ANTARCTIC

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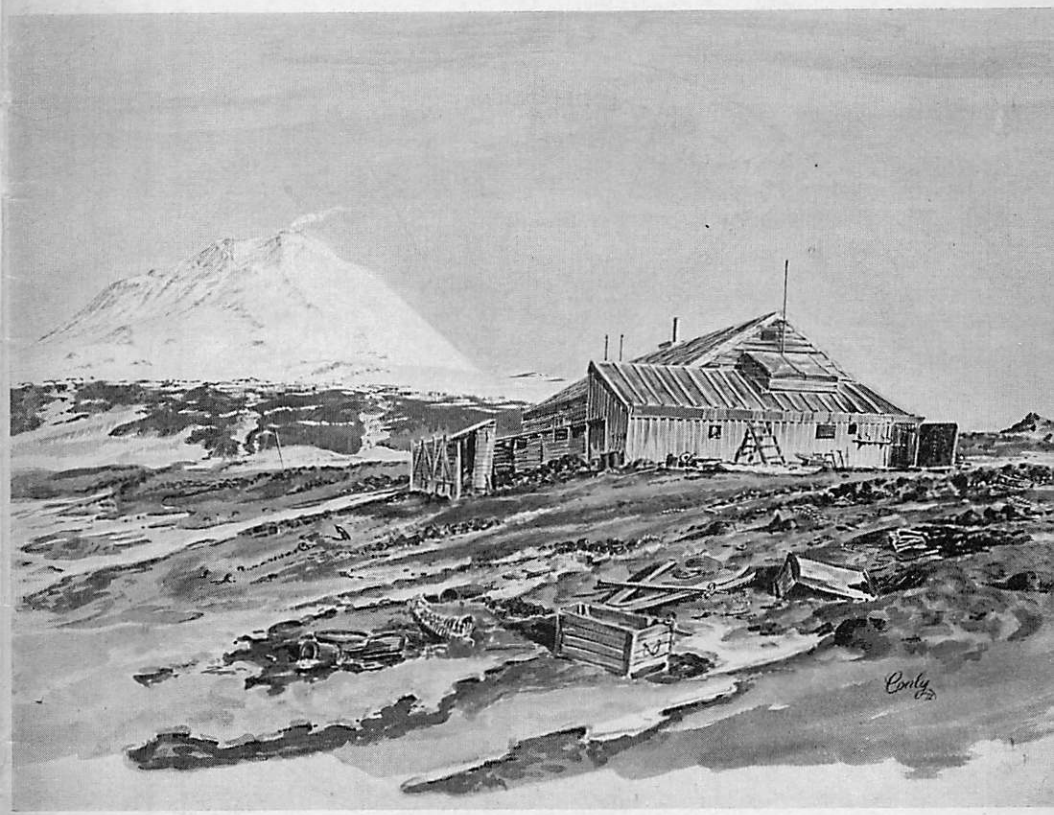
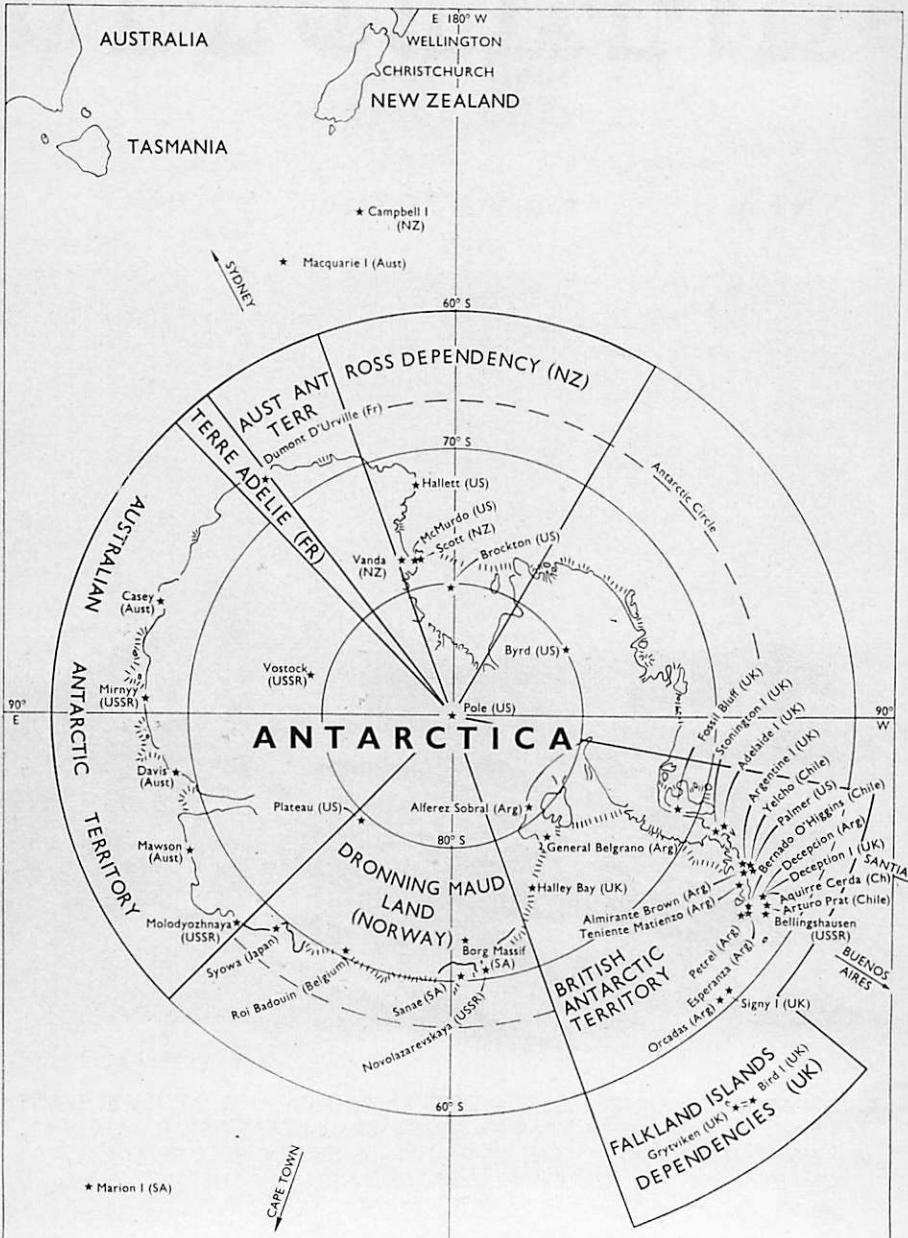


THIS WATER COLOUR OF SCOTT'S LAST EXPEDITION HUT AT CAPE EVANS WAS PAINTED EARLY THIS YEAR BY A NEW ZEALAND ARTIST, R. M. CONLY. HE FLEW SOUTH TO DO A SERIES OF PAINTINGS ON THE ROLE OF THE ROYAL NEW ZEALAND AIR FORCE AND NEW ZEALANDERS IN THE ANTARCTIC.

Vol. 6, No. 5 **March 1972**



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CONTENTS

ARTICLES

FRANK WILD: INCURABLE ADVENTURER 162
MUSEUM HONOURS 'A VERY GALLANT GENTLEMAN' 172
SUMMER CARETAKERS 176
ANTARCTICA OBSERVED BY N.Z. PAINTER 178

POLAR ACTIVITIES

NEW ZEALAND 146, 147, 148, 149, 150, 151, 152, 153, 177
AUSTRALIA 154, 155, 169
U.S.A. 156, 157, 171, 183, 184
UNITED KINGDOM 158, 159, 160
U.S.S.R. 167, 168
FRANCE 169
SOUTH AFRICA 170, 183
JAPAN 174, 184

GENERAL

PHILATELY 161
TOURISM 175
OBITUARY 180
ANTARCTIC BOOKSHELF 181

Publication of this issue coincides with the 60th anniversary of the loss of Scott's party on its return march from the South Pole.

We have noticed the occasion in several ways: Our cover picture is from a recent painting of the hut at Cape Evans from which the Polar team set out on the journey which was to end in tragedy; we feature an article on Frank Wild, who served under Scott in the Discovery expedition, 1901-04; and we direct attention to a museum in England which honours the gallant Captain Oates.

Busy summer season at Scott Base and Vanda

A successful meteorological programme at Vanda Station, continuance of upper atmosphere studies at Scott Base, installation of a wet laboratory for the University of Canterbury at Cape Bird, and establishment of a refuge hut at the lower end of the Wright Valley, were among summer season activities of New Zealand Antarctic Research Programme teams. In a report last month Major J. R. M. Barker, leader at Scott Base, says the weather generally has been good, and has allowed a busy programme to be completed, although with fewer men than usual.

This season another scientific programme was added to the list when equipment was installed at Scott Base to receive very low frequency signals induced by electric storms in the ionosphere. The programme was to have been initiated at Siple Station during the summer, but as the station will not be manned this winter, the equipment has been installed at the base for 12 months.

Much work has been done round the base to improve the storage of supplies, and base buildings have been improved and renovated. Three 8ft by 8ft huts were prefabricated in the garage, and then dismantled and flown by helicopter to sites in the field where they were re-erected, tied down and painted.

One hut was placed at the lower end of the Wright Valley as a refuge hut, and another was placed at Cape Bird for use as a wet laboratory by the University of Canterbury marine research unit. The third was rebuilt at Vanda Station to house the small generators.

