Aerographer's Mate A. C. Boeger, who was returning to Christchurch aboard an R.A.F. Hercules piloted by Squadron Leader P. Forrester. Their small ice floe was then three miles west of Cape Royds. Their remarkable journey had taken them westward from Cape Bird, south through Wohlschlag Bay, along the Ross Island coast, and then westward again.

A United States Navy VXE6 Squadron helicopter piloted by Lieutenant A. Costlow and Lieutenant (j.g.) J. McComas, landed on the ice floe, picked up the men, and flew them to McMurdo Station where they were taken to the hospital for treatment and rest. In addition to the effects of hunger and ex-

haustion, they were suffering from minor frostbite and snowblindness.

Later Mr Lowry told Mr B. R. Laybourn, information officer at Scott Base, what happened. Soon after the trimaran left Cape Bird both of its outboard motors cut out. Fuel tanks and motors were switched, but nothing happened. Then a northerly breeze swept the trimaran south into the pack ice.

Another change of wind began to blow the trimaran northward so it was abandoned. The men remained on an ice floe for several hours, and at one stage were within 20yds of the shore. But a southerly gale suddenly arose and swept the small craft back into McMurdo Sound. Then huge waves washed across the ice, breaking it up, and the men were forced to jump from floe to floe to keep afloat.

Small supplies of food—sledge biscuits, sardines, sugar, chocolate, peanut butter, marmite, and meat bars—were salvaged from the trimaran. They were rationed and eaten with sugar-flavoured snow.

PARTY'S SAVIOUR

Mr Lowry said that a captured penguin was the party's real saviour. Its warm, raw flesh provided the first real body heat, and gave the men new hope.

On the ice floe, exposed to icy seas and bitter winds, the men shivered uncontrollably at times. They kept walking on their ice island, partly to keep warm and partly for something to do. Several times they became very depressed. Then something would happen and their hopes rose. They joked and sang, took photographs, and wrote their diaries.

A Hercules aircraft passed within a mile of the men on December 1, and they hastily fired distress flares. But these failed to attract attention because the bright night sunshine apparently swamped any glare. After sighting the aircraft the men organised half-hour watches. But there were more disappointments. Searching aircraft and helicopters were sighted; there was no result from the firing of more flares.

Then at last the men saw the rescue helicopter fly all the way to Cape Bird and return in a great hurry. They thought it would not be long before they were found.

A few days after their rescue the men returned to Christchurch. Because of the loss of their trimaran, which has been in use since the 1970-71 season, they will not be able to continue their research programme this season.



SHIP AND SLEDGE MODELS

New Zealanders who spent last winter at Scott filled in their spare time at nights by imitating their predecessors of more than 60 years ago. Like the seamen aboard the *Discovery* and the *Terra Nova* they made models.

Sledges were a popular choice, but the most ambitious project was a scale model of the *Discovery* completed by a base field assistant and dog handler, Mr R. K. McBride. He started work on the model in March and finished it in July.

Mr McBride had no plans for the model when he chose the *Discovery* so he made his own. He found a plan of the ship in Scott's "The Voyage of the *Discovery*," photographed it, and then enlarged it to give him a scale of 1in to 10ft. For more details he worked from photographs in other books in the base library.

The bulk of the model is made from a piece of Oregon pine, and from hickory used for dog sledge runners. Other men at the base helped Mr McBride with the bits and pieces he needed.

The leader at Scott Base, Major J. R. M. Barker, made a 1in to 1ft scale model of a Nansen dog sledge and its related equipment. Sledges were also made by the cook, Mr P. J. McNiell, a radio technician, Mr K. B. Matson, and the base engineer, Mr M. Macdonald.

Studies of 'Long Eye' and Colds at Pole Station

Why do men living in isolation on the Antarctic Continent invariably catch colds soon after their first contact with newcomers from the outside world? An American microbiologist whose special interest is in infectious diseases is looking for the answer to the question at the Amundsen-Scott South Pole Station this summer. Russian, Japanese, and British scientists are doing similar research at their Antarctic bases.

Dr H. G. Muchmore, of the Oklahoma Medical Research Foundation, who flew south from Christchurch several weeks ago, said that immunity to infectious diseases in isolated communities was a subject of some importance to space scientists, especially in cases where men might remain in space for long periods.

It is not normal for a group of men all to have colds at the same time when in the previous three months of isolation they had none, according to Dr Muchmore. The colds in themselves are generally not serious, and Dr Muchmore is trying to determine whether through isolation the men lose their resistance. Then, if possible, he will attempt to identify the virus.

Dr V. Stillner, of the Harvard Medical School, who is an associate of Dr Muchmore, is also working at the Pole Station this summer. He is studying the state of consciousness and attention of men after long periods of isolation.

During winter isolation several physiological changes take place in men at Antarctic stations. These include changes in sleep patterns, occasional depression, complaints of lack of concentration, and staring—or, as it is more popularly known in the Antarctic, "long eye."

Dr Stillner quoted the case of an American at a Russian Antarctic station who spent up to three hours a day staring at the wall. This habit clears when men return to the outside world or leave isolated stations.

Generally "long eye" occurs more at

the smaller stations. Dr Stillner says altitude might have something to do with the complaint. But both Syowa and Mirny Stations where this sort of behaviour has also been noted, are at sea level. A pilot study of 15 men who spent the winter in isolation in the Antarctic revealed that 20 per cent admitted to this staring behaviour. Sixty per cent claimed they had seen others staring for periods.

Problems of health and isolation for more than seven months apparently did not cause concern to the 22 men, eight of them civilian scientists, and 14 from the United States Navy, who spent the winter at the South Pole this year. Their main worries were lack of lobster on the menu, the failure of their tomato plants to bear fruit, and having to shovel snow by hand in a 20-knot wind when the temperature was minus 90deg Fahrenheit.

When Lieutenant W. Talutis, the officer-in-charge at Pole Station, returned to see houses, green grass, and flowers, in Christchurch, he said that the only problems in the winter had been a number of equipment crises. Two of the four generators were out of action, but special parts were specially made, and they were repaired eventually. Large quantities of snow have to be collected for melting into water. A tractor is used but when it broke down the men had to shovel snow by hand, and in the words of Lieutenant Talutis, the job was "no picnic."

The artificially grown tomatoes were given a dose of ultra-violet light for a

few minutes every day. They grew taller but no fruit appeared. And the lack of lobster? The men at McMurdo Station 250 miles to the north had lobster all the year round but they neglected to send any to the men at the South Pole before their winter isolation began. That was why Lieutenant Talutis complained that the food was not very good.

There were no real health problems from February 14 to November 3. One man sprained his finger, and the station doctor removed several tattoos, but more for practice than anything else.

One memory Lieutenant Talutis still has of his winter at the bottom of the world is an unexpected 10-mile walk back to the station when a tractor broke down. A balloon carrying a scientific instrument ruptured 10 miles from the Pole after it had been launched.

As the University of Wyoming, which was conducting the research, had offered a \$100 reward for the recovery of the balloon's payload, a group of men set out in a tracked vehicle for the area where the balloon's last transmission had been heard. The group searched without success, the vehicle's engine died, and there was nothing else to do except walk home.

The men intended to use the reward to help pay for a party in Christchurch on their way home. They had their party—but paid for it out of their own pockets.

BISCUITS FOR N.Z. ANTARCTIC TEAMS

Eighty dozen home-made biscuits were flown from Christchurch to the Antarctic this season just before Christmas. They were a gift from the Canterbury branch of the New Zealand Antarctic Society to the New Zealanders at Scott Base and Vanda Station.

Each year for the last 10 years members of the branch have sent biscuits and fruit cake to Scott Base for Christmas. This year, however, there were more biscuits, and no fruit cake.

Third de Gerlache goes South

Three generations of one Belgian family—de Gerlache de Gomery—have been in the Antarctic since 1898. In that year Adrien de Gerlache led a Belgian expedition south in the Belgica. His son was the leader at the Belgian station, Roi Baudouin, in the International Geophysical Year, and last month the grandson, Ensign Bernard de Gerlache, of the Belgian Navy, flew south as the guest of the United States Navy.

Ensign de Gerlache is acting as an observer for the Belgian Navy and the Belgian-Netherlands Antarctic Expeditions Committee. He has a doctor's degree in law and economics, but in spite of his family association with the Antarctic he does not intend to follow in the footsteps of his grandfather and his father. He intends to go into business when he returns to Belgium early next year.

In 1898 the Belgica expedition made some new discoveries in the region of the Palmer Archipelago, and sailed as far south as Alexander Island. The ship was then beset in the pack ice and drifted for 12 months to the south of Peter I Island, thereby gaining the distinction of being the first exploring vessel to winter in the Antarctic.

An American member of the cosmopolitan expedition was Dr Frederick A. Cook, who later achieved some notoriety as a rival to Peary. His claim to have reached the North Pole was discounted by geographers. Another member of the expedition was Roald Amundsen.

Sixty years later Ensign de Gerlache's father, Baron Gaston de Gerlache, and Prince de Ligne, landed by helicopter on the Princess Ragnhild Coast of Queen Maud Land. It was the first landing by Belgians on Antarctic territory since the Belgica expedition. The expedition established Roi Baudouin, which was in use until 1967. Baron de Gerlache was in the Ross Dependency in 1961 when he visited McMurdo Station and Scott Base.

TWO U.S. SCIENTISTS HONOURED FOR WORK IN POLAR REGIONS

Two distinguished United States scientists who have contributed much to knowledge of the Antarctic have been honoured recently for their work. Dr Albert P. Crary, director of the National Science Foundation's division of environmental sciences has been awarded the Vega Medal of the Swedish Society for Anthropology and Geography; Dr Thomas C. Poulter, second-in-command of the 1933-35 Byrd Antarctic Expedition, has been elected an honorary member of the American Polar Society.

Dr Poulter was senior scientist of the expedition, and led the party which rescued Rear-Admiral Byrd from his Advance Base in 1934. Later he went south again with the United States Antarctic Service expedition of 1939-41. He was then scientific director of the Armour Institute in Chicago, and its research foundation was responsible for the design of the Snow Cruiser, an enormous vehicle weighing 33½ tons, which was planned as an entire expedition on wheels. It carried a satellite ski plane on its roof, and was planned to cross crevasses unhindered.

Unfortunately the "ship on wheels" was not a success. It could not operate independently, and remained at Little America III until its resurrection in the early years of Operation Deepfreeze.

Honorary membership of the American Polar Society is restricted. It has included in the past Rear-Admiral Byrd, Vilhalmur Stefansson, Lincoln Ellsworth, Professor Frank Debenham, and Dr Paul Siple. Among the present honorary members are Dr Laurence M. Gould, Captain Finne Ronne, and Colonel Bernt Balchen.

Dr Crary was awarded the Vega Medal for his important contributions to the geophysical and geographical exploration of the polar regions. Past recipients of the medal, awarded annually since 1880, have included Roald Amundsen, Ernest Shackleton, and Rear-Admiral Byrd.

From 1959 to 1967 Dr Crary was chief scientist of the United States Antarctic Research Programme. He was chief scientist of the programme during and after the International Geophysical Year, spent two years as station leader at Little America in 1957 and 1958, and was deputy chief scientist for Antarctic operations. From 1952 to 1955 he was chief scientist for the Arctic ice island T-3 programme.