The dogs at Scott Base have continued to thrive and have had some use this season, when they took a survey party on to the Ross Ice Shelf to resite snow movement markers. They have also been used extensively by base staff for recreational runs.

Vanda Station has been manned during the summer, and a successful meteorological programme was carried out. The hydrological and glaciological party working at Vanda and in the Asgaard Range completed its work on the river flow into Lake Vanda, and on the movement of three glaciers in the mountains overlooking the lake.

A Japanese exchange party again spent a useful season carrying out geochemical studies of Lake Vanda. It was also able to visit other lakes in the dry valleys for similar work.

Two Austrian documentary film-makers, Mr Rheinhold Materna and his brother, Dr Walter Materna, spent most of the season at Scott Base. They made a documentary film of all the scientific and base activities which take place in summer.

United States air support for the New Zealanders changed in pattern this season. Most of the resupplying of Scott Base was done by Starlifters, leaving only a small quantity of cargo to be brought in by sea at the end of the season.

The change to twin-turbine helicopters by the Navy's VXE-6 Sqaudron meant that the New Zealanders had to spend some time becoming accustomed to the change in loading technique. But when this was achieved, the normal excellent co-operation with the helicopter crews was achieved.

VISITORS AND BRIDGE

Vanda Station was closed for the winter on February 9, and the leader, Mr C. Johnson, returned to New Zealand with memories of four months of a never-ending stream of visitors, warm

temperatures, excellent food, and pleasant evenings of bridge. Before he came to New Zealand in 1962 he spent four years with the British Antarctic Survey, two of them at Halley Bay where mail arrived once or twice a year, and there was nothing but tinned food.

Life at Vanda Station was very agreeable, according to Mr Johnson. The meals were nothing short of excellent, there was plenty of fresh food, and mail arrived every week. The maximum summer temperature was plus 6deg C. Normally it would be zero or minus one degree C.

Messrs Johnson, D. Davidson, B. McGuire and R. W. Thornton played bridge almost every night. Two of the team could play, and they taught the other two.

The men had no time to get bored, and often felt that the station was more like a motel-cum-coffee bar. They had periodic visits from Japanese scientists, men from the dry valley drilling project, and American and New Zealand parties.

SCIENTIFIC WORK

The glaciology and hydrology team working from Vanda was in the field from October 28 to February 9. All the planned projects were completed successfully by Messrs J. Hawes (glaciologist-hydrologist), W. R. Thompson (hydrologist) and L. K. Cairns (surveyor).

Mr Hawes reports that a levelling traverse was carried out from the lower Wright Valley across the Wilson Piedmont to the Bay of Sails to complete data for an accurate (above sea level) height for Lake Vanda and its environs: The height is now set at 310ft.

The Onyx River arrived with a rush on November 29, one week earlier than in the two previous seasons. The peak instanteous discharge for the season (200 cusecs) was recorded during the first week. Flow then settled down to a mean daily flow of about 20 cusecs. After a very gradual recession the river ceased flowing over the weir at midnight on February 8.

During the summer the Lake Vanda water level rose about 2ft, and a very large moat formed. Mr Hawes made several wet suit dives from the raft of 44-gallon drums built by the New Zealanders and Japanese to retrieve undisturbed cores of sedimentary deposits. These will be used to correlate the amount of sediment deposited in previous years with the flow of the Onyx.

All major lakes were visited at the beginning and end of the season to record local changes. Climate screens were also installed at Lakes Bonney and Vida.

The Jeremy Sykes, Alberich, and Heimdall Glaciers in the Asgaard Range were surveyed twice for mass balance figures. Visual observations indicate positive balances this year. Photo-theodolite mapping of selected glaciers was continued to detect any margin fluctuations.

POLAR MEDALS AWARDED

Captain T. Woodfield, master of the Royal Research Ship Bransfield, and previously in command of the R.R.S. John Biscoe, is among 12 members of the British Antarctic Survey who have been awarded the Polar Medal for outstanding services. His award is for service in the period 1955-68.

The John Biscoe is remembered by New Zealanders as the first H.M.N.Z.S. Endeavour. It took Sir Edmund Hillary and his party south in 1956, and was the New Zealand Antarctic support ship until 1962.

The other B.A.S. men who have been awarded the Polar Medal for service between 1963 and 1965 are: Dr G. T. Bowra (medical officer), M. Fleet, R. R. Horne, L. M. Juckes, A. F. Marsh, M. R. A. Thompson, R. Worsfall (geologists), D. R. Jehan (meteorologist), H. M. O'Gorman (wireless operator), R. G. B. Renner (geophysicist), and R. F. S. Stocks (builder).

MAJOR FOSSIL FIND IN VICTORIA LAND

A discovery of major importance—fossils in Northern Victoria Land, an area of Antarctica where no marine fossils have been found before—was made in the Evans Neve area this season by a geological party from the 16th expedition sent south by the Victoria University of Wellington. Another party, working in the Boomerang Range, about 150 miles west of Scott Base, dug out of Shapeless Mountain probably the most varied collection of fossil plants yet found in the Trans-Antarctic Mountains.

The most important fossils found by the Evans Neve party were brachiapods (shell-fish similar to some bivalves) and trilobites (primitive extinct arthropods like wood lice). They were discovered on a bluff of the north side of the Mariner Glacier eight to ten miles south-west of Mount McCarthy in the Bowers Group rock sequence.

Dr M. G. Laird, of the Geological Survey, who led the party, says a preliminary study suggests a Late Cambrian (about 500 million years ago) for the upper part of the Bowers Group. This shows that the Bowers Group forms the northernmost portion of a marine basin which extended for at least 1850 miles across the Antarctic Continent along the line of what are now the Trans-Antarctic Mountains. The basin almost certainly spread into South Australia, and is evidence that the Australian and Antarctic continents were once adjacent.

FERN-LIKE PLANTS

Dr P. J. Barrett, leader of the other VUW party, who has been appointed director of the university's new Antarctic Research Institute, says in his report that the Shapeless Mountain fossils included large slabs of silstone with entire fronds of pteridosperms (seed-bearing fern-like plants), and many smaller fern-like leaves of several varieties. In addition there were very abundant primitive gingko leaves, and bamboo-like stems, of which the "horse-tail" is the only modern equivalent. Several tree trunk impressions nearly 10ft long lay exposed on sandstone surfaces.

Previous work by New Zealand and United States geologists indicates, says Dr Barrett, that the lens in which the plants were found was 200 million years ago part of a swamp on a flood plain at least 497 miles long.

TOBOGGAN TROUBLE

The Evans Neve party consisted of Dr Laird, Dr P. Andrews, also of the Geological Survey, and Messrs P. Kyle and P. Jennings. Its main aims were for Mr Kyle to examine and sample McMurdo volcanic rocks on Mount Overlord and on the Pleiades, and for Drs Laird and Andrews to study exposures of the Bowers Group. A subsidiary aim was to make a geological reconnaissance of the previously unvisited southern Salamander Range, and of the nunataks in the northern half of the Evans Neve.

A United States Navy Hercules flew the party from McMurdo Station to the Evans Neve with its three motor toboggans and five sledges on November 17. It was in the field for 34 days and was picked up on December 21. Because of toboggan breakdowns, particularly clutch failures, the party was immobilised for eight days, and only about half of the programme envisaged could be carried out.

But Dr Laird says in his report that although only 13 days were spent on geology, the trip was highly successful in one of its main aims—to establish

the age of the Bowers Group. The fossil discovery was one of the most important geological finds in recent years, and would at last enable geologists to correlate the sedimentary rocks of Northern Victoria Land with those of the rest of the Trans-Antarctic Mountains and with rock sequences in Australia. The expedition also filled a gap in the geology of the Evans Neve.

YOUNGEST FOSSILS

The fossils discovered at the head of the Mariner Glacier are the first body fossils to be discovered in the Bowers Group, and the first (apart from some plant remains) to be found in Northern Victoria Land. They are the youngest fossils so far described from the Trans-Antarctic Mountains, and may date the last marine sediments deposited before mountains were raised on the site of the previous marine trough. The discovery also indicates that shallow seas covered at least part of Victoria Land at this time.

Another important discovery, says Dr Laird, was the presence of Bowers Group rocks in the northern part of the Evans Neve, lying far to the west of previously known occurrences. The previously unvisited southern end of the Salamander Range was found to consist not only of granite, as previous maps showed, but also of dolerite.

After Drs Laird and Andrews returned to New Zealand in late December, Messrs Kyle and Jennings spent another six weeks on the volcanics project in the McMurdo Sound region. They visited Capes Barne, Bird, Royds, and Crozier to drill small cores in the lava flows. Measurement of these will place limits on the age of the lava flow and help interpretation of the area's volcanic history.

Mr Kyle was able to visit the active summit crater of Mount Erebus. This allowed him to sample lavas that Sir James Clark Ross saw erupting from the volcano on January 27, 1941.

The VUW party which worked on the Beacon strata in the Shapeless Mountain area comprised Dr Barrett, Miss R. Askin, and Messrs D. Wright and A. Chinn. Mr D. Bamford, a geology student, joined the party for the last month. Four United States Navy helicopters flew the party and its equipment to the base near Shapeless Mountain, and it spent the next five weeks working and travelling by motor toboggan in the area.

Dr Barrett says in his report that the area was selected for the study of the upper few hundred yards of the 6500ft-thick Beacon sequence of flat-lying sandstone and siltstone, which is from Devonian to Jurassic (450 to 180 million years) in age. The purpose of the expedition was to search for more plant fossils, and to study and explain the field relations between the sedimentary and volcanic rocks at Shapeless Mountain.

The shapeless appearance of the massif, which is about six and a quarter miles across, is the result of the disturbance of the normally flat-lying Beacon strata by vast explosive volcanic eruptions which ended the Beacon sedimentation in the Jurassic period. In places beds dip up to 50deg, and blocks up to nine and three-quarter feet across have broken through the more nearly horizontal strata in three places. These are regarded as vents for the explosive eruptions.

COAL BED FOUND

After the discovery of the fossil plants, the party found a coal bed nearly 23ft thick lower in the Beacon sequence, at nearby Mount Fleming. Anothers lens containing more primitive simple types of leaf, still very well preserved, was also discovered. Leaves of one species were up to 15in long.

Siltstones at a number of localities were sampled for processing to extract fossil spores and pollens. These and the leaf fossils will be compared with similar, and in some cases identical, forms from Australia, where the sequences of similar age are more fossiliferous and better known. This study will also check on the degree of similarity between Antarctic floras and those of the other fragments of the Gondwanaland super-

continent (Australia, India, South Africa and South America) which has been drifting apart for the last 100 million years.

After Christmas, Miss Askin and Messrs Bamford, Bright and Chinn worked for four weeks at five localities around the Skelton Neve, south-west of Scott Base, moving by helicopter from place to place. They studied the lower Beacon strata, most of which has been regarded as a shallow marine deposit, although work over the last few years has shown the uppermost fish-bearing beds to be a river plain deposit.

This season's party found extensive mud-cracked surfaces in the middle of the lower Beacon sequence, indicating exposure to the air, and an environment where deposits are not entirely marine. The party also mapped and described previously unvisited areas in the Warren Range and the upper Ferrar Glacier.

Victoria University has initiated a geological mapping programme at a scale of 1:250,000 in this part of Antarctica, and is obtaining the co-operation of other New Zealand and American geologists. Field work for the Mount Harmsworth sheet was completed this season and added to the data for two additional sheets.

SEALS SAFEGUARDED BY NATIONS' CONVENTION

A new convention to safeguard all species of Antarctic seals has been adopted by the 12 Antarctic Treaty nations after a nine-day conference in London. The convention will ensure that if commercial sealing begins on the sea ice surrounding the continent, the killing of certain species will be prohibited, and the taking of other species will be subject to strict limits.

The conference agreed that not more than 175,000 seals should be killed annually. Under the convention the Ross seal, the elephant seal, and the fur seal cannot be killed, and killing quotas have been fixed for the crab-eater, Weddell, and leopard seals.

In 1964 the third consultative meeting of the treaty nations in Brussels agreed on measures for the conservation of seals, penguins, and bird life in the Antarctic. These measures protected seals on all the beaches south of Latitude 60deg S. The new convention now includes seals on the sea ice.

The Brussels conference established in Antarctica the world's largest fauna and flora conservation area of five million square miles. These conservation measures will be extended under the new convention to another eight million square miles.

The convention will come into force after seven of the countries represented at the conference have signed and ratified it. The convention will be open to signature by the Governments represented in London, and to access by any State with the consent of all the contracting parties.

Countries represented at the conference were: Argentina, Australia, Belgium, Britain, Chile, France, Japan, New Zealand, Norway, South Africa, Soviet Union, and the United States.

* * *

A seal census in the Bellingshausen Sea was made this season by three helicopters from the United States Coast Guard icebreaker Southwind. They recorded 3362 seals in an area of 204 square miles or nearly 16.5 seals a square mile. This figure was higher than the Weddell Sea count.

Plans for co-ordinated scientific activities

A more co-ordinated effort between American and New Zealand scientists in their future scientific activities in the Antarctic may be one result of the planning conference held at McMurdo Station in January. The conference, held in the Antarctic instead of New Zealand for the first time, was concerned with the more efficient and economic operation of United States and New Zealand scientific and support programmes.

There has been considerable co-operation between the Americans and the New Zealanders in past years, but there have not been many joint programmes. These are being planned for future seasons, according to Mr R. B. Thomson, superintendent of the Antarctic Division, Department of Scientific and Industrial Research.

Two joint programmes in which New Zealand scientists are involved are the international dry valley drilling project, and the drilling programme on the Ross Ice Shelf. Mr Thomson said after his return from the conference that a number of upper air physics programmes, including meteorology, will also be more co-ordinated than in past years. New Zealanders now man American equipment at Scott Base; next year New Zealand equipment for upper air physics studies will be operated by American scientists at Siple Station.

Mr Thomson believes that future Antarctic research programmes will change significantly because of the need for more sophisticated equipment and closer understanding of each nation's programmes. Greater co-ordination is the best way to achieve quickest results.

An increase in direct support of the joint programme — probably more flights by the Royal New Zealand Air Force — is hoped for in the future. Mr Thomson says that additional finance will be needed to keep in step with increased costs and salaries. And the prospect of joint ventures should attract better-qualified and experienced scientists next season.

New Zealand has had good scientists in past Antarctic programmes but it has been unable to attract the very best. The basic problem of attracting the best men has been related to the money this country has been able to offer. With additional finance and the joint ventures this problem may be overcome.

Support for the American and New Zealand programmes was also discussed at the planning conference. As a result the United States Navy support force is expected to consider the use of New Zealand-based facilities — such as communications and aircraft maintenance— instead of providing its own units in Christchurch or sending material back to the United States — a time-consuming and costly procedure.

It might be cheaper for the support force to have this work done in New Zealand. Any savings could be applied to the scientific programme.

FIRST ANTARCTIC SECRETARY

The first woman secretary to visit the Antarctic was there in January—complete with notebook, pencil, dictaphone, and typewriter. Miss Margaret Lanyon, who has worked for the United States Antarctic Research Programme in Christchurch for about 10 years, followed in the footsteps of women scientists and journalists when she spent five days at McMurdo Station doing major secretarial work for the annual planning conference.

Shallow water diving trials at Cape Bird

A preliminary shallow water diving programme to determine the feasibility of using scuba divers for underwater research was an important part of the work done at Cape Bird this summer by the University of Canterbury's zoology department. Mr J. K. Lowry, who was in charge of the field party, reports that the results were encouraging.

In the 1970-71 season the department began a general benthic survey of the inshore waters in the immediate area of Cape Bird down to 950ft, a quantitative study of certain benthic faunal associations, and a summer season plankton study. A small laboratory was added to the field station hut by the Antarctic Division of the Department of Scientific and Industrial Research, and the summer party used successfully for inshore research the trimaran Clione provided by the University of Canterbury.

BENTHIC SURVEY

This season the Antarctic Division installed a small wet laboratory on the beach, and electricity for the whole station was supplied from a diesel generator provided by the University Grants Committee.

The summer programme was divided into four major projects. They were the completion of the benthic survey, an ecological study of Paramoera walkeri, a very abundant sub-tidal amphipod crustacean, a study of push ice deterioration and beach formation, and the shallow water diving programme.

Messrs Lowry and R. R. Voller opened Cape Bird station on October 27, and the other members of the permanent summer party, Messrs P. Sagar and W. Farrelly, arrived two weeks later. Professor G. A. Knox, head of the zoology department, Messrs J. Burnip, the department's photographer, and D. Tattle, were at Cape Bird for part of the season.

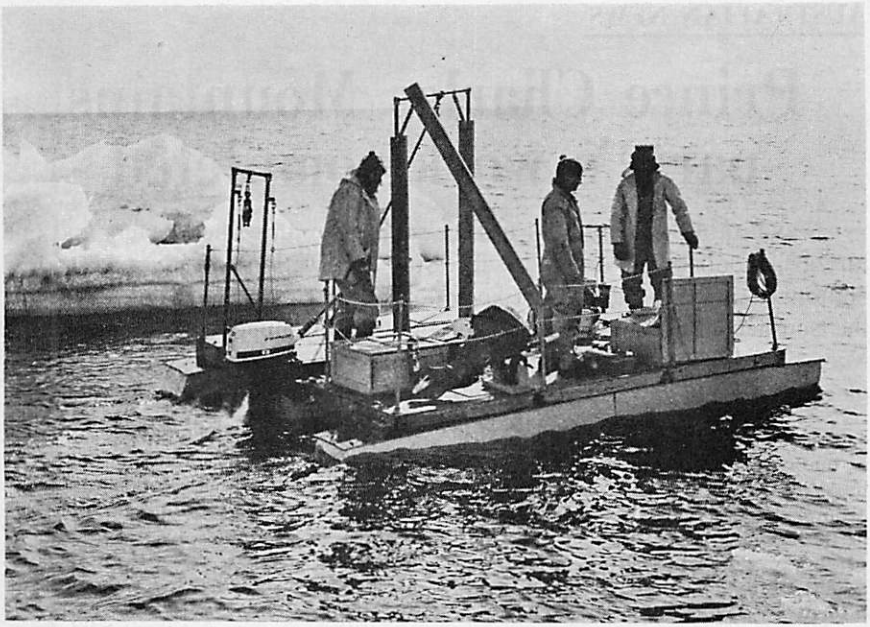
To launch the Clione an ice ramp had to be cut through the push ice, using a petrol-driven drill and chain saws. Clione took the water on November 31, and light ice and generally good weather provided quite reasonable boating for the remainder of the season.