European Nations' Plans

Some member nations of the Council of Europe are interested in a joint programme of scientific research in Queen Maud Land. Discussions began two years ago, and are now well advanced, although no definite agreement has been reached.

Britain, France, West Germany, Belgium, the Netherlands, Italy, and also Switzerland are involved. Of these five have been or are concerned with Antarctic research.

According to Paul-Emile Victor, director of Expéditions Polaires Françaises, two formulas for the execution of the common programme are being considered. There could be a number of national groups working in co-ordination on a common programme or an international project where a group would be formed regardless of nationality.

When Paul-Emile Victor passed through Christchurch on his way to Dumont d'Urville, he mentioned the International Glaciological Expedition in Greenland which he led. Frenchmen, Germans, and Swiss worked together perfectly on the project.

France has no plans at present to work outside Adélie Land. But Paul-Emile Victor did mention the possibility of some co-operative effort.

ROYAL AIR FORCE HERCULES FLIGHTS TO U.S. STATION

British and New Zealand aircraft have been assisting the United States support programme in the Antarctic this season. Last month and this month they co-operated with the Military Airlift Command in the transport of urgently needed cargo from Christchurch to McMurdo Station. Most of the cargo was needed for construction work at Siple and South Pole Stations.

Two Royal Air Force Hercules aircraft took part in the summer Antarctic airlift with Military Airlift Command Starlifters and Hercules aircraft of the Royal New Zealand Air Force. The R.N.Z.A.F. completed ten return flights between Christchurch at the beginning of this month; the R.A.F. detachment made 20 flights, the last on December 15.

Arrangements for British co-operation were made with the Royal Air Force by the United States National Science Foundation. The R.A.F. crews flew home in time for Christmas with something new to talk about in the mess. On December 8 one Hercules flew to the Amundsen-Scott South Pole Station—there to fly round the world three times in 12 minutes.

Squadron Leader C. M. Quaife arranged a training mission to the South Pole for sentimental reasons. The aircraft followed Scott's route to the Pole up the Beardmore Glacier. A Royal Air Force officer attached to the United States Navy's VXE6 Squadron flew to the South Pole as a navigator in the 1961-62 season, and on January 6, 1958, Squadron Leader John Lewis flew a single-engined de Havilland Otter from South Ice over the Pole to Scott Base after Sir Vivian Fuchs and his party had left on the second stage of their crossing of the continent. But the flight on December 8 was the first by an R.A.F. Hercules and its crew.


The R.N.Z.A.F. flights were made in support of both the New Zealand and the United States research programmes. This was the largest number since 1965 when the R.N.Z.A.F. first started flying its Hercules aircraft to the Antarctic.

Last season five flights were made, and in previous years there have been three flights annually.

Cargo handling for all American and New Zealand flights to the Antarctic this season was done by the New Zealand Army and the R.N.Z.A.F. An officer and nine men from the Royal New Zealand Army Service Corps, and six men from the R.N.Z.A.F. organised the loading and unloading of cargo at Williams Field, McMurdo Station, for distribution to inland stations. The men lived on the airstrip and flew a New Zealand flag borrowed from Scott Base to maintain their identity. One team worked through November, and a second finished its work at the end of this month.

Two R.N.Z.A.F. helicopter pilots are spending two months this summer on helicopter operations with the United States Navy's support force. Flight Lieutenant V. S. Paul and Flying Officer K. Jolly flew south this month and will return in February.

They are the first R.N.Z.A.F. pilots to fly helicopters in the Antarctic, and will serve with VXE6 Squadron, which operates twin-turbine Iroquois helicopters.



VOLUME V INDEX

Subscribers to "Antarctic" are reminded that the index to Volume V (1968-70) has been printed. Copies can be obtained from the New Zealand secretary, P.O. Box 1223, Christchurch. The price is 35 cents in New Zealand currency or the local equivalent.

MINERALS IN ANTARCTIC CONCERN NATIONS

Exploration for minerals in Antarctica, and visits to the continent by tourists and private expeditions, are matters of concern to the Antarctic Treaty nations. Recommendations adopted by the seventh consultative meeting of representatives of the 12 treaty nations in Wellington last month recognised that mineral exploration was likely to raise environmental problems, and unsponsored visits could affect both scientific programmes and the environment.

New Zealand first raised the issue of mineral exploitation at the last consultative meeting in Tokyo two years ago, and several representatives referred to it in their speeches at the opening session. The meeting was told that the prospect of mineral exploitation would inevitably raise the formidable problem of national sovereignties. But it decided only to recommend to the governments concerned that the effects of mineral exploitation should be carefully studied and included on the agenda of the eighth consultative meeting in Oslo two years hence.

In its recommendation the meeting reaffirmed that Antarctica should continue to be used exclusively for peaceful purposes and should not become the scene or object of international discord. It noted the technological developments in polar mineral exploration, the increasing interest in the possibility of their being exploitable minerals in Antarctica, and the need for further study and discussion by the treaty nations. Also it recognised that mineral exploration was likely to raise environmental problems, and that the treaty nations should be responsible for the protection of the environment and the wise use of Antarctic resources.

New Zealand's Minister of Foreign Affairs (Sir Keith Holyoake) raised the question of visitors to Antarctica when he formally opened the meeting. He said that the continent was both a unique scientific laboratory and a political laboratory which had to be protected

from too many visitors. How to manage this fairly and justly would exercise the treaty nations for some time.

Chile's representative (Mr Oscar Pinochet) said that human activity in Antarctica should be controlled in such a way that pollution never reached the shores of the continent. The question of mineral resources in the future could undermine the foundations of the treaty organisation.

FRENCH ATTITUDE

The French representative (Mr Pierre Charpentier) expressed his delegation's concern that one day mineral prospecting would take place on the Antarctic Continent and the formidable problem of national sovereignties would of necessity be raised. This danger had been avoided when the treaty was negotiated because it would have prevented any agreement.

Japan's representative (Mr Toshio Mitsudo) saw little possibility of commercial development in Antarctica at present. But he said that the nations' scientific activities were already proving of benefit to mankind and would continue to do so.

Mr P. H. Philip, the South African representative, referred to the new and more complex pattern of problems and potential difficulties created by the impact of the world upon Antarctica, and by the increasing ease of access to the continent. He said that the threat of creeping pollution and environmental destruction should not be allowed to

encroach upon the one continent which had thus far escaped its destructive force.

Britain's representative (Sir Arthur Galsworthy) expressed his country's concern about any possible threats to the continued proper working of the treaty. He noted the steadily increasing numbers of unofficial visitors to Antarctica, both tourists and adventurers, and the growing interest of countries which were not parties to the treaty. A few of these countries appeared to look upon Antarctica not so much as a peaceful scientific laboratory to be used for the benefit of all, but more as a potential source of untapped wealth.

Sir Arthur Galsworthy referred to the convention for the conservation of seals in the Southern Ocean, which was negotiated outside the Antarctic Treaty by 12 nations represented at the consultative meeting. He said that if the convention was ratified by the participating governments and its machinery developed effectively, mankind would have set up a conservation regime for the world's largest remaining unexploited group of mammals before commercial exploitation was upon them.

This need to anticipate exploitation of resources was equally relevant to mineral exploitation in Antarctica, Sir Arthur Galsworthy emphasised. Unrestricted commercial exploration could seriously jeopardise the working of the treaty. Internationally agreed arrangements for conservation were essential, and it was easier to agree on these before industrial activity had started than later. World events could easily overtake the consultative meeting's rather slow and cautious arrangements to meet Antarctic problems.

In addition to the recommendations on the possible effects of mineral exploration, the meeting adopted recommendations dealing with co-operation in transport arrangements, the organisation of telecommunications, the preservation of areas of particular scientific interest, rules of conduct for visitors to Antarctica, historic monuments, the importation of laboratory animals and plants,

man's impact on the environment, and a review of specially protected areas.

A non-commercial international air transport system for the Antarctic Treaty area was suggested by the United States. The system would serve to facilitate scientific research by providing better and faster access to all parts of the continent during the summer, and intercontinental transportation during the winter at least to selected locations.

The meeting agreed that the project should be studied by the national offices responsible for the administration of Antarctic expeditions. The representatives decided to recommend to their governments that they accept the principle by using, where appropriate, common transport facilities by sea and by air for scientific and other staff proceeding with their equipment to and from Antarctic stations.

FUTURE ACTIVITIES

Possible substantial or continuing activities or territorial claims in Antarctica by nations that are not parties to the Antarctic Treaty were considered by the meeting. It agreed that, in such circumstances, it would be advisable for governments to consult together as provided for by the treaty and to be ready to urge or invite as appropriate the nation or nations to accede to the treaty, pointing out the rights and benefits they would receive, and also the responsibilities and obligations of contracting parties.

The meeting also reviewed the legislative and/or administrative action taken by the contracting parties, or in preparation, to conserve fauna and flora. It noted an authoritative opinion that there was at present no serious direct threat to Antarctic seals and birds, and in particular that no species was endangered, although the possibility of over-exploitation of some local populations of seals could not be entirely ruled out.

The representatives recommended to their governments that they approve a list of 43 historic monuments identified and described by Argentina, Britain, France, Australia, the Soviet Union,

Chile, Norway, and New Zealand. These commemorate the achievements of Antarctic explorers and the deaths of members of expeditions dating back to 1899.

Sir Keith Holyoake formally opened the meeting, which was held from October 30 to November 10. Mr F. H. Corner, leader of the New Zealand delegation, was elected chairman. Representatives of the other 11 nations were:

Argentina—Mr Juan Carlos Beltramo, Argentine Ambassador to Bucharest.

Australia—Dame Annabelle Rankin, High Commissioner in Wellington.

Belgium—Mr Alfred van der Essen, Minister of Belgium, Ministry of Foreign Affairs, Brussels.

Chile—Mr Oscar Pinochet, Chilean Ambassador to Tokyo.

France—Mr Pierre Charpentier, Ambassador of France, Paris.

Japan—Mr Toshio Mitsudo, Japanese Ambassador to Wellington.

Norway—Dr Edward Hambro, Ambassador of Norway, Ministry of Foreign Affairs, Oslo.

South Africa—Mr P. H. Philip, South African Consul-General, Wellington.

U.S.S.R.—Mr A. I. Ivantsov, Minister of the U.S.S.R., Wellington.

United Kingdom—Sir Arthur Galsworthy, High Commissioner, Wellington.

United States—Mr Kenneth Franzheim II, United States Ambassador to Wellington.



JOINT EXPEDITION SAILS TO AUCKLAND ISLANDS

Twenty-nine scientists from New Zealand, Australia, and the United States, sailed to the Auckland Islands last month on an expedition organised by the Department of Lands and Survey. They will remain there until early March to do research aimed at improving knowledge of the islands and its plants and animals, both native and introduced.

Nearly 300 miles south of New Zealand, the Auckland Islands are now administered as reserves for the preservation of flora and fauna. Bird life is not abundant but there are seals and sea lions on the coast. Introduced mammals include rabbits, goats, pigs, mice, and wild cattle. They are there as a result of the attempt to colonise the islands last century.