Sagar began his ecological study of Paramoera walkeri on November 31. He obtained a large amount of data on age classes within the population, on summer growth rates, and on the relative abundance of the species throughout the season. In addition he set up and maintained a Paramoera community in the wet laboratory. Early in his study he found that a large percentage of the population was infected by at least two species of epizoic protozoans, which were incorporated into the study.

Farrelly started his study of summer push ice deterioration and the consequent beach formation soon after his arrival. He set up transects along three miles of beach and began weekly measurements of changes in the push ice, as well as sediment collections from exposed beach. In addition he was able to collect inshore sediments while diving, and from dredge samples taken on the Clione.

Tide measurements were also made during part of the season by Farrelly and Lowry. These were made in conjunction with observations at McMurdo Station, thus giving some comparative data between the two areas. Lowry says it is hoped that a more sophisticated approach to this problem will be made next season.

For the diving programme Tattle made eight dives, using the Clione as a diving platform. Farrelly and Lowry



Good Antarctic boating weather. Clione, the University of Canterbury trimaran, at sea off Cape Bird. She was used this season as a platform for shallow water diving trials.

made four dives each. The dives lasted an average of 20 minutes each, and ranged in depth from 19½ft to 75ft. The deepest dive was made on a sloping bottom inhabited by scallops and a very abundant burrowing sea anemone.

In slightly shallower water on a more level bottom scallops and anemones disappeared, and in their place red sea urchins and magenta sea stars occurred. In still shallower water between 19ft and 32ft a bed of luxuriant green algae covered the bottom, providing a habitat for two species of fish, a snail, and a bright red amphipod. It is in this shallow water habitat that the department hopes to concentrate its diving programme next season.

A photographic record of much of the summer party's activities was made by Burnip, who arrived at Cape Bird late in November, and stayed until the third week in December. In addition he photographed many of the invertebrates and fish collected in the benthic survey.

The field sampling for the survey was completed by Voller and Lowry, and some of the collections at Cape Bird were sorted. More sorting, identification, and cataloguing will be done this winter.

On January 12 Lowry went to Cape Hallett aboard the United States Coast Guard icebreaker Northwind. There he took a series of quantitative benthic samples for comparison with samples taken at Cape Bird the year before.

An iceberg 2000ft long, 1000ft wide and about 80ft high has come to rest in front of Scott Base. Since the ice broke out on February 17 there has been open water for five miles in front of the base. A storm on the first two days of March with winds gusting to 45 knots brought the iceberg closer in.

AUSTRALIAN NEWS

Prince Charles Mountains party's work completed

Favourable weather, and full air support by three helicopters and one aircraft, contributed to the successful completion of the Australian National Antarctic Research Expedition's 1971-72 summer programme in the southern Prince Charles Mountains several hundred miles south of Mawson. The field work included extension of a geodetic control survey, glaciology, biology, and geophysics.

This summer's programme is described as one of the most successful undertaken by ANARE. The amount of work acomplished was beyond the expectations of those who planned it. The main part of the programme was completed, and a subsidiary part, which had lower priority, was also fully carried out.

The Prince Charles Mountains party of 18 was led by Mr A. Humphreys, senior engineer of the Antarctic Division, and included geologists from the Bureau of Mineral Resources, and surveyors from the Division of National Mapping. A support group from the Antarctic Division, and pilots and engineers for the three Hughes 500 helicopters and the Pilatus Turbo-Porter fixed-wing aircraft completed the party.

AIR OPERATIONS

Air operations for the establishment of the base camps at Moore Pyramid and Mount Cresswell, about 200 and 360 miles respectively from Mawson, were planned by the division's aviation officer, Group Captain R. F. M. Dalton, R.A.A.F. (retd.). He retires from the division next month.

Heavy pack ice was encountered this season by the Nella Dan on her voyage south with the 1972 relief parties for Mawson and Davis. She sailed from Melbourne on December 10 with the relief expedition led by Mr D. F. Styles, then acting director of the Antarctic Division.

Aboard the Nella Dan were 12 of the 25 men for Mawson, including the officer in charge, Mr N. Roberts, and 10 of the 12 men for Davis, with the officer in charge, Mr D. Gillespie. Others in the expedition were the Prince Charles Mountains team, men for summer work at Mawson and Davis, and an Army amphibious detachment under Lieutenant R. J. Brooks, to assist with the transfer of men and cargo at the bases. Captain P. Clemence was in charge of the three helicopters, and Captain D. Leckie was the pilot of the Pilatus Porter.

After battling through several miles of pack ice the Nella Dan moored beside a large ice floe 32 miles north of Mawson on December 26. Christmas mail and food were flown first to the 1971 team who had been isolated for nearly 11 months, and then the helicopters began to ferry 55 men and seven tons of cargo to the base. The Pilatus Porter was unloaded onto the floe to have its wings refitted. They had been removed to prevent damage by heavy seas on the voyage south.

SUMMER CAMP

After a trial flight Captain Leckie flew the Pilatus Porter to Moore Pyramid, which was the centre of the 1971 survey operations. After the base camp had been re-opened and a party established there, Captain Leckie tried to fly to Mount Cresswell, from where the 1972 survey teams were to operate. He ran

into heavy cloud about 120 miles out and had to return to Mawson.

On its second attempt the aircraft, carrying a small party, reached Mount Cresswell, and the summer base camp was established. Two days before the Nella Dan sailed, a report was received from Mawson that a tractor train had returned after a traverse of more than 800 miles to establish a depot of food, fuel, and equipment at Mount Cresswell.

During the next few days the three helicopters ferried men and supplies to the base until it was operational.

BLOCKED BY ICE

The Nella Dan left the Mawson area on January 2 for Davis, but after sailing about 50 miles was blocked by a belt of heavy pack ice 25 miles wide. At her eleventh attempt to free herself, she forced a narrow lead through the ice, and reached Davis on January 13 to relieve the 12 men led by Mr L. Gardner who, during their year, carried out programmes of meteorology, upper atmosphere physics, and glaciology. During the Nella Dan's stay the Army detachment installed bulk storage fuel tanks, and improved the water storage facilities.

When the Nella Dan sailed for Fremantle the medical officer at Davis, Dr R. Waterhouse, remained until his relief, Dr J. F. Jackson, arrived on the ship's final voyage south last month. On the return trip to Melbourne this month Dr Waterhouse went ashore at Macquarie Island to act as medical officer for the remainder of the year.

The Nella Dan reached Fremantle at the end of January, and sailed again at the beginning of last month. She took Dr Jackson, one man for Davis, and the remaining 12 members of the 1972 Mawson party. Mr W. Young, senior technical officer of the Antarctic Division, led this expedition in the final phase of the 1971-72 operations to relieve the remainder of the 1971 Davis and Mawson parties, and the Prince Charles Mountains survey team.

Led by Mr G. Smith, a senior technical officer in the Antarctic Division, the relief expedition for Casey sailed from Melbourne in the Thala Dan on January 7. When the ship reached the pack ice outside Casey on January 16 her two helicopters were used to locate open leads through the ice to and from the base.

Later the aircraft made flights from the base to outlying areas where geological, glaciological and biological surveys were carried out. A small Army amphibious detachment under Lieutenant I. Peachey, used two landing craft to assist with unloading and transport stores.

With the 1971 Casey expedition, led by Mr J. Walter, and three men from Macquarie Island, the Thala Dan returned to Melbourne early last month. She sailed a few days later for the French Antarctic station of Dumont d'Urville.

DIVERSION TO CASEY

Early this month the Nella Dan was diverted 400 miles to the ice edge off Casey to pick up an injured mechanic. She was on her final relief trip from Mawson to Melbourne when a decision was made to bring the man back to Australia.

A senior diesel mechanic, Mr R. Waring, of Cooma, New South Wales, was instructing a new tractor driver when he caught his right foot in the track of the tractor and injured it severely. He was treated by the medical officer at Casey, who reported that his condition was satisfactory.

Later, however, an orthopaedic surgeon in Melbourne was consulted about Mr Waring's injury. As the accident was likely to restrict his activities for several months, it was decided that he should return to Australia.

The Nella Dan, which had sailed from Mawson, and to call at Macquarie Island, then headed for Casey. Her helicopter flew 18 miles to the base and picked up Mr Waring, and the voyage was resumed. She was expected to reach Melbourne on March 14.

U.S. Navy's 18th year of support for scientists

More than 25 American scientists and about 2000 men from the United States Navy, Air Force, Coast Guard, Army and Marines, were involved in this season's Antarctic operations. The Navy's 18th consecutive year of logistic support for the United States Antarctic Research Programme began on October 8 when summer work began at McMurdo Station, and ended officially on February 29 when the station was left to its winter isolation.

This year the Navy will leave 181 of its men to spend the winter at McMurdo Station, the Amundsen-Scott South Pole Station, and Palmer Station off the Antarctic Peninsula. The National Science Foundation will have 20 scientists at the same three stations, and one at the Soviet Union's Novolazarevskaya Station on the coast of Queen Maud Land.

Scientists from 21 universities and research organisations carried out studies this season at six stations, and aboard icebreakers in the Ross, Amundsen, and Bellingshausen Seas.

FLIGHTS DELAYED

The early weeks of the season were hampered by a five-day snowstorm which dropped more than 20in of snow and left drifts up to 15ft high in the McMurdo Sound area. This storm brought all flights from Christchurch to the Antarctic to a complete standstill. At one time nine aircraft were waiting at Christchurch with men and supplies, and more than one million pounds of cargo accumulated during the period.

On November 1 a Navy Hercules aircraft made an open field landing in Wilkes Land to deposit a French traverse team. This 10-man party began from Carrefour, a small advance base about 25 miles from Dumont d'Urville, the first stage of a journey which will end next season at Russia's Vostok Station, about 1000 miles across the ice-cap. Four Navy resupply missions were flown to the party. On the first a Hercules was damaged when attempting an open field takeoff after it had left fuel and supplies. It was written off, and the remaining missions were completed by airdrops.

Navy Seabees—200 officers and men of Mobile Construction Battalion 71—arrived at McMurdo Station in October to start the summer construction programme. Work began on the new geodesic dome complex at the Pole Station on November 9 and ended on February 15. Construction of the new Siple Station near the Ellsworth Mountains in Marie Byrd Land started on December 13 and halted on February 11.

The building of a new incinerator and a sewage treatment plant headed the construction projects at McMurdo Station. Others included new berthing facilities at the Williams Field airstrip, a new helicopter pad at McMurdo Station, and a new fire station-telephone exchange building.

TRANSMITTER SITE

Another 150ft section was added to the seaboard of the Elliott Quay pier in Winter Quarters Bay, and the Seabees prepared a new communications transmitter site. They also laid an oil line from McMurdo Station across the hill to New Zealand's Scott Base, and did much work on fuel lines and roadways around the station.

American scientists conducted six major research projects at the South Pole Station this season. These included deep-core drilling in the ice-cap by the U.S. Army's Cold Regions Research and

Engineering Laboratory; the University of Nevada's study of natural concentration of silver and iodine in Antarctic precipitation; and the University of Rhode Island's tracing of metals and halogens in the atmosphere. Other projects were: Photometric observation of the aurora by the Lockheed Missiles and Space Company; a 30-day measurement of submicron particulate matter in the stratosphere by the University of Wyoming; and a study of atmospheric radon by the French National Centre of Scientific Research.

HELICOPTER MISSION

Four Navy helicopters flew a "skytrain" mission on November 18 to deliver New Zealand scientists and their supplies to the mountain ranges of Victoria Land for a two-month geological mapping survey. Three men and a woman, plus 4800lb of supplies, were landed at the base of Shapeless Mountain 150 miles west of McMurdo Station.

This season three Coast Guard icebreakers—Northwind, Staten Island, and Southwind—supported the Navy's operations. Three days after Christmas the Northwind and the Staten Island began breaking a 16-mile channel through the ice in McMurdo Sound to Ross Island and McMurdo Station. By January 8 the 7ft thick ice was broken out of the sound.

The Northwind and the Staten Island then worked in the Ross Sea escorting supply ships and assisting scientific programmes until the latter part of February. Hallett Station was restocked and refuelled on February 21 when the Northwind picked up the 18 men who had spent the summer there on her way to New Zealand.

The Southwind spent the summer assisting with scientific projects in the Bellingshausen and Amundsen Seas. She assisted the cargo ship Wyandot to resupply and refuel Palmer Station early in January. More than 14,000 tons of cargo was carried to the Antarctic in the final weeks of summer by two Military Sealift Command cargo ships—the Private John R. Towle and the Wyandot.

Automatic station uses satellite for U.S. signals

For the first time an unmanned, fully automatic scientific station in the Antarctic has exchanged signals with a university laboratory in California. The link between the unmanned station near McMurdo Station, and the laboratory was made via a satellite positioned 22,300 miles above Hawaii.

Stanford University, with grants from the National Science Foundation, has been developing the prototype unmanned station since 1969. Research on it has cost $US300,000.

For the last two years the prototype station has been set up at Byrd Station, where snow loadings on the pedestal foundations were measured, and tests were made of wind loadings on the antenna which has to maintain alignment with the satellite.

This summer the station was transferred to Arrival Heights, about two miles north of Scott Base, and set up on the edge of precipitous cliffs facing north. Signals were relayed through the synchronous satellite to California all through January. The station, which has 32 channels, was then closed until February 15, when the satellite was replaced.

Unmanned automatic stations have been designed to augment the work carried out at manned stations. They will lessen the logistic support needed to maintain manned stations.

The new station may be used for an international research programme if the participating countries have the necessary compatible equipment. Already the Antarctic Division of New Zealand's Department of Scientific and Industrial Research has been invited to take part in such a programme. It is now evaluating the cost and how effective participation might be in New Zealand's Antarctic research programme.

BRITISH ANTARCTIC SURVEY

OPEN WATER SPEEDS RELIEF OF BASES

The building of several new huts has been one of the projects of the British Antarctic survey this summer. The programme has been greatly assisted by light ice as far as the southernmost bases.

There has been very little sea ice again this season and the B.A.S. ships have been able to move freely in most areas. All bases except Halley Bay were relieved before Christmas, the Marguerite Bay bases on December 3—a record early date.

The R.R.S. Bransfield arrived at King Edward Point, South Georgia, in mid-November and landed field parties at various points around the island. Among them, a Dutch party was landed at the Bay of Isles to film local wild life, and a party of B.A.S. geologists was landed at Royal Bay on the east coast.

Summer visitors landed at King Edward Point included Professor M. Weller, of Iowa State University, who is making a study of southern wild fowl in the Falkland Islands, South Georgia, and the Auckland Islands. Another senior visitor, Dr. W. Block, of Leicester University, is working on the respiration of collembola at Signy Island and South Georgia.

The ship then visited the South Orkney Islands and relieved the Signy base, before proceeding to the west coast of the Antarctic Peninsula. A party of three was landed on Anvers Island to open up the old British base again as a summer air facility, for the Twin-Otter and Turbo-Beaver flying south after their winter overhaul in Canada. The last leg of the flight, between South America and Adelaide Island, took place at the end of November.

The Bransfield then visited the Argentine Islands base, and as Marguerite Bay was reported to be open, was also able to relieve the two southern bases, Adelaide Island and Stonington Island, on this voyage. This early access to Adelaide enabled the ship to deliver a quantity of urgent stores, which were to have been flown in from Anvers Island, thus saving valuable flying time and fuel. Surprisingly, no pack ice was encountered but brash ice driven on shore by strong winds at Adelaide complicated unloading.

On December 6 the ship put in again at the Argentine Islands to unload stores, and then returned to South Georgia to rendezvous with the R.R.S. John Biscoe. The Biscoe had first arrived there at the end of November, and had subsequently been carrying out a benthic survey near the South Orkneys.

A party of botanists was transported to the south-east of the island, and spent some time before working northwards towards Royal Bay. A party of zoologists was also taken to Bird Island, at the western extremity of South Georgia, where more than 8000 fur seals were tagged or marked.

FIRE DESTROYS HUT

The Biscoe remained at South Georgia transporting field parties to a number of localities, and later resumed trawling off the South Orkneys. In mid-January, she called at Anvers Island to pick up the two men who had reopened the base. Unfortunately, shortly before the ship arrived, and while repairs were being carried out, the hut caught fire and was destroyed.

The men, who were unhurt, were fortunately able to take refuge at the nearby American Palmer Station. The ship also picked up a man who had been flown from Adelaide Island to

Palmer with an eye injury. He was later taken to Ushuaia and flown home for medical attention; he is now awaiting a corneal graft.

Additional stores were then taken to the Argentine Islands, Adelaide and Stonington, but unloading at the Marguerite Bay bases was hampered by rough seas. Stores taken to Adelaide included extra fuel, as 5000 gallons had been lost through a small fuel-tank leak.

SUMMER VISITORS

The Bransfield meanwhile returned to the Falkland Islands for Christmas. After Christmas, more stores and summer visitors were collected from Punta Arenas and the ship then returned to South Georgia. The summer visitors included Dr. R. Adie, the survey's chief geologist and deputy director; Mr W. Sloman, chief administrative officer; Mr P. Whiteman, engineering officer; Mr R. Piggott, of the Radio and Space Research Station, and adviser to the B.A.S. on ionospherics; and Professor T. Kaiser, of Sheffield University, whose department has a VLF programme running at Halley Bay.

Another senior scientist, Dr. C. M. Swithinbank, the B.A.S. chief glaciologist, had gone south to Adelaide Island on the Bransfield's first voyage to continue the radio echo ice sounding programme. Another member of the permanent staff, Mr P. Tilbrook, a zoologist, has spent the summer at Signy Island.

The Bransfield then sailed for Halley Bay, and once through a belt of pack ice to the south and east of the South Orkneys, made good time and arrived at Halley Bay on January 21. Unloading was completed in three days and the ship again reached the belt of pack ice on January 28. As visibility had deteriorated this slowed her down considerably, but she reached Signy on January 30 and South Georgia two days later.

The two aircraft arrived at Adelaide Island at the end of November and the first flight to Stonington Island took place almost immediately. On December 10, when an improvement in the weather allowed flights further south, it was possible to start supplying the field parties. A depot was also laid in preparation for next summer's projects.

Dr. Swithinbank then installed his glaciological echo-sounder in the Twin-Otter, and in trial runs over George VI Sound found that the best results were obtained on very low-level flights. A number of good profiles were obtained, in particular over the Fuchs Ice Piedmont, Adelaide Island, where the ice had previously been found too "warm" for good penetration.

Bad weather again prevented flying during the first two weeks of January, although the aircraft were able to return to Adelaide on January 3. In mid-January there were further flights in support of the field parties, and a depot was laid at Mt. Jackson, about 100 miles due east of Fossil Bluff.