Some of the scientists will study the relationships between these animals and the flora and fauna. Five American scientists sponsored by the National Science Foundation will study the habits of the Auckland Islands flightless teal,

the distribution of chlorinated hydrocarbon pollutants, and various mosses and lichens.

The expedition, which is led by Mr B. D. Bell, senior fauna conservation officer, Wildlife Division, Department of Internal Affairs, has been supported by other interested government departments, museums, the universities, and the National Scientific Foundation. The research vessel *Acheron* has been chartered until the expedition returns to New Zealand on March 5. She will make three trips to the islands with staff, equipment, and stores, and between trips will transport scientists from point to point and provide support.

HALLETT STATION TO BE CLOSED

Hallett Station, one of the original International Geophysical Year stations, which was operated jointly by the United States and New Zealand from 1957 to 1965, will be closed at the end of this summer, the United States National Science Foundation has announced. Bird banding and a study of the embryology and incubation behaviour of the Adelie penguin will be the final work done there.

Located some 400 miles north of Scott Base, the station was built in the 1956-57 summer on Seabee Spit, a promontory in Moubray Bay, facing the Victoria Land mountains. This promontory is also the home of up to 100,000 Adelie penguins.

Between 1957 and 1964 the station was maintained logistically by the United States, and New Zealand was responsible for the programme in ionospherics, seismology, geomagnetism, and the greater part of the auroral programme. Every second year a New Zealander was station scientific leader. Leaders were: J. A. Shear (S.), 1957; K. W. Salmon (N.Z.), 1958; R. Roberts (U.S.) 1959; R. B. Thomson (N.Z.) 1960; R. W. Titus (U.S.), 1961; C. B. Taylor (N.Z.) 1962; H. Freimanis (U.S.), 1963; N. M. Ridgway (N.Z.), 1964.

On March 6, 1964, a disastrous fire completely destroyed the main scientific building and the equipment operated by three New Zealanders throughout each year. Since then the station has been occupied by American scientists in the summer months, chiefly for biological research. It has functioned also as a communications and weather reporting station on the air route between Christchurch and McMurdo Station, and has provided before the ice breaks up an alternate landing field in case Williams Field in McMurdo Sound is closed.

Before the fire, Hallett Station had many exciting moments in its eight years' history. During its construction the U.S.S. Arneb was nipped and holed

by ice. In the 1958 winter Hallett Station was the first Antarctic base to recognise in its auroral records the effect of the nuclear bomb tests in the Pacific.

A Globemaster on a flight from Christchurch on October 16, 1958, hit a hill 30 miles to the north when coming in for an air drop to the station. Six of the men aboard were killed in the crash. In 1960 winds gusting to 140 m.p.h. on May 24 caused serious damage to the buildings. Two helicopters were blown from their moorings and badly damaged in November, 1963.



SOLO POLE TRIP POSTPONED

A British paratrooper who planned to travel alone by dog sledge to the South Pole from Scott Base this season has postponed his journey for at least a year ("Antarctic," September, Page 251). He said in London that the New Zealand authorities had turned down his request to borrow or buy dogs from Scott Base.

Trooper Tom McClean, aged 29, has received no support for his project from the Ross Dependency Research Committee or the Antarctic Division, Department of Scientific and Industrial Research. He said, however, that his plans were still going ahead, and he had the full backing of the British Army, and support from a major British newspaper. "I'm pretty sure we'll be ready for next year," he told the correspondent of a New Zealand newspaper. "If not, we'll put it off for another year."

Apparently Trooper McClean feels he has been let down by the New Zealand authorities. "Scott and his men did it for the glory and for their country," he said. "Now they won't let us try it. If the people of New Zealand could just get the idea that it's a great adventure—that's what I want."

Scott Base Leader's Year of Memories and Problems

By J. R. M. BARKER

A leader at Scott Base who spends the winter there has much more to do in the Antarctic than endure the hours of darkness. And his year in the south is more like 18 months because he spends six months of planning and preparation in New Zealand. When he arrives at Scott Base the leader in the previous winter hands over; the new leader is involved immediately in all the comings and goings of the hectic summer season.

Major J. R. M. Barker, leader at Scott Base for the 1971-72 season, had been there as deputy-leader in the previous summer. But in this article he reveals that a leader has entirely different problems to solve.

* * *

The flight down to McMurdo Station and the sudden arrival at Scott Base seemed to pass in a flash and as I had been there before, it was as though I had only been away for a short while. The winter party soon "thawed out" and it was good to see old friends from the previous summer. Soon my own base staff began to arrive and the winter party left when they had handed over.

The first field parties and the group of men, who were to spend the summer at Vanda Station passed through the base, spending a few days sorting stores and equipment, before being flown by helicopter to their new home in the moon-like dry valleys.

Then followed a hectic two months of arrivals, briefings, departures, endless radio contacts, flight co-ordination meetings, crises and problems solved. And all the time round me, the normal busy life of the base, quietly co-ordinated by the cheerful, robust deputy-leader.

Soon it was Christmas, by which time a number of field parties had returned to New Zealand. Many others joined the base staff for the period of relaxation, during which field trips were arranged for the summer base staff.

Meanwhile, essential work went on and soon the tempo increased again as some of the major field parties returned

after spending several months in the field. Suddenly, the end of the summer season approached with last-minute flurries to ensure that all essential items of stores were at hand before the last plane and ship departed. The last to leave were the stalwarts of the summer support staff, and the busy season was at an end.

I feel a strange mixture of deflation and anticipation. But there was much to be done in preparation for the winter. We set to work on outside preparations, with as many of the 11 men taking part as was possible. There were seals to be killed and stored for the dogs, the dog lines to be moved nearer the base, equipment and vehicles to be stored, fuel and routes to be flagged.

SLEDGE JOURNEYS

Before the sun went down, several short sledge trips were undertaken to locations on the ice shelf and these were to supply many photographs and much material for discussion later in the winter.

Gradually as the days shortened and the temperatures dropped, life within the base settled to a pattern. The amount of administration and co-ordination required became minimal.

I became the odd job man, doing those



MAJOR BARKER
A Scott Base Portrait
by Maurice Conly

jobs which were not within the province of the other members at the base. A multitude of tasks presented themselves and I was able to set myself goals to achieve, thereby hopefully setting a standard to be followed by the others.

All the time I had to study my companions, to watch for changes which might affect their attitudes towards each other, their work or the life of the base.

Darkness settled on the scene, but seldom was it not possible to see some distance, particularly when the weather was clear and the moon was up. I tried to ensure that everyone got outside whenever possible, and gradually everyone became accustomed to moving around without concern.

Midwinter, the great time-mark, came and went, and soon all were looking forward to the return of the sun. The list of outstanding work on the programme became shorter and shorter, and soon came the time to start planning and preparing for spring trips.

More and more daylight and magnificent sunrises heralded the return of the sun, and with this the tempo

increased. Everyone became involved in preparation of sledge trips and the anticipation of seeing fresh scenery and living hard for a day or two.

The flight of the aircraft from New Zealand at the end of the winter was delayed for six days, but this did not seem to matter for the joy of mail when it did arrive.

MORE ACTIVITY

The last month was a time of increased activity, visiting land-marks of interest, completing the season's work at the base and preparing for the arrival of the new team.

Finally the day arrived when there were new faces in the base messroom and I realised that my season was at an end.

I remember the happy times of the summer, with the base staff and field parties combining well to get the work done and yarnning over a can of beer when work was done.

I remember the shock of hearing a familiar voice on the radio tell me that the owner of the voice and his companion had just returned from unsuccessfully chasing a windfilled parachute with its vital load for six miles across the snowfield before it disappeared down a glacier.

I remember watching the progress of an enormous iceberg about the bay in front of the base and the disappointment when it finally disappeared.

I remember the evenings in the winter spent working on my model in company with others in the sledge-room; the parties in the mess, ice parties, and visits to the historic huts.

It was a year filled with happy memories and, above all, the memory of the comradeship of my team.

SUBSCRIPTIONS

Subscription rates have been increased. Details of the new rates are on the inside back cover.

Drilling on Ross Island and in Floor of Southern Ocean

An international team of 30 scientists from Japan, New Zealand, and the United States will drill a hole nearly a mile deep into the Antarctic bedrock on Ross Island this season to help trace the continent's climatic and geologic history. The drilling, which will be done during January and February next year, will mark man's first deep penetration of Antarctica.

The international scientific effort, known as the Dry Valley Drilling Project, is a major three-year drilling programme with boreholes planned at a minimum of 10 sites on Ross Island, in McMurdo Sound, at sites along the Antarctic coast, and inland in the dry valleys, the area free of ice and snow 60 miles west of McMurdo Station.

In a parallel effort to the Dry Valley Drilling Project, the Deep Sea Drilling Project, a major ocean floor coring project supported by the National Science Foundation, will drill in Antarctic waters for the first time during February. Oceanographers aboard the drilling ship *Glomar Challenger* will concentrate on drilling and sampling the sea floor near that part of the Antarctic Continent south of Australia and New Zealand.

On Ross Island the 1500-metre deep hole will be drilled, using a wire-lined, diamond-bit rock coring rig, next to the earth science laboratory at McMurdo Station. Seven Canadian and New Zealanders will conduct the drilling, and the international team of scientists will examine the rock cores, which will have a diameter of 2.5in.

Dr P. N. Webb, of the New Zealand Geological Survey, will be the scientific co-ordinator for the project, and Mr R. B. Thomson, superintendent of the Antarctic Division, Department of Scientific and Industrial Research, will be responsible for the logistic support of the drilling operations.

Later a hole will be drilled in McMurdo Sound between McMurdo Sta-

tion and the eastern Taylor Valley in 300 metres of water. An attempt will be made to retrieve 300 metres or more of marine sediment core from beneath the moving sea ice. Interbedded marine, volcanic, and glacial sediments will be cored continuously.

Three sites near the coast, Marble Point, the New Harbour Shoreline, and the Walcott Glacier, will be drilled to a depth of up to 300 metres, and should yield the oldest basement rocks in the McMurdo Sound region.

Drill sites will be established on or near Lakes Vida, Vanda, Fryxell, and Bonney, and Don Juan Pond. The purpose is to determine, as nearly as possible, the lakes' chemical, biological, and geophysical regimen.

ROSS SEA SITES

Drilling will be done this season, and in the next two seasons. But the list is subject to revision both in timing and specific location of sites.

In the *Glomar Challenger's* programme drilling into the ocean floor will be done at sites in the Ross Sea area, within 100 to 150 miles of McMurdo Station. The ship has equipment for drilling into the sea floor to a depth of at least 4000ft, and has a dynamic positioning system which enables her to maintain station over the drilling site in oceanic depths.

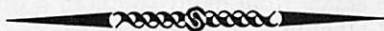
On December 22 the *Glomar Challenger* sailed from Fremantle to begin the first of several cruises into the Southern Ocean. About 14 holes, some of which will be drilled in the abnormally deep waters of the continental shelf, will

produce more knowledge of the Antarctic Continent through the study of sediments that will be recovered.

After Cruise 28 the Glomar Challenger will come to Lyttelton on February 28 next year. Among the scientists aboard will be three New Zealanders, Dr P. J. Barrett, of the department of geology, Victoria University of Wellington, Dr D. A. Burns, of the

Oceanographic Institute, and Dr P. N. Webb, of the Geological Survey.

Cores from the Glomar Challenger and from the Dry Valley Drilling Project will be analysed to help scientists understand the record of Antarctica's 200 million-year evolution from a temperate zone member of the Southern Hemisphere super-continent Gondwanaland to its present position.



NO REPORTS FROM N.Z. DOCTOR ON SOLO ANTARCTIC YACHT VOYAGE

More than two months ago Dr David Lewis, a 55-year-old New Zealander, sailed from Sydney on the first stage of his single-handed attempt to circumnavigate the Antarctic Continent in his 32ft steel sloop *Ice Bird* ("Antarctic," September, pp 240-41). He crossed the Tasman in 13 days, and sailed from Halfmoon Bay, Stewart Island, on November 2, heading south-east towards the 60th parallel.

Dr Lewis planned to send periodic radio reports during his voyage by way of New Zealand, the Falkland Islands, and South Africa. But to date his signals to Sydney have been almost indecipherable. There were fears for his safety on the Tasman crossing when he failed to keep a radio schedule. He explained later that he had been so engrossed in his reading—one of his books is Gibbon's "Decline and Fall of the Roman Empire"—that the batteries of his transmitter ran down.

The latest report is that there may be news from him by Christmas or the New Year when the *Ice Bird*'s westerly route along the 60th parallel should have brought her midway between Cape Horn and the northern tip of the Antarctic Peninsula.

Originally it was reported that Dr Lewis intended to sail only from Australia to the Antarctic Peninsula. However, he plans to spend about three months in the Antarctic Peninsula area and the South Shetlands. He expects

to leave at the end of March, continuing round the 60th parallel, and reaching Sydney by April or May. His 17,000-mile voyage will take seven months altogether.

By mid-November Dr Lewis expected to encounter floating ice. He has arranged with the Scott Polar Research Institute in Cambridge to supply him with ice reports by way of the Falkland Islands when he reaches Drake Passage. If the reports are favourable he will sail south to the British base at the Argentine Islands, 80 miles north of the Antarctic Circle. He has been invited to stay at the base by Sir Vivian Fuchs, director of the British Antarctic Survey, and also hopes to visit another British base on Stonington Island in Margeurite Bay.

Before he continues his voyage Dr Lewis plans to visit Bellingshausen Station, the Soviet base on King George Island. Also he hopes to go ashore on the Antarctic Peninsula from the Argentine Islands or Stonington Island.

Floating Laboratory in Waters of Antarctic

By M. A. McWHINNIE

For the last eight years the U.S.N.S. *Eltanin*, the first American ship devoted entirely to multi-disciplinary research in Antarctic waters, has been a frequent visitor to New Zealand. Since her first Antarctic cruise in July, 1962, she has sailed from many southern ports, including Wellington, Auckland and Lyttelton. Women scientists have sailed aboard the *Eltanin* from the early cruises. In this article Dr M. A. McWhinnie, professor of biological sciences at De Paul University, Chicago, describes the ship, her equipment, life and work aboard, and the part she plays in Antarctic research.

Built in 1957 to serve in Arctic resupply, the *Eltanin* was converted to a "floating laboratory" for Antarctic research in 1962. She is equipped for on-board research as well as for long-cruise sampling, and survey work. Her conversion provided six research laboratories, a photographic darkroom, a computerised data processing centre, scientists' office, machine and carpenter shop, and an electronics shop.

Satellite navigation equipment, installed in 1965, enables precise determination of at-sea locations. The ship accommodates 28 scientists, 10 technical supporting staff, and a crew of 48 men.

After two shakedown cruises in the North Atlantic, the *Eltanin* left New York in May, 1962, for Cruise 3 and arrived 36 days later at her first southern port, Valparaiso, Chile, on June 27. She has now completed Cruise 54 between Fremantle and Melbourne, Australia.

Each cruise is usually 60 days long, but one cruise to the Weddell Sea lasted 80 days, and another in the eastern Pacific was only 24 days long.

Cruise 51 this year began and ended at Lyttelton. Future efforts will concentrate on the as yet little-studied Indian Ocean sector of these rich south circumpolar waters.

On Cruise 51 the *Eltanin's* deepest penetration was to 78deg 29min S—

164deg 19min W at the south end of the Bay of Whales in the Ross Ice Shelf. Twice she has sailed to Winter Quarters Bay, Ross Island.

The *Eltanin* was designed for research in a number of scientific areas—including marine geology, physical hydrography, seismology, chemical and physical oceanography, upper atmospheric phenomena, meteorology, and marine biology. The latter has included population densities and distribution of marine flora and fauna, primary (phytoplankton) productivity, zooplankton metabolism, microbiology, biochemistry of lipids in the food chain, organic compounds of sea water, and energy transfer through that marine ecosystem.

EXCITING LIFE

Life on the *Eltanin* was busy and exciting. The early cruises were for the most part multi-disciplinary, and geologists worked alongside biologists, physicists, and chemists. At a typical oceanographic station, a geologist took a deep-sea core, then biologists set a tow trawl to collect benthic or pelagic organisms. Each specialist group collected its own samples. This mix of scientists, each interested in a different aspect of marine science, increased our understanding of the entire marine environment.

With increased understanding of this water mass, each discipline felt the need to intensify and extend its studies. This resulted in some cases in an increase in the amount of experimentation, the extent of biochemical analysis, and the need to confirm the data obtained at a given location.

In some studies, such as marine biology, the time required at each station increased greatly. Alternately, physical oceanographers required extensive study of a region by taking numerous deep-sea cores, spending longer periods in ship travel to extend seismic profiling, and sampling water for hydrographic data.

To improve ship use, it was decided to stage a series of specialised cruises. On Cruise 38, studies of the marine biota alone were conducted on the first completely biological cruise: all aspects of the marine biosphere, both upper-water-column and bottom-dwelling organisms, were studied.

In further refinement, the second all-biology cruise (Cruise 46) confined its efforts to the upper water column; all eleven studies were correlated to investigate the pelagic system. The flow of energy through the euphotic zone of the Antarctic ecosystem was the central principle and Cruise 51 continued this concept.

SPECIAL CRUISES

Animals in the benthic realm will be studied on additional single-purpose cruises. Geology, physical hydrography, seismology, current, and other physical programmes also can be studied on specialised cruises. This approach permits comprehensive investigation of each of the natural sciences.

Most cruises feature some international co-operation. Two weather observers are consistently members of the scientific group: initially they were from the United States National Weather Service, but recently Australians have been working in this specialty. Data are sent to Melbourne and ultimately through the world weather system. Other Australians have engaged in some of the scientific studies, as have New Zea-

landers from the University of Canterbury and the Dominion Museum. On occasions Russian exchange scientists also have participated.

From the early cruises, women scientists have been a part of the *Eltanin's* staff, and on several cruises they have worked in laboratories, managing and sorting samples on the deck and, in data acquisition and processing. Perhaps their presence makes the cruises a little like home.

EXCELLENT FOOD

Because the ship is at sea for about 10 months of each year, recreational diversions are important. So too is excellent food—four meals a day. At Christmas, or perhaps Easter or Midwinter Day, this hard-working group has a brief respite when a party is arranged. Sometimes crossing the Antarctic Circle serves as the cause for a brief social event: there are always new scientists aboard for whom this marks a momentous occasion. Movies are shown daily.

For some, the greatest thrill is to speak to home by ham radio. On most cruises someone in the scientific group is a licensed operator who generously gives his time to establish telephone patches so each can contact his friends and family.

But through these lighter moments, the *Eltanin's* work continues. After 10 years of intensive work, much remains to be done. With many United States scientists, vigorous graduate students, and visiting scientists of other nations, we will come to understand this exciting, inviting, and complex part of the globe, through the indomitable spirit of the *Eltanin* as she works in the south circumpolar waters around Antarctica.

Acknowledgements: The author would like to acknowledge the generous assistance of Dr George A. Llano and Mr Guy Guthridge of the Office of Polar Programmes of the United States National Science Foundation for their critical reading of this manuscript.

B.A.S. ACTIVITIES

NEW HALLEY BAY BASE MAIN TASK IN 1972-73

A major project in the British Antarctic Survey programme for the 1972-73 season will be the construction of a new base at Halley Bay. The base, first established in 1956, was completely rebuilt in 1967; in the last two years there has been severe crushing by ice, and the buildings are now under 30ft of snow.

The size of the new base has been reduced to accommodate a maximum of 18 men—a team sufficient to keep Halley Bay operational as a full geophysical observatory. Field work will be reduced to a small amount of glaciology as work on the accessible rock areas has been completed. About 50 men, including 12 Royal Marines from the Falkland Islands, will be available for building the base.

This season there will be a winter party of 100 at the seven B.A.S. bases: eight at Adelaide Island, 11 at the Argentine Islands, 21 at Halley Bay, 16 at Signy Island (South Orkneys), 23 at South Georgia, 17 at Stonington Island, and four at Fossil Bluff, the advance base on the east coast of Alexander Island. Field huts will also be occupied intermittently.

Heavy snow accumulation and movement of the ice shelf in the Halley Bay area have always presented major problems. Since the base was first set up in January, 1956, a number of different building methods have been tried, but all have eventually proved unsuccessful.

In 1967, when the base was last completely rebuilt, each of the seven 72ft-long buildings was designed as a series of very strong "circles" linked by weaker sections, so that it could settle differentially without causing structural failure.

Although this proved successful for a few years, in the last two years upthrusting of the floor of the trench in which the base is built has caused severe crushing. The ice has flowed around the main beams, pushing up the floors which have, in turn, forced partitions through

the ceilings. In addition, there has been failure of a number of roof sections. These buildings are now under 30ft of snow.

It seems that the only solution is to build monolithically, and eventually it was decided that this could be achieved most speedily and cheaply by erecting a flattened circle of culverting, 19ft in diameter, in which normal buildings could be constructed.

HEAT PROBLEM

To avoid the old problems of heat passing through the walls and melt water consequently running down beneath the buildings and undermining the foundations, cold air will be drawn through the space between the tubes and the buildings. The ends of the large tubes will be completely drift proof, and the access shafts will be tied into the main structures. Individual buildings will be linked by small tubes which will be free standing.

The Royal Research Ship John Biscoe sailed from Southampton on October 3 with 17 men who will be wintering and seven who are going south for the summer only. The ship is scheduled to relieve the bases at South Georgia and

the South Orkney Islands (Signy Island), and then support scientific parties in the two areas, transporting them to and from various points inaccessible by land. A considerable time will also be spent in the vicinity of the South Orkneys continuing the marine biological survey.

Summer visitors being transported include a biologist, Dr Takao Hoshiai, from the National Science Museum, Tokyo, who will be working at Signy, and Mr Duncan Carse who will be filming in South Georgia. Mr Carse was leader of the South Georgia survey which spent three summers (1951-52, 1953-54 and 1955-56) carrying out topographical and geological surveys, as a result of which a 1/200,000 map of the island and two geological reports were published.