GEOLOGICAL WORK

Five sledge parties continued work from Stonington Island in variable weather. Two geologists worked on the east coast of the Peninsula while two others who were working in George VI Sound discovered more Cretaceous fossils at Carse Point. A third party of geologists spent two months in the area south-east of Marguerite Bay and then travelled to Mt. Jackson.

A geophysical party spent a month on western Alexander Island, and later reconnoitred the area inland from Mobiloil Inlet on the east coast of the peninsula. A survey party of five men succeeded in closing the tellurometer traverse across the Wordie Ice Shelf and George VI Sound. When the summer melt prevented further work in the sound, the party moved to the southern part of the Palmer Land plateau to extend the control scheme already begun in that area.

At the base, ten tons of supplies were moved up to the airstrip on North-east Glacier, ready for transport south. The airstrip and some of the stores had to be moved five miles further up the glacier in January when a number of crevasses opened up.

An airstrip was also marked and stocked in eastern Alexander Island between Ablation Point and Fossil Bluff. A small hut was erected to house three glaciologists who will work in the area for a year. Glaciologists also worked to the east of the northern end of the sound in January.

TRIPS FROM HALLEY BAY

No major journeys have been undertaken this season since the establishment of an inland field station in October, but there have been a number of shorter journeys. Two men measured sea temperatures along the ice front and two others used a grab to collect sea-bed samples. This latter party, travelling by Skidoo motor toboggan, covered a record 120 miles in one day on the journey back to base.

Two surveyors travelled 300 miles mapping the present ice front north of base and two man-hauling parties visited the Dawson-Lambton Glacier—a round journey of 160 miles. Short field trips were also undertaken for physiological projects.

Unhappily, in February one of the best dog teams was lost in a crevasse during work along a glaciological stake line. Fortunately, the two men in charge of them were not injured.

In addition to the small hut erected for glaciologists in George VI Sound, a field hut was also built for the study of Hodges Glacier, inland from Grytviken, South Georgia. Also at South Georgia, a new wet-laboratory, two new 125kw generators, and a chicken-house were installed at the King Edward Point base, and the eroding shoreline was reinforced with piling.

CONSTRUCTION WORK

A new stores hut was erected at the Argentine Islands, and maintenance work done on several existing buildings. A new electrolytic hydrogen generator was installed.

At Stonington Island, a large two storey extension has been added to the base hut.

The buildings at Halley Bay, which were erected at the beginning of 1957, are deteriorating badly and will have to be replaced next year.

The R.R.S. Shackleton, the former B.A.S. ship now operated directly by the Natural Environment Research Council, has also spent the summer in the Antarctic. She has been continuing, for the thirteenth year, the programme of sea seismic and magnetic work in the Scotia Sea and Drake Passage, under the direction of Professor D. H. Griffiths, of Birmingham University.

H.M.S. Endurance visited all bases except Halley Bay and assisted field parties at South Georgia. Attempts by her helicopters to ferry stores to Hodges Glacier were restricted by persistent bad weather. In January, she began a hydrographic survey in the Debenham Islands area of Marguerite Bay, but later sustained some damage when she ran aground and consequently had to curtail her programme.

Visits by foreign ships included the Piloto Pardo, the Hero, and the United States icebreakers Staten Island and Southwind, all of which called at the Argentine Islands' base. The Southwind's helicopters took in three American zoologists, who spent a few days studying local seal populations. The Chilean ship Yelcho visited Stonington Island, and a Russian research vessel, the Akademic Knipovich, called at King Edward Point on a number of occasions.

SCOTT BASE RADIO SYSTEM

An ultra-high frequency two-way radio system has now been installed at Scott Base. It will provide instant short-range communications in and around the base.

Tiny, pocket-size sets will be used mainly near the base although their range is sufficient to reach the dog lines more than a mile away, and Williams Field on the Ross Ice Shelf. Dog handlers and mechanics have found the system particularly useful, and it will provide an additional safety factor in the winter.

Famous Polar explorers

Four famous polar explorers—Sir James Clark Ross, Sir Martin Frobisher, Henry Hudson, and Captain Robert Falcon Scott—are commemorated by a new series of stamps issued by the British Post Office on February 16. This is the first special issue devoted to the pioneering work of British seamen and navigators in opening up Arctic and Antarctic territories, although Captain James Cook was honoured by an earlier stamp in 1968.

Ross is the subject of the 3p stamp. His portrait is taken from a print held by the Royal Geographical Society of an engraving by Henry Cook of the painting by J. R. Wildman in the National Maritime Museum, Greenwich. The background map is that of the South Polar Sea printed in 1841 by order of the House of Commons.

Scott's portrait on the 9p stamp is taken from a photograph held by the Royal Geographical Society. The background is adapted from the track chart of the 1910-1913 expedition.

The stamps were designed by Miss Marjorie Saynor, a freelance designer and illustrator, who was trained as a mural artist. Previously she had done period portrait figures and illustrated maps. When the naturalist and artist, Peter Scott, son of Captain Scott, was shown Miss Saynor's work, he said: It is an excellent series and I am very proud."

VOLUME 5 INDEX

The index for Volume 5 of "Antarctic" (1968-70) has been completed, and will be printed shortly. Subscribers who wish to have a copy should write to the New Zealand secretary, P.O. Box 1223, Christchurch. The price will be 35 cents in New Zealand currency or the local equivalent.

FRANK WILD: INCURABLE ADVENTURER

By A. G. E. JONES

When Captain Scott and his party reached the South Pole on January 18, 1912, they had man-hauled their sledge just 97 miles beyond a point on the bleak Polar Plateau that had been reached three years earlier by another gallant band of four Englishmen. Forced to turn back by shortage of food and atrocious weather when so close to their goal these four were Ernest Shackleton, Jameson Adams, Eric Marshall — and Frank Wild.

Skelton is a village at the foot of the Cleveland Hills in the North Riding of Yorkshire. Even though it is two or three miles from the coast, its position on a rise in the land gives it a glimpse of the North Sea. It is in a part of Yorkshire which has given the country many of its best seamen; ten miles away from Skelton is Staithes where James Cook, Britain's first Antarctic explorer, was born, and a further ten miles off is Whitby whence Cook sailed as a seaman. (1)

It was here that Frank (or John Robert Francis) Wild was born on April 18, 1873, and where he was baptised on May 7. His father was a schoolmaster, and it was presumably in the village school that he had his early education, though in his later years he may have had to go farther afield for a higher school. It was intended that he should follow his father's career and he had some experience as a pupil teacher, but as that was not to his liking he went to sea at the age of 16. In doing that he was following a family leaning, since on his mother's side he was a direct descendant of James Cook and one of his uncles had made three voyages to the Arctic—probably in one of the last Hull whalers. (2)

EARLY YEARS

Frank Wild began as a seaman and in 1889-90 made a voyage to Australia. The Sobraon (2131 tons) Captain J. Elmslie, was fitting out and taking cargo in the West India Dock for a voyage to Melbourne when he joined her crew of 60 officers and men. She left the River Thames on October 7, 1889, calling at Plymouth on her way down the Channel and arriving in Australia early in 1890. Wild's later service in merchant ships cannot now be traced, but in time he became senior officer. (3)

At the turn of the century there were some outstanding men on the lower deck in the Royal Navy, long-term engagements, better conditions, and higher pay having attracted men who looked on the service as a career. William Lashly (whose diary was published recently), Thomas Crean and Edgar Evans became well known in Scott's second expedition.

NAVAL SERVICE

Frank Wild entered the Royal Navy as an A.B. on August 7, 1900, on a 12-year engagement, joining H.M.S. Pembroke, a shore station. In less than three weeks, because of his exprience and ability, he qualified as "trained man" and in September he joined H.M.S. Wildfire, the title then given to the barracks at Sheerness. In January 1901 he qualified as Probationary Seaman Gunner 2nd Class and three months later as Seaman Gunner 1st Class. After 14 days' leave he joined H.M.S. Vernon, the Royal Navy's gunnery school at Portsmouth, then being revitalised under the influence of Captain Percy Scott. (4)

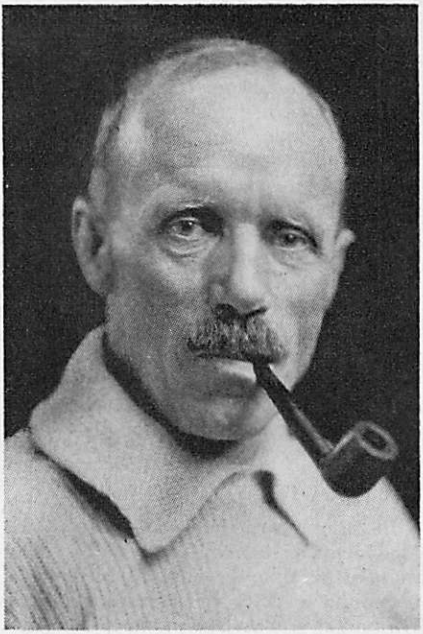
In 1898 the Royal Geographical Society and the Royal Society agreed to dispatch a British National Expedition,

which later received financial assistance from the Government. The Discovery was built at Dundee and Clements Markham (who was the moving spirit in this enterprise) gave the command to Lieutenant R. F. Scott, R.N. As an educated man and a thorough sailor, Frank Wild was attracted by the prospect of Antarctic exploration and he joined the Discovery as a seaman on July 27, 1901, at London. He was "lent" by the Royal Navy and for three years was borne on the books of H.M.S. President for service, pay, promotion and pension. He was engaged as an A.B. at £8 a month and went on board on September 30, being discharged at London on September 30, 1904. During this time he went through three Antarctic summers and two winters.

Scott felt unable to command men without the Naval Discipline Act and, even though the Discovery was a yacht registered as a merchant ship, the crew came largely from the Royal Navy and the ship was run on naval lines. In consequence, Frank Wild on the lower deck was well removed from the officers, and there was little reference to him in Scott's narrative. (5)

In 1902 Wild was in a sledge party under Lieutenant Royds and Dr Koettlitz, and was in another party (with Lashly and Evans) which went with Royds to Cape Crozier. In 1903 he was in a supporting party on a depot journey to Barne Inlet. It was only when Vince was lost that Wild attracted notice. With his attention to detail which was so useful later on, he had armed his boots with a few light nails, and when the accident occurred he took the lead and gave his companions a helping hand. When the party got back to the Discovery Scott found that Wild was the one man who was cool and collected. (6)

In the Discovery Frank Wild found his place in life as a man of action and adventure. He was a little man, keen and alert, very stocky and strong, with extraordinary powers of adaptation to severe conditions; he picked up a good working knowledge of many subjects,



Frank Wild

and could take good and bad fortune with a smile. Courageous and resourceful, he was quick to anticipate the right thing to do. The photograph of the crew of the Discovery shows him as a man older than his 28 years, his life at sea having taught him a sense of responsibility and independence, (7)

[*When the expedition's periodical, the "South Polar Times," was produced during the winter under Shackleton's editorship, one of its contributors was Frank Wild, who wrote upnder the nom-de-plume of "Shellback."—Ed.*]

WITH SHACKLETON

The fourth mate in the Discovery was Ernest H. Shackleton who had spent eleven years in the Merchant Service and, having no difficulty in rubbing shoulders with the lower deck, knew a good man when he saw one. When Shackleton planned his own Antarctic expedition, he asked Wild to become a member. For those two years, 1907-09, he was borne on the books of H.M.S.

President for time only. Since Shackleton did not have Scott's "pull" with the Navy the years did not count for pension and promotion. He was in charge of provisions in the shore party, but his wiry physique, his seamanship and general ability and his interest in sledging made him an invaluable member of the party.

After making some early depot journeys, Wild, Adams and Marshall joined Shackleton's sledge party which achieved lat. 88°23' S. the farthest south then reached. This is a story which has been told so often, in "The Heart of the Antarctic" and elsewhere, that it does not need to be repeated; but it does bring out his stamina, reliability and dependability. ([8])

SOUTH WITH MAWSON

In the years between Scott's and Shackleton's expeditions Wild spent most of his time in shore establishments, becoming a petty officer and gunlayer. He had a year at sea in the Ocean, but otherwise he led the dull peace-time life of men in barracks. Even though the Navy was expanding, promotion was largely by seniority, and with that dull prospect in front of him Wild bought himself out on his return from the Antarctic in 1909. ([9])

On the scientific staff of Shackleton's expedition was a young geologist, Douglas Mawson, a fellow Yorkshireman, then a university teacher in Australia, a man who did good work not only in his own field but as a sledger. Mawson was so impressed with what he saw of Wild that he invited him to take charge of the western party in his Antarctic expedition of 1911-14. Mawson landed his main party in Adelie Land and the test of Wild's courage came when he had to choose between setting up his base on the Shackleton Ice Shelf off Queen Mary Land—with all the risk of part of the ice shelf breaking away—or returning home. Wild and his party unanimously agreed to use the ice shelf as their base and they survived the year. ([10])

It is difficult to assess Wild's work in this year since "The Home of the Blizzard" does not throw much light on life at the western base. The winter seems to have been spent amicably and in the spring, when sledging began Wild's parties discovered and surveyed more coast than Mawson's party. In his book, Mawson spoke of Wild's high merits as an explorer and leader". During this time Wild became the oldest resident of Antarctica, having spent more than four years in the South. ([11])

THE GREATEST ADVENTURE

Wild returned to England in 1913, when Shackleton was planning his second and most ambitious expedition — the British Trans-Antarctic Expedition which was to cross the continent from the Weddell Sea to the Ross Sea — and Frank Wild joined him as second-in-command. This is another story which does not need to be repeated at length.

The Endurance was beset in the Weddell Sea on January 18, 1915, and crushed on November 21. The crew camped on the pack ice until April 9, 1916, when open water forced them to take to their boats, Wild steering the James Caird with the other boats to Elephant Island. Shackleton wrote that "Wild sat at the rudder with the same calm, confident expression that he would have worn under happier conditions; his steel-blue eyes looked out to the day ahead . . . He seemed unmoved by fatigue and unshaken by privation . . . I remember that Wild always rose superior to fortune, good or bad . . ."

When they reached Elephant Island and landed at Cape Valentine, Shackleton sent Wild along the coast in the Stancomb Wills and he found a better beach (at Cape Wild) and it was here that the majority of the party lived until they were relieved. When Shackleton decided to make his boat voyage to South Georgia Wild should have been first choice, but Shackleton picked him as the man to hold together a weakened party on shortened rations.

Shackleton wrote of his complete confidence in Wild, and this was a test of his leadership. He had a large party of men with no shelter other than an upturned boat, with all the difficulties of living

close together in very difficult circumstances. There was always the uncertainty as to whether the Boss had been able to reach South Georgia and would be able to bring assistance, but Wild's cheery optimism held the party together for months. All were alive and cheerful when Shackleton came for them. Wild's work on this expedition was recognized by the grant of the Back Award of the Royal Geographical Society. (12)

The Great War had started very shortly after the sailing of the Endurance from England and when Shackleton's crew returned in the latter part of 1916 the war seemed to have no end in sight. Wild re-joined the Navy, being given a temporary commission as lieutenant, R.N.V.R., and (like Shackleton) was sent to the North Russian front early in 1917 as principal naval transport officer, a post in which his special ability and experience could be used. (13)

In 1918 the British Northern Exploration Company Ltd. decided to exploit the rich mineral deposits in Spitsbergen, under Mr Salisbury Jones, the chairman. He chartered the Ella (Captain Thompson) with Shackleton, Wild and McIlroy. The ship left London in July 1918 and after Shackleton had been recalled by the War Office they continued to Spitsbergen with Salisbury Jones in charge The British flag was hoisted at Elbtoft Harbour, and the German wireless station and properties destroyed. Frank Wild, in charge of the prospecting party, spent the winter usefully in Lowe Strait but the company did not produce commercial results. (14)

WILD TAKES CHARGE

After this failure, Wild and McIlroy tried cotton planting in Nyasaland in 1920, but this was not a success. However, Shackleton who was planning his Quest expedition sent for Wild, who went as second-in-command. This was an expedition which might not have achieved much in any case as the Quest was an old, small vessel with limited power, and the death of Shackleton upset the plans. Frank Wild took charge and did what he could. From South Georgia he pushed the Quest as far south as lat. 69°18' S., long. 17°11' E., whence he sighted the ice shelf of the continent off Princess Astrid Coast. Then, moving to the west, he pushed on to lat. 68°32' S., long. 0°5' E., where he was held up by impenetrable pack ice, and although he did not claim it as land, he sighted the Princess Martha Coast.

Returning to Cape Town, Wild planned to visit Marion, Crozet and Heard Islands and the coast of the continent between Enderby Land and Coats Land. But he was worn and weak from the trials of the voyage, and after virulent influenza decided to return home. Shackleton would probably have done no more. Wild received a telegram from King George:

"While it grieves His Majesty to think that your gallant leader was not spared to bring you home the King considers that your record of achievement and the indomitable spirit displayed by all members of the expedition were in every way worthy of his great example."

Wild had become a Companion of the Order of the British Empire in 1920 on his return from Spitsbergen, and now he was given the Freedom of the City of London and the gold Patron's Medal of the Royal Geographical Society The Patron's Medal was awarded to Peary, Scott, Amundsen, E. A. Wilson, Mawson and other polar explorers but (through the influence of Clements Markham) not to Shackleton and to this extent the award to Wild recognised the work of the "Boss". (15)

THE LAST YEARS

From this time onwards nothing went right for Wild. He went to South Africa, but his farm did not prosper. His capital invested in cotton planting in Zululand did not pay and two years of drought followed by floods put an end to that enterprise. For a time he did contract work on the Zululand line, and was a barman in an hotel in Gillol.

When the Danish training ship, Kobenhavn disappeared Frank Wild was invited to search for her, but negotiations fell through. Then he moved to Johannesburg, and to Rhodesia for several years. Not only did he lose his

savings, but lost much of his faith in himself. Even so, he retained his unflinching determination and never-failing sense of humour, which was sometimes perhaps a little acid. His friends in Britain were anxious to help him, but he would not accept help.

In March, 1939, he was granted a Civil List pension of £170 per annum, at which time he was working in a mine near Klerksdorp. He had pneumonia for three days and died there on August 19, 1939. He was buried at the Brixton Cemetery, Johannesburg, a few days later, the funeral being attended by officers and sea cadets of the Witswatersrand branch of the Navy League of South Africa. Wild left a widow. (16)

AN ASSESSMENT

Wild was fortunate to have been born when he was. If he had been born ten years earlier he would have been too old to start on Antarctic exploration. If he had been born 20 years later he would have found that the era of small pioneering expeditions had passed. In time he would have become a master in the Merchant Service, but probably little more. He was fortunate in meeting a man like Shackleton who could see his merit and who did much to help him. This was reciprocated in an immense loyalty to the Boss to whom he was an admirable second-in-command. He had tremendous admiration for his wonderful leader, and when Shackleton died Wild was lost. He had a simple confiding nature which was his undoing in the commercial world.