LAUNCH SLIPWAY

In the Biscoe's cargo for Signy are 100 tons of pre-mixed concrete, and another 200 tons are being carried by the R.R.S. Bransfield. This is for constructing a slipway ready for a new 25ft launch which is also being taken south in the Bransfield.

Ice conditions in this northern area are at least one month behind those encountered last year and are likely to delay these programmes. In mid-November fast ice still extended to a distance of four miles from Signy.

The southern part of the west coast of the Antarctic Peninsula is generally not accessible before January, so the Biscoe will not attempt to relieve the two Marguerite Bay bases—Adelaide Island and Stonington Island—until then. In mid-January she will be joined by H.M.S. Endurance, and the two ships will together carry out hydrographic survey in the area for several weeks.

R.R.S. Bransfield sailed for the Antarctic on November 1 and in the next seven months will visit all the six main bases. The bulk of her cargo consists of the materials for the new Halley Bay base and she is carrying a summer building team as well as 43 wintering staff. The ship is likely to be at Halley Bay for one month.

Normally the Weddell Sea is not open to shipping until the end of January, so the Bransfield will first take men and cargo to Signy Island, and proceed to the northern part of the peninsula to relieve the Argentine Islands base before returning to Montevideo to take on more cargo and summer visitors.

Visitors joining the Bransfield at Montevideo this year include the survey's director, Sir Vivian Fuchs, and the senior logistics officer, Mr Derek Gipps. After supervising the rebuilding operations at Halley Bay, they will fly 1000 miles westward to join the Biscoe at Adelaide Island. It will be the first time that a flight over this route has been undertaken.

Another summer visitor travelling to Halley Bay will be a South African observer, Mr J. G. Nel, who was leader of the 12th South African National Antarctic Expedition (1971).

During her first two Antarctic seasons the Bransfield suffered from severe vibration. After much research, chiefly at the National Physical Laboratory, it was found that this was due to cavitation, and it was decided that a half tunnel should be constructed over the propeller to improve the water flow. This has been made strong enough to avoid ice damage and has successfully reduced the vibration to an acceptable level.

FIELD OPERATIONS

Stonington Island field work started again in mid-August, when supplies were ferried up to the plateau. Some of these are for a local depot and some for ferrying on to Fossil Bluff and the glaciological field hut (Spartan Cwm) 20 miles to the north. Glaciological work was resumed at the beginning of September, by two of the four men who had wintered at the Bluff.

Later in September, parties were again active in the area immediately south of Marguerite Bay, south of the Eland Mountains on the eastern side of the peninsula at 71deg 45min S. and in the George VI Sound area. Work in the sound includes gravity and magnetic surveys along both the east and west coasts.



A British Antarctic Survey Twin-Otter aircraft supplying a field party near George VI Sound. Two of these aircraft are used for support work in the Antarctic Peninsula area. They are flown back to Canada at the end of each season for overhaul.

B.A.S. Photo—T. Christie

At South Georgia, glaciologists continued work on two glaciers. The Hodges Glacier programme was seriously interrupted by an avalanche in July but is now running smoothly again. Winter field work on reindeer on the Barff Peninsula was completed, and preparations were then made for summer biological work on Bird Island. This is mainly concerned with fur seals and a marked population of albatrosses.

A slight earth tremor was felt and recorded at the base on King Edward Point on September 5; it appeared to be of local origin. The geophysics programme has been maintained despite the fact that one of the three physicists broke his leg while ski-ing in May and was out of action for some weeks.

At Halley Bay, a local magnetic survey and a programme of VLF recordings were completed by the end of August. Depots were established during August in preparation for summer glaciological journeys. In mid-September

a party set off to carry out the annual reconnaissance of a route across the hinge zone—the heavily crevassed junction between the ice shelf and inland ice. A tractor which fell into a crevasse in November, 1969, was successfully salvaged and found to be in perfect condition after three years.

ARGENTINE AID

With the help of the Instituto Antártico Argentino and the Argentine Air Force, a Stonington Island geologist, Mr John Hudson, who became ill suddenly with severe abdominal pains, while sledging south of the Eternity Range, 200 miles from base, was flown to Buenos Aires for an emergency operation. After a second operation he is on his way to recovery.

When Mr Hudson became ill at the beginning of October, steps were taken immediately to fly him out. One of the two B.A.S. Twin-Otter aircraft which were preparing to leave Canada was

dispatched but was not expected to reach the area for 10 days.

In the meantime, the B.A.S. doctor at Adelaide Island reported that the patient's condition was deteriorating rapidly. B.A.S. therefore appealed to Capitan Mackinlay, of the Instituto Antartico Argentino for help. The response was generous and immediate.

An Argentine Twin-Otter was flown to Vicecomodoro Marambio, calling at Teniente Matienzo to take a doctor on board. In spite of persistent bad weather, an attempt to fly south was made on October 10, but the aircraft was forced to return to Matienzo.

Two days later the weather improved slightly on the west coast of the peninsula and the B.A.S. aircraft, which had been held up at Punta Arenas, succeeded in reaching Palmer Station on Anvers

Island where the Argentine aircraft also arrived. It was then decided that the B.A.S. aircraft should continue the rescue operations, and it flew on to Adelaide Island. The next day it was able to pick up the sick man, and the day after, accompanied by the B.A.S. doctor, flew him north to Rio Gallegos in Argentina by way of Punta Arenas. From there the Argentine Air Force again took over and flew him to Buenos Aires.

Having flown the sick man to Rio Gallegos, the B.A.S. Twin-Otter flew back to Adelaide Island. It has since been joined by the second aircraft from Canada. They are now engaged in supplying the advance base, Fossil Bluff, in George VI Sound and supporting field parties working in a number of areas south of Marguerite Bay.



New Australian Officers

A retired Royal Australian Air Force group captain, and a former Queensland farmer who flew a light aircraft from Sydney to London in 1968, are two of the officers appointed to take charge of Australian Antarctic and sub-Antarctic stations next year. They are Mr B. F. N. Rachinger, who led the relief party to Macquarie Island last month, and Mr J. L. Naylor, who will take charge at Mawson this month.

Messrs Rachinger and Naylor come from New South Wales. Two men from Victoria, Messrs S. B. Bromham and G. E. McInnes, will go to Davis and Casey respectively. Mr Bromham left Melbourne on December 7 in the Nella Dan to relieve Davis; Mr McInnes will sail in the Thala Dan on January 5 for Casey.

Mr McInnes, a 45-year-old school teacher, has a degree in geology from the University of Sydney, and was leader of the Casey party in 1970. In 1958 he took part in the Sydney-Hobart yacht race.

Mr Bromham, who is 33, has been a

senior scientific officer with the Victorian Country Roads Board since 1967, and has a physics degree from the University of Melbourne. He is in charge of the board's foundations investigations laboratory.

Mr Naylor, aged 40, managed his own cattle and sheep property in north-west Queensland until 1969. He has had extensive experience in geological and geochemical surveys, and recently returned from the United States where he conducted geological surveys.

Mr Rachinger, who is 51, was a fighter pilot with the R.A.A.F., and retired after 30 years' service, including a command in Thailand. He commanded the base squadron at Laverton, Victoria, before his retirement.

Two Queen's Scouts, selected from nominations by the Scout Association of Australia, sailed on the relief voyage to Macquarie Island last month, and assisted in the installation of the 1973 party. They were Mark Challen (17), of Mildura, Victoria, and Michael Fenton (19), of Sandy Bay, Tasmania.

JARE 14 PLANS

80-day inland traverse from Syowa in 1973-74

An 80-day inland glaciological traverse from Syowa Station towards the Yamate Mountains in the 1973-74 season, the launching of seven upper atmosphere sounding rockets next winter, and the temporary occupation of Mizuho, the small inland camp 185 miles south-east of Syowa, are among the planned activities of the 14th Japanese Antarctic Research Expedition (JARE 14) for 1972-74. Forty men of the expedition left Tokyo towards the end of last month aboard the icebreaker Fuji, which is commanded by Captain Fuyuki Maeda.

Leader of the expedition, and of the 1972-73 summer party, is Dr Kou Kusunoki, who is returning to the Antarctic for the fifth time. His experience with Japanese Antarctic research began in 1956-57 with JARE 1. He was acting leader of JARE 8 in 1966-67, winter leader of JARE 10 in 1968-70, and visited United States and New Zealand stations in February, 1968. Dr Kusunoki will be on board the Fuji with 19 men of the summer party for the whole of her cruise.

An upper atmosphere physicist at the University of Tokyo, Dr Takeo Hirasawa, will lead the 30 men who will winter at Syowa Station in 1973-74. He wintered at Syowa with JARE 8 in 1967-68, and joined the JARE 11 summer party in 1969-70 to take charge of the sounding rocket programme. He will supervise next year's winter rocket programme.

A South African meteorologist, Dr W. Hofmeyer, deputy director of the Weather Bureau, will join the summer party aboard the Fuji between Fremantle and Cape Town. Two Japanese scientists, Assistant Professor Yoshio Yoshida, a geomorphologist from Hiroshima University, and Mr Shyu Nakaya, a geochemist from Hokkaido University, will work in the dry valley area of the Ross Dependency with New Zealand assistance, and two or three others are

expected to participate in the programme.

The Fuji called at Fremantle early this month, and will be in the vicinity of Syowa about New Year's Day. Men and about 500 tons of cargo will be transported to the station by the ship's two Sikorsky helicopters. When ice conditions are favourable the ship will proceed to Syowa and unload heavy materials.

RETURN OF FUJI

Until the end of February the two expeditions will carry out the change-over. The formal change-over of the 13th and 14th expeditions is set for February 20. Thirty men of the JARE 13 winter party led by Mr Sadao Kawaguchi will embark on the Fuji for Cape Town. There they will leave by air for Japan. The Fuji will be at Cape Town from March 9 to 15, and then call at Singapore between April 4 and 9. She is due back at Tokyo on April 20.

Most of the JARE 14 scientific activity will be a continuation of last year's programmes. Field surveys in various scientific disciplines will be carried out near Syowa, and during the summer a new weather observation hut about 240 square yards in area will be erected.

Work aboard the Fuji will include physical, chemical, and biological oceanographic observations, and upper

atmosphere physics (radio wave propagation). Marine meteorological observations will be made by the ship's weather office.

During the summer several groups will be dispatched from Syowa to exposed rock areas and glacier areas to make studies in glaciology, geology, geomorphology, biology, and limnology. Ground control surveys for map making will also be conducted.

Observations at Syowa will cover meteorology, upper atmosphere physics, cosmic rays, ionosonde, seismology, geomagnetism, ocean tides, geochemistry, glaciology, and human physiology. The sounding rockets will be launched into the aurora during the winter darkness in 1973.

Mizuho Camp, established in 1970, will be occupied temporarily during the winter. The team there will conduct research in glaciology, meteorology, geomagnetism and medical science.

About eight or nine men will take part in the inland glaciological traverse between November next year and January, 1974. They will work mainly on a resurvey of strain grids and strain triangle nets installed in the summer of 1969-70 by JARE 10. This will contribute to the study of the ice budget and the ice sheet in the area from Syowa (69deg S) to 72deg S and the Yamato Mountains.

Mr Renji Naruse will lead the traverse party. He was a glaciologist with JARE 10, and a member of the 1969-70 traverse party.

Members of the 14th expedition are:

SUMMER PARTY (1972-73)

Dr Kou Kusunoki, leader (glaciology, oceanography); Messrs Toshimi Sugita (physical oceanography); Yoshiyuki Iwanaga (chemical oceanography); Kazunori Kuroda (marine biology); Noboru Sate and Shoji Togashi (survey); Dr Masaru Akiyama (biology); Messrs Shoza Kojima (geology); Kohachiro Kiriara (construction engineer); Masafumi Maruyama (logistics assistant).

WINTER PARTY (1972-74)

Dr Takeo Hirasawa, deputy leader (leader of winter party); Messrs Tsukasa

Kozuma and Tadayoshi Nakamura, and Hiroshi Jyobashi (meteorology); Ichizo Nishimuta (ionosphere); Masayoshi Takahashi and Yoshiaki Abe (geophysics); Shun'ichi Kobayashi (meteorology); Masaru Ayukawa, Hisashi Yabuuma, Masayuki Kuwajima (upper atmosphere physics); Junichi Hirabayashi (geochemistry); Kunie Omoto (geomorphology); Renji Naruse, Kotaro Yokoyama (glaciology); Seikichi Tsuboi (human physiology); Dr Hitoshi Hirane (surgeon); Messrs Kumio Shimano, Shigeo Ashima, and Masaki Kajikawa (rocket engineers); Sadao Takeuchi, Iwao Ishii, Shigeo Shiga, and Yashinori Murayama (mechanics); Sumio Matsuda, Hideshi Nishikage (radio operators); Nobutaru Iyama and Nobutaka Nemoto (cooks); Yasuo Takahashi and Kazuyuki Shiraishi (logistics assistants).



INTERNATIONAL PARK

An international conference on national parks has adopted a proposal that Antarctica should become the world's first international park. The proposal was put forward by Mr Nicholas Clinch, a past president of the American Alpine Club, and leader of the club expedition which climbed Antarctica's two highest mountains, the Vinson Massif and Mount Tyree, in 1966.

Mr Clinch told the conference that if Antarctica was established as a world park it would not be exactly overrun by tourists. He admitted that the Antarctic Treaty nations were already adhering very close to the world park concept.

Representatives of 90 countries attended the second world conference on national parks in Jackson, Wyoming. It was sponsored by the United States National Parks Service, the International Union for the Conservation of Nature, and the United States National Parks Centennial Commission.

French Forced to Terminate Wilkes Land Traverse

Continued mechanical trouble, difficult terrain, bad weather, and low temperatures, have forced the French scientific traverse party to terminate at the 400-kilometre mark the last stage of its 2000-kilometre two-year journey across Wilkes Land to the Soviet Vostok Station. Because of similar difficulties last season the party could not push beyond the 800-kilometre mark although plans were based on covering 1000 kilometres.

A signal was received on December 16 at McMurdo Station from Dumont d'Urville stating that the traverse had been terminated at the 400-kilometre mark because of trouble with the vehicles and very rough terrain. The party was "limping back" to its starting point, Carrefour, the small advance base 25 miles inland from Dumont d'Urville.

Spare parts for the vehicles were flown from Paris to Christchurch, and then taken to McMurdo Station by a United States Navy Hercules. They were included in an air drop made to the party on December 29.

The Wilkes Land traverse, which is the main scientific project in the French programme this season, is part of the International Antarctic Glaciological Project in which the participants are France, the United States, the Soviet Union, and Australia. The first French objective was to link Dumont d'Urville in Adelie Land with Vostok.

This season 16 men of Expeditions Polaires Francaises, led by the director, Paul-Emile Victor, left Paris on October 23. They flew from Christchurch to McMurdo Station in a United States Military Airlift Command Starlifter on October 31.

On November 2 the party was flown from McMurdo Station to Carrefour, the small advance base 25 miles inland from the main Dumont d'Urville base by a United States Navy Hercules. The same day Paul-Emile Victor and five men travelled in weasels from Carrefour to Dumont d'Urville.

Bad weather at Carrefour delayed preparation of the traverse vehicles and sledges left there last season. The ten men of the party led by Marcel Renard were unable to start the traverse until November 11.

The party reached the 200-kilometre mark on November 19. It was delayed by hard sastrugi four to five feet high and other surface difficulties.

On November 21 a United States Navy Hercules of VXE6 Squadron dropped supplies, mainly fuel, to the party by parachute. The journey was resumed from the 200-kilometre mark on November 27 after bad weather and temperatures down to minus 43deg Centigrade. After proceeding only 10 kilometres the party had to halt for repairs to a broken track on one of the vehicles.

BAD SURFACE

By December 2 the party was 310 kilometres from Carrefour. It was still moving on a bad surface, and reported more mechanical troubles.

Last season a United States Navy Hercules made a landing on the ice-cap to deliver fuel, fresh food, and mail, when the party had covered about 240 kilometres. It crashed on December 4 while making a jet-assisted take-off.

This season the party reported that the abandoned aircraft was still visible but half-buried under snow. The interior was in good order and condition.

The French research programme this season was to be a continuation of the work done in 1971-72, mainly from the

800-kilometre mark to Vostok and in the vicinity of a newly-discovered under-ice dome at the 1200-kilometre mark.

The Expeditions Polaires Francaises relief ship *Thala Dan* sailed at the beginning of the month from Hobart for Terre Adelie. Ice conditions in the Terre Adelie sector are rather unfavourable. A satellite report before the ship sailed revealed a belt of fast ice about 100 kilometres wide, and very compact pack ice some 250 kilometres to the north.

COUSTEAU NOW IN ANTARCTIC

Underwater explorer Commander Jacques Cousteau and his crew are now in the Antarctic. They have taken the oceanographic ship *Calypso* to the waters of the Antarctic Peninsula, and will remain there for more than a year.

Paul-Emile Victor, director of Expeditions Polaires Francaises, is a close friend of Cousteau. When he passed through Christchurch on his way south to Dumont d'Urville, he said that Cousteau's enthusiasm after taking the *Calypso* into the Bering Sea had prompted him to go to the Antarctic and work in what he considers to be "the least polluted ocean in the world."

When the *Calypso* sailed from Monte Carlo in September she carried a helicopter for short trips, aerial photography, and spotting whales, seals, and penguins. Other equipment includes a diving saucer, underwater cameras, television equipment, and a new type of special diving equipment for ice-cold water.

This time Cousteau and his crew plan to study the effects of abusive hunting of whales, and the chemical intoxications to which the most vulnerable warm-blooded animals are subject (blue whales, rorquals, humpback whales, right whales, grampuses, seals, penguins, and albatrosses.

Argentine Tourist Cruises

Tourist cruises to the Antarctic were pioneered by Argentina several years ago. This season the Argentine National Bureau of Tourism has arranged two tours to the Antarctic Peninsula in the Argentine Maritime Lines ship *Libertad*. The tourists will also call at Ushuaia, the most southerly city in the world, on the island of Tierra del Fuego, and Port Stanley, Falkland Islands, which are known to Argentina as the *Islas Malvinas*.

Captain Ismael R. Martinez will command the *Libertad*, which can carry 182 people, including the crew. On the first cruise from January 7 to January 20 the tourists will sail from Buenos Aires first to Port Stanley. Then the *Libertad* will cruise among the islands off the Antarctic Peninsula. The itinerary includes calls at the scientific station *Almirante Brown* in Paradise Bay, and the *Melchior Islands* where there is an Argentine naval detachment. The ship will then proceed to Ushuaia, and after some time ashore the tourists will return to Buenos Aires in an *Aerolineas Argentinas Boeing*.

The second cruise from January 20 to February 2 will be similar except that the sea and air journeys will be reversed. Tourists will fly first to Ushuaia where they will board the *Libertad* for the Antarctic Peninsula part of the cruise. Then the *Libertad* will proceed to Port Stanley, and finally Buenos Aires.

Fares for the cruises range from \$230 to \$880 dollars a person, according to the type of cabin aboard the *Libertad*, and whether it is inside or outside. In addition to the attractions of ice, snow, mountains, penguins, and seabirds, the tourists will have ship-board entertainment and scientific lectures.

SANAE 14

Large winter team at Borga Base this Year

South Africa's 14th Antarctic expedition will sail in the research ship RSA for Sanae Base in western Queen Maud Land from Cape Town on January 6, and is expected to arrive no later than January 20. This season SANAE 14 will have its largest winter team at Borga Base 235 miles south in the Borga Massif. Six men will leave for the base as soon as possible after the arrival of the RSA.

The 1972-73 team of 22, which will be led by Mr S. A. Rees, will include the SANAE 13 surveyor, Mr R. Sevcik, who will stay on for a second term. Team training in Pretoria was completed on December 14. It included first-aid, fire-fighting, survival techniques, and lectures on the Antarctic. Every man had to learn to cook because there is no full-time chef at Sanae Base.

Two geologists, a surveyor, two mechanics, and a technician will man Borga Base. The technician will be responsible for radio echo sounding, and communications with Sanae Base.

TWO NEW VEHICLES

Two new tracked vehicles will be sent south in the RSA next month. One has hydrostatic transmission, and the other automatic transmission, making use of a six-cylinder Deutz diesel engine. One vehicle is of South African design. The Antarctic Division of the Department of Transport hopes to submit a report on the performance of these vehicles for publication in a later issue of "Antarctic."

The seven men of the meteorological team on Gough Island were relieved by the RSA in October. On its normal relief voyage the ship called at Tristan da Cunha on behalf of the British Government and landed supplies ordered by the islanders.

A team from the Department of Public Works did the necessary maintenance to the various buildings on Gough Island.

It also enlarged the existing store and added a small emergency base to it.

Five South African biologists will leave Cape Town this month for Marion Island aboard the French supply ship Gallieni, which is en route to the French Antarctic and sub-Antarctic stations. The party will be led by Mr J. U. Grobelaar, of the University of the Orange Free State.

Some of the biologists will stay on the island for four months until the annual relief voyage by the RSA in April. Others will remain for another year to make full use of the new biological laboratory which was erected earlier this year.

Professor E. M. van Zinderen Bakker, programme director of the South African Antarctic biological programme, will accompany the RSA in April. This will be his first visit to the island since the highly successful biological and geological reconnaissance during 1965-66. He was responsible for the expedition's report, "Marion and Prince Edward Islands," and hopes to go to the seldom-visited nearby Prince Edward Island.

Mr J. G. Nel, who was leader of SANAE 12 when the new Borga Base was erected, will accompany the British Antarctic Survey team to Halley Bay where a new base is to be built. Mr Nel, who is attached to the Antarctic Section of the Department of Transport, will leave early next year. He expects to study any new ideas in base construction.

SUB-ANTARCTIC

MACQUARIE ISLAND FLORA ENDANGERED BY RABBITS

Rabbits introduced by the sealers many years ago are now endangering the flora on Macquarie Island in the sub-Antarctic. When the Australian National Antarctic Research Expeditions' 25th season of Antarctic operations began last month one of the passengers on the *Nella Dan* which took the relief party from Melbourne was an officer from the Tasmanian Department of Agriculture. He will spend two months on the island to continue the long-term rabbit control project.