Wild's unfailing optimism was of immense value; in fact he seems to have been better in adversity than when expeditions were running well. But he appeared to lack the natural capacity for leadership. When he appeared in photographs with Shackleton he was clearly the second man; when he was in charge of his own parties he sat with the "boys" and did not stand out as Scott and Shackleton did. But in all the photographs his clear, steady gaze showed a man who knew he was capable of getting the job done quietly, without fuss or shouting. (17)

Finally, let us not forget that Frank Wild's Antarctic experience spanned the whole period of what has been described as the "Heroic Era", when men progressed across the icy Polar wastes with sledges pulled by dogs or ponies, and when these failed, by themselves.

This period began with the Discovery expedition in 1901 and virtually came to an end with Shackleton's 1914-17 abortive attempt to cross the Antarctic Continent.

[The author records his grateful thanks to Mr R. J. Bruce for help with Wild's service career.]

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[N.B. I have not given page references for most of the narratives as they are easy to obtain and are found in so many editions].

SOVIET NEWS

Two-month exploration in MacRobertson Land

Soviet scientists have completed a two-month exploration programme in MacRobertson Land, a region that has not been studied in depth previously. Geologists, biologists, and surveyors covered an area of about 100,000 square miles, using helicopters and light aircraft.

The Soviet press agency, Tass, reports that the main base camp was established on the Amery Ice Shelf, one of the largest glaciers flowing from the Antarctic ice sheet into the Indian Ocean. From this camp parties were flown into the area between the Lars Christensen and Ingrid Christensen Coasts during the summer season.

Temporary field camps were established in the Commonwealth Mountains and the Prince Charles Mountains to the north. A camp was also set up on Beaver Lake, one of the few open bodies of water on the Antarctic Continent.

The Soviet scientists worked in an area where Australians previously carried out geological surveys, uncovering some of the oldest rocks, dating from the Archean era, that have been identified in the Antarctic.

According to Tass, geologists continued the earlier surveys and located a number of mineral deposits.

The deepest penetration by the expedition appears to have been Komsomolsky Peak, a 10,000ft mountain jutting out of the ice-cap 500 miles from the coast. Tass says the peak was discovered by Soviet pilots in 1958, but only now have scientists been able to reach it from the ground.

DRILLING AT VOSTOK

A drilling rig, operated by scientists at Vostok Station, has penetrated through the ice cover of the Antarctic to a depth of 1720ft. The well was drilled 11,375ft above sea level, and the core obtained included ice more than 15,000 years old.

Buried spores, bacteria, and dust particles of terrestrial and even cosmic origin are being studied by this technique in the Antarctic. Study of the ice core makes it possible to obtain a picture of the past radiation and heat condition of the earth.

Ice drilling with extraction of the core is an intricate process. A special thermodrill was developed at the Leningrad Mining Institute for the purpose. The drill penetrates the ice at the edges of the well, leaving the core intact.

Professor Boris Kudryashev, one of the designers of the drill, is convinced that thermal drilling will make it possible to penetrate the entire ice layer, which, at Vostok, is more than 14 miles thick. It will then be possible to reach the Antarctic bedrock in the area.—News from the U.S.S.R.

LASER ICE STUDY

Lasers will be used on a large scale this year by the Arctic and Antarctic Research Institute to obtain a clearer picture of glacier movement in wide areas of the Antarctic. Last year lasers were used in this way for the first time in the Antarctic, and already the first results have been encouraging.

With lasers it is possible to estimate the degree of glacier stress, determine how fast it is moving, and all changes in the direction or the speed with which it is progressing. The beginning of movement of a glacier can be recorded from a distance of several miles.

Last year's experiments show that there was no regularity in the movement of a glacier. At times it moved for several minutes, and then stopped for several hours. There were periods when the movement continued for hours.

Special laser doppler systems have been developed for this work. A fixed laser sends a beam continuously which is reflected back by a mirror set up on the glacier. Glacier movement changes the phase of the reflected beam, and from this the movement can be calculated easily.

The system will make it possible to use lasers to study such important questions as the dynamics of ice masses, the rate of drift of sea glaciers, the stress of ice covers, and the dynamics of snow avalanches.—Soviet News.

RECORD TRIP

Early in January a tractor-drawn sledge train arrived at Vostok from Mirny with food and equipment. Nine tractors completed the 900-mile journey in the record time of 34 days. They returned to Mirny without incident, making a round trip of 1875 miles, the Russian news agency, Novosti, reports.

NEW SHIPS

Two ships used by the 17th Soviet Antarctic Expedition this season were newcomers to Antarctic operations. They were the Gruziya, and the Navarin, which carried the advance party. Both are non-naval cargo-icebreaker types. Mainstay of the Soviet expeditions since 1956 has been the Ob. The Professor Vize has now become a regular Antarctic visitor also.

"PENGUIN" SUIT

An electrically-heated light-weight "penguin" suit has been developed by the Ukraine Academy of Sciences for use by members of Soviet Antarctic expeditions. It will keep a man warm in a temperature of minus 55deg Fahrenheit, according to Tass, the Soviet news agency.

Key parts of the suit are the vest and the shoe insoles, which are fashioned with electro-conductive elastic fabric. The remainder of the suit is made of conventional fabrics.

The electro-conductive fabric is sewn in thin ribbons to the back of the vest. Heat comes from a dry storage battery weighing from 3lb to 6lb, which can be carried in sections like a hunter's bullet pouches.

Ice thickness survey

East Antarctica's ice cap has been found to be considerably thicker than previous information suggested. Scientists from the Scott Polar Research Institute found much of the ice cap in Wilkes Land, over which they flew this season, to be between 11,000ft and 12,000ft thick.

On its third trip south to measure the thickness of the Antarctic ice the institute team, led by Dr S. Evans, found that part of the ice cap was a record 12,150ft thick. Although the team could complete only 160 hours flying in the United States Navy Hercules specially fitted with radar equipment developed by the institute, the airborne survey gave clear and useful records of ice thickness and also penetrated the ice to deeper levels than ever before.

In this summer's research good internal reflections were received from the ice sheets, which showed pronounced layering of the ice as with rock strata. The use of a computerised inertial navigation system in the Hercules enabled the aircraft's flight lines to be determined with far greater accuracy.

Late in December the six scientists of the team spent an unexpected eight hours at Vostok Station, where they sampled Russian hospitality and exchanged scientific table talk. The Hercules was on the way back to McMurdo Station when it was directed to the South Pole Station because of bad weather. It was 70 miles from Vostok when advice was received that the South Pole Station was closed, and therefore it had to divert to the Russian base.

New Australian Division Director

A leading Commonwealth scientific administrator, Dr R. I. Garrod, has been appointed director, Antarctic Division, Department of Supply, in Melbourne. Dr Garrod has been Senior Assistant Secretary, Science Division, Department of Education and Science, Canberra, since 1968.

Dr Garrod will take up his duties within the next few months. Until then Mr D. Styles will hold the position of director. He has been acting director since the death of Mr B. Rofe in August last year.

Dr Garrod, who is 54, obtained his Ph.D. in physics at the University of London in 1947. From 1939 to 1947 he worked in England, first on the private developments of electrical and electronic instruments, and then did research in metrology, metallurgy, and engineering at the National Physical Laboratory. When he returned to Australia in 1947 he was in charge of the crystal physics group at the Defence Standards Laboratories and then at the Aeronautical Research Laboratories, both Department of Supply establishments.

In 1966-68 Dr Garrod was defence research and development attache in the Australian Embassy, Washington. Then he was appointed to the new position of head of the Science Branch (later Science Division), Department of Education and Science. In this post he had administrative responsibilities for activities associated with Commonwealth scientific policies, and support for scientific research.

Dr Garrod led the Australian delegation to the 7th General Assembly and International Congress of the International Union of Crystallography in Moscow in 1966. In 1971 he was the scientific representative on the Australian delegation to an international meeting in Manila convened by the Government of the Philippines to consider the establishment of an intergovernmental Association for Science Co-operation in Asia.

FRENCH COMPLETE TRAVERSE

In spite of high winds, ground fog, blowing snow, and delayed resupply missions, the first stage of the French scientific traverse across Wilkes Land towards the Soviet Vostok Station was completed slightly earlier than expected. The traverse party led by Roger Gillard received its last air drop of supplies on January 12, and began the homeward journey a few days later. It expected to reach Dumont d'Urville late in February

Ten men, including a doctor, two geodesists, two glaciologists, two electricians, and two mechanics, made the 500-mile traverse, which was the first stage of a 1000-mile traverse to Vostok. The last stage will be completed during the summer of 1972-73. It is part of the International Antarctic Glaciological Project planned by France, the United States, the Soviet Union, and Australia.

The French began their traverse on November 1 last year from Carrefour, the small advance base about 25 miles from Dumont d'Urville. On the United States Navy's first resupply mission on December 4, when the party had covered 1150 miles, a Hercules aircraft was lost while making a jet-assisted take-off from the ice-cap.

After this mishap the remaining resupply missions were accomplished by air dropping the materials. Three drops of supplies, food, and fuel, were made at 100-mile intervals along the traverse route. The severe climate of Wilkes Land produced almost "whiteout" conditions, and several times the Hercules