The leader of the annual relief operation was Mr G. McKinnon, geographic officer, Antarctic Division, Ministry of Supply. Mr J. Steel, of Melbourne, led the 1973 party of 17, who will carry out research in geophysics, upper atmosphere physics, biology and medical science, and collect meteorological data.

Other passengers aboard the *Nella Dan*, commanded by Captain F. Larsen, an experienced Arctic and Antarctic sea captain, were Mr W. B. Caldwell, director of the Tasmanian Lands Department, Mr P. Murrell, director of the Tasmanian National Parks and Wildlife Service, Mr M. G. Duncombe, secretary of the Macquarie Island advisory committee, and two Scouts, selected on a national basis.

Cargo was unloaded at the station by a nine-man Army detachment led by Captain G. Leadsman, of Sydney. They used three amphibious vehicles.

The *Nella Dan* returned to Melbourne on November 30 with the 16 men of the 1972 party who have spent a year on the island, including Dr R. Waterhouse who had spent a year at Davis before accepting his post.

Eight Gentoo penguins, which abound on Macquarie Island, were brought back by the *Nella Dan*. They will go to the Melbourne Zoological Gardens.

Many short-term projects will be carried out by the expedition. Members of the Antarctic Division will continue biological studies during the change-over. Taking part were seven scientists

nominated by the Tasmanian State Government—a geologist and two geographers from the University of Tasmania, two geophysicists from the University of New South Wales, and two botanists from Melbourne University.

Three days before the relief expedition sailed from Melbourne a member of the winter party, who had spent about a year on the island, died suddenly. He was a 33-year-old radio operator, Mr K. Andrews, of North Balwyn, Victoria. Mr Andrews reported sick to the medical officer on the evening of November 11, became unconscious shortly afterwards, and died within the hour.



CARETAKERS AT CAPE ROYDS

Two members of the New Zealand Antarctic Society returned this month after two weeks as caretakers at Cape Royds. It is the fourth successive season that the society has sent caretakers to the Antarctic under the auspices of the Antarctic Division, Department of Scientific and Industrial Research.

This year both the caretakers were named Wilson. Mr P. L. Wilson is a 68-year-old dental technician from Wellington, who has been a track and cross country runner for 50 years. Mr V. J. Wilson, who is 60, is a retired clinical psychologist, and has been an amateur radio operator for many years.

SOVIET NEWS

New Station on Hobbs Coast Major Project This Season

Establishment of a new station—Russkaya—at Cape Burks, on the Hobbs Coast of Marie Byrd Land, will be one of the major projects of the 18th Soviet Antarctic Expedition this season. Russkaya, the sixth coastal station established by the U.S.S.R., will operate all the year round. It has been named in honour of the Russian seamen who sailed with Bellingshausen and Lazarev in the *Mirny* and *Vostok*.

More than 700 scientists, seamen, airmen, builders, and other specialists will take part in the programme of exploration and research planned by the Arctic and Antarctic Institute, Leningrad. The expedition is headed by Mr P. Senko, a well-known polar explorer, who has taken part in five Antarctic expeditions. The first group of scientists sailed for the Antarctic in the Professor Zubov at the beginning of last month.

This season Soviet scientists will continue the investigations carried out by their predecessors on the coast and in the central regions of the Antarctic, and in the waters of the Southern Ocean. They will perform a wide range of meteorological, geophysical, glaciological, and other investigations, and also launch rockets to probe the upper atmosphere.

Geologists, geodesists, geophysicists, and other specialists, will resume their exploration of the mountains inland from the MacRobertson Coast near the gigantic Amery Ice Shelf. The complex research programme, which includes deep seismic probing of the Antarctic ice-cap, will be headed by Mr D. Solovyov. He has taken part in nine Antarctic expeditions, and is the author of several works on the geology of the continent.

Another experienced polar explorer, Mr V. Piguzov, will head the construction team at Russkaya. Man has never set foot in the desolate, almost inaccessible, and poorly studied Hobbs Coast region. When the new station is established,

Soviet scientists will be able to learn more about the nature of West Antarctica, and compare the data they obtain with information from opposite points of the continent.

Joint research will be conducted by Australian, British, Soviet, American, and French scientists in the International Antarctic Glaciological Project. A Soviet traverse with tracked vehicles and sledges will be made from the coast in the direction of the South Magnetic Pole. During the traverse glaciological, magnetic, and other observations will be made, and the ice-cap will be studied by drilling, radar, and seismic probing.

Modern scientific instruments, aircraft, helicopters, and powerful caterpillar tracked vehicles, have been provided for this season's expedition. A Minsk-32 electronic computer will be delivered to Molodezhnaya, the meteorological centre on the coast of Enderby Land. This will enable scientific data to be processed on the spot. Aircraft will be operated under the control of an experienced Arctic and Antarctic pilot, Mr P. Moskalenko.

Soviet scientists will co-operate with other expeditions and exchange scientific information with them. A United States exchange scientist, Dr Edward Grew, will spend the winter at Molodezhnaya. He is a geologist from the University of Wisconsin, and will study ancient rocks that have undergone extreme heat, pressure, and chemical changes, in the general area of the station.

ANTARCTIC WEEK CELEBRATED

Antarctica is less than 2500 miles away from Christchurch in the minds of its citizens. They have memories of the departure of Scott and Shackleton from the port of Lyttelton, and have had a close association with the United States Navy's Antarctic support force since 1955.

In past years the city has celebrated Antarctic Week at the beginning of the Antarctic summer season. Antarctic Week was observed again in October this year after a break of five years. It was organised jointly by the support force, the Antarctic Division, Department of Scientific and Industrial Research, the United States National Science Foundation, and the Canterbury branch of the New Zealand Antarctic Society.

In a formal proclamation of the week on October 16 the Mayor of Christchurch (Mr N. G. Pickering) referred to the city's historic link with expeditions of the past, and the co-operation between Americans and New Zealanders working in the Antarctic.

Special Antarctic displays were featured in city stores to mark the week, an essay competition, the subject being the Antarctic Treaty, was held for schools, and the band of the United States Navy's Pacific Fleet made a special visit to play at various functions.

The premiere of a German-made film "Antarctic—Continent for Science," and music by the Pacific Fleet band were features of a civic evening during the week. Representatives of the Antarctic Division, the support force, and the National Science Foundation, all emphasised in their speeches the importance of international co-operation in the pursuit of scientific knowledge on the Antarctic Continent, and the significance of the Antarctic Treaty as a model for peaceful international co-operative efforts.

Antarctic Week ended with an open day at Christchurch Airport. Between 15,000 and 20,000 visitors saw a parachute descent from 10,000ft by three members of the United States Navy para-medical team which has been based in the Antarctic this summer, and

there were long queues all afternoon waiting to inspect Military Airlift Command Starlifters and VXE6 Squadron Hercules aircraft.

Antarctic relics, photographs, and literature were displayed by the Canterbury branch of the New Zealand Antarctic Society, and tents, ration packs, clothing, a scale model of Scott Base, and a variety of equipment were included in displays by the Antarctic Division and the National Science Foundation.

For the children the most popular attraction was snocat Able, one of the vehicles used by Sir Vivian Fuchs and his party on their crossing of Antarctica in 1957-58. The snocat, left at Scott Base and used there for 13 years, is in storage until it can be displayed in the Canterbury Museum. It rumbled to new life over grass instead of ice, carrying hundreds of children. In addition Antarctic Division drivers towed hundreds more on sledges behind motor toboggans.

NEW PRESIDENT OF SOCIETY

The new president of the New Zealand Antarctic Society is Mr J. A. Cross, of Christchurch. He has been treasurer of the Canterbury branch for several years. Mr G. W. Markham, of Wellington, a former superintendent of the Antarctic Division, D.S.I.R., is the new vice-president.

Other national officers elected at the annual meeting of the council of the society were Mrs B. Hale, secretary, and Mr R. G. McElrea, treasurer, both of Christchurch.

The council adopted a resolution that the society should become incorporated.

INDIAN SUBSCRIBER AT BASE IN ENDERBY LAND

"Antarctic" has readers in Britain, the United States, the Soviet Union, Japan, South Africa, Australia, Argentina, France, Chile, Norway, Belgium, and West Germany. Now it has a reader in Enderby Land—an Indian scientist who has wintered at Molodezhnaya, the main Soviet station in the Antarctic.

Most subscribers to "Antarctica" have their copies sent by surface or air mail. Mr Parljit Singh Sehra, of the Physical Research Laboratory, Ahmedabad, who is believed to be the first Indian to spend the winter in the Antarctic, had his copies—60 of the 66 issues of the quarterly bulletin—sent from Christchurch to Moscow by air freight, and then by sea from Leningrad to Molodezhnaya.

Recently the Editor received a request from Mr Sehra, relayed by radio from Molodezhnaya through McMurdo Station and Scott Base, seeking to join the New Zealand Antarctic Society and subscribe to "Antarctic." He added that he would appreciate all available back issues of the bulletin, and its predecessor, "Antarctic News Bulletin."

Mr Sehra asked that these be sent by air mail and registered post to Moscow

in time for them to be placed aboard the first Soviet ship due to leave Leningrad for the Antarctic early last month. When the Editor found how much it would cost to send 60 issues of "Antarctic" (all that were available) to Moscow, he sent a radio message back to Mr Sehra to make sure he still wanted the bulletins sent air freight. Back came a reply that he was, in effect, quite happy about the cost.

Mr Sehra's large and expensive parcel is expected to reach him this month. He is a member of the 17th Soviet Antarctic Expedition, and is studying for a doctorate in upper atmospheric physics. His field is the structure and circulation of the upper atmosphere, and he has been taking soundings of this area with the aid of meteorological rockets.

Hay, Straw, Ice for Wharf

Bales of New Zealand hay and straw have been tested for use as building materials at McMurdo Station this season. If the tests are successful a new wharf will be built in Winter Quarters Bay, using water frozen round a wall of hay bales, rather like straw in mud bricks.

Ice-bound hay bales outside Scott's hut at Cape Evans inspired the idea of the hay bale wharf. This hay was part of the fodder taken south in the Terra Nova to feed the ponies used on Scott's last expedition.

Shoaling and storm damage last year to the timber and steel wharf at Elliott Quay has made an alternative wharf necessary. The new wharf will be 400ft long, 80ft wide, and 24ft thick, and will

need 800 bales of hay and straw. Bales will also be placed along the top of the ice wharf to insulate the ice and stop it from melting in the warmer weather of the Antarctic summer.

The test bales, 460 of them, will be stacked into a 45ft square block 15ft thick and pinned together with bamboo stakes. Lengths of chain mesh fencing will be used to bind the whole together, and the cube will be flooded with water in such a way that layers of ice about 4in thick will be built up through and round the bales.

Before the bales were flown south last month they were tested to check that their contents were non-toxic in order to protect wildlife which might get at them.

THE READER WRITES

Sidelights of Antarctic Research

Letters, preferably not longer than 500 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 ARCHER

One of our American readers, Amory H. Waite, has answered the questions raised in "Antarctic" (June, page 189) by the presentation of a hunting arrow from Rear-Admiral R. E. Byrd's 1933-35 expedition to a New Zealander by his second-in-command, Dr Thomas C. Poulter. We wanted to know who was the Antarctic archer who took a bow and arrow to Little America aboard the Bear of Oakland.

* * *

46 Monmouth Boulevard,
Oceanport, New Jersey.

Sir,—On page 189 you make a big mystery of the archer in BAE 11. The expedition was equipped with many items of gear for use in maintaining a standard of health, exercise, and sport for all hands! Footballs, baseball gear, fencing foils and mask, etc.

I was the last man to join the ice party, having been chosen from my job as chief radio operator of the Bear of Oakland only because (1) the "electrician" of the ice party decided to go back to Dunedin to marry his new girl friend, which he did, leaving the expedition without an electrical officer, and (2) when the fire in the tractor destroyed one-third of our total transport I was able to rebuild the generator and starter and get her going again.

So I was ordered to the "beach" by the Admiral. Thus I joined the famous (or infamous) group so tardily that it took me a long time to catch up with the list of stores that others had provided for the common good.

It was almost winter before I became aware of an archery range set up in the camp where many of us practised often, using indoor target arrows. However, Dr Poulter, who ran the range and taught newcomers how to use the bows, also had some hunting arrows (sharp metal tips) and used them on at least one occasion that I remember to shoot the Weddell seals we used for dog feed. (We humans ate a few crabeaters also.)

Dr Poulter was the custodian of the archery gear at Little America II but I never knew that any of it was ever on the Bear of Oakland. He went down on the Jacob Ruppert and returned on it in 1935—Yours, etc.

AMORY H. WAITE, Jr.

(We are grateful to a distinguished Antarctic veteran for his identification of the archer and the arrow. "Bud" Waite is still remembered by an earlier generation of New Zealanders as the radio operator in the group of three men who travelled for 72 hours in the 70deg below zero weather to rescue Admiral Byrd from his Advance Base on the Ross Ice Shelf in 1934. His polar experience includes 11 Antarctic expeditions, and participation in 12 Arctic scientific programmes over a period of 31 years. When "Bud" retired in 1966 after 24 years' service with the Department of the Army, he had become widely known as an explorer, inventor, electronics engineer, lecturer, and author. His achievements as an electronics engineer included the invention of an accurate polar altimeter, and the development of a radio echo sounding system for measuring ice thickness.—Editor.)

ANTARCTIC BOOKSHELF



THE VOYAGE OF THE CHALLENGER

By Eric Linklater

Published by John Murray, London, 1972

288 pp. Illustrations and maps, index. English price, £5.00.

By the middle of the 19th Century all the land surfaces of the earth, with the exception of the Antarctic regions had been explored and delineated and their natural products and their fauna and flora were fairly well known.

This was far from being the case with the surrounding oceans, whose depths still remained a mystery and about which some strange ideas still persisted. For example Edward Forbes, professor of natural history at Edinburgh University postulated the theory that life did not exist in the ocean at a greater depth than 300 fathoms.

This theory was soon to be destroyed by another professor of natural history at the same university—Charles Wyville Thomson, who saw in Norway living specimens of animal life dredged up from the immense depths of dark Norwegian fiords. Furthermore, he learnt that a broken telegraph cable brought up for repair from a thousand fathoms deep in the Mediterranean had living animals clinging to it.

With Dr W. B. Carpenter, of the Royal Society, Thomson borrowed ships from the Admiralty and by deep sea dredging discovered animal life from protozoa to molluscs at a depth of two thousand fathoms. In 1870 Thomson persuaded the Government to lend and furnish one of Her Majesty's ships for a prolonged and arduous voyage of exploration across the oceans of the world. Thus was born the Challenger expedition, the subject of this new book.

H.M.S. Challenger sailed from Portsmouth exactly 100 years ago, on December 21, 1872, on an epoch-making voyage that would take her 69,000 miles across the oceans and would last for

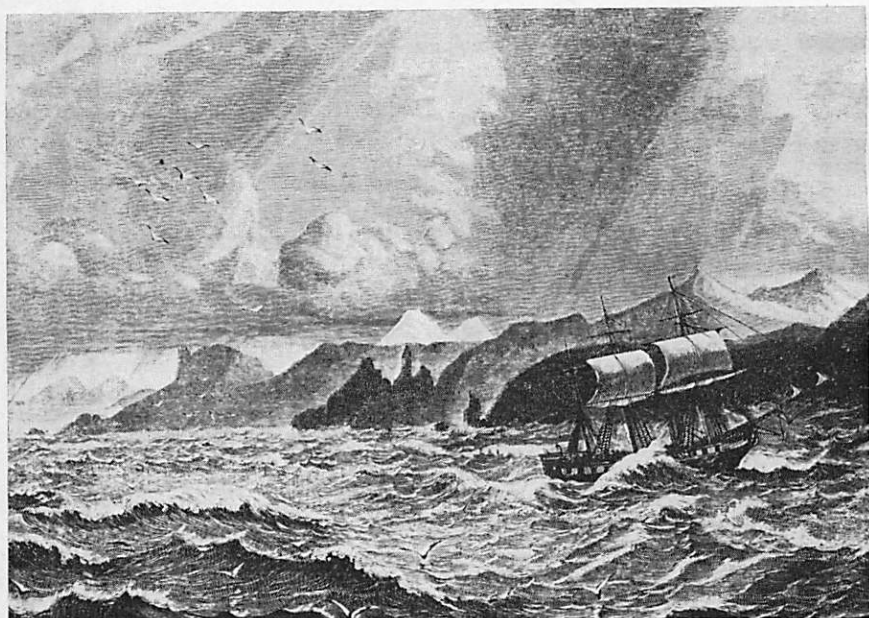
three years and a half. Her aim was to chart the depths, movement and content of the seas and to scour the oceans for marine life, for clues to climatic phenomena and to search for minerals. She was commanded by Captain George Nares, later to win fame in the Arctic regions, and on the scientific side besides Wyville Thomson there were John Murray and H. N. Moseley. It is worth noting here that in later years when he had achieved fame and a knighthood it was Murray who paid for the publication of the 50 massive volumes that record the Challenger's findings.

The ship was equipped with the most up-to-date sounding and dredging apparatus available and besides carrying out some 362 deep sea stations she called at many ports around the world, often for lengthy stays.

This then is the bare bones of a voyage which was to give rise to the new science of oceanography, and from the many published accounts Eric Linklater has distilled a narrative that is no dry as dust account, but a lively and entertaining record of remote people and places.

The Antarctic section of the voyage is covered in a mere six pages although there are two chapters devoted to the sub-Antarctic islands of Prince Edward, Marion, the Crozets, Kerguelen and Heard. It is worthy of record that on February 16, 1874, the Challenger became the first steam vessel to cross the Antarctic Circle, reaching a latitude of 60deg 40min S. Although no land was sighted much ice was encountered and the first photographs were made of the typical tabular Antarctic icebergs.

From rock fragments dredged up it



Cape Challenger, Kerguelen Island, with Mount Ross in the distance. H.M.S. Challenger is on the right of the picture.

was very evident that they were of continental origin as gneisses, shales and limestones do not occur on any oceanic island. It can be said then that the Challenger's voyage did much to reawaken interest in the Antarctic and to bring about the great expeditions at the beginning of the twentieth century.

The book is well illustrated, the 28 pages of colour pictures being particularly well chosen. Many of the black and white pictures are from photographic

plates made on the voyage, some being reproduced for the first time.

All of the many narratives which were written after the conclusion of the voyage have been long out of print or now command high prices. It would be safe to say therefore that today few people are aware of this historic scientific voyage a century ago, and this finely produced volume should serve most effectively to fill the gap in our knowledge.—H.F.G.

ADEQUATE EARTH

A poem by Donald Finkel

Published by Atheneum, New York, 1972. pp. viii and 1-51. Glossary.

Soft cover. U.S. price \$2.95

It was bound to happen sooner or later, that someone would set down his Antarctic thoughts and experiences in blank verse. This is what Donald Finkel has done in this little book. It is not

surprising that the lonely places of the earth should bring out the poetry that lies deep in every man. Mountaineers have felt it; one recalls Geoffrey Winthrop Young's "On High Hills". Sir

Ernest Shackleton felt it; there are several pages of his verse in his biography by Margery and James Fisher. Edward Wilson, who died with Scott, wrote that fine poem "The Barrier Silence" which still has the power to move.

Donald Finkel is on the faculty of Washington University, St Louis, where he is poet in residence. He accompanied a scientific expedition to the Antarctic in 1970 and fell under the spell of the frozen continent. Referring to his book he says in his notes: "This is not a work of scholarship but of the imagination. These precious scraps culled from sledging journals, memoirs, histories and technical articles are intended simply as lights in a constellation of which my own observations form an integral part."

"These precious scraps" scattered throughout the book are taken from Scott, Amundsen, Shackleton, Cherry-Garrard, Oates and Byrd, even a National Geographic map.

Of the winter journey to Cape Crozier by Cherry-Garrard, Wilson and Bowers, the author writes:

*Three ragged figures, windclothes stiff
As a statue's overcoat, pulling like
dogs*

*in the dead dominion, in the dead of
night,
of winter, peering from under our iron
balaclavas, across the ice that clings
to the world's face, like a frozen beard.*

And of Scott's attainment of the Pole:

*"The goal behind us, every direction's
back; nowhere to go but home,
Horizon unbroken every way
we look. The same eight hundred
miles to go; no one to cheer us
but the wind; nothing we have not
seen before but death—and even
his face is familiar."*

There are adequate notes and a glossary of Antarctic references.

To sum up, you need not have been to the Antarctic to appreciate this book, but it will enhance your enjoyment of it if you have.—H.F.G.

PUBLICATIONS RECEIVED

Reports on Progress in Physics, Vol. 34, 1971. 70 pp. Glaciers and Other Large Ice Masses, by W. F. Budd and U. Radok. Published by Institute of Physics, London. Single issue. U.K. price £2.00.

Plastic Legs on Ice

A New Zealand geologist, Mr J. H. Lowery, who lost a leg and his other foot by amputation after falling 100ft down a crevasse in 1959, is now working near Vanda Station in the Wright Valley, about 70 miles west of Scott Base. He is believed to be the first person with artificial legs to do rugged work on the ice.

Mr Lowery, who is 35, is so fit, fast, and sure of his footing that he sometimes leaves able-bodied mountaineers behind. He has a spare set of plastic legs with him, and has left another set with the Antarctic Division of the D.S.I.R. in Christchurch.

In 1959 Mr Lowery was with a geological and survey party exploring about 180 miles from Scott Base on the Ross Ice Shelf. On November 19 he was in a snocat with Dr B. M. Gunn and Lieutenant T. Couzens about 15 miles south of Cape Selborne. Their snocat plunged without warning into a crevasse about 9ft wide which was completely covered by drifted snow.

Lieutenant Couzens was killed in the accident. Dr Gunn and Mr Lowery were trapped in the snocat, and were brought to the surface more than 27 hours later. Mr Lowery suffered a severe spine injury and a fractured jaw, and was badly frostbitten. He spent a long time in hospital, and his right leg was amputated below the knee. Later he returned to Otago University and completed his degree.

"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 for non-members of the Antarctic Society 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, 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

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.

New Zealand Secretary

Mrs B. Hale, P.O. Box 1223, Christchurch.

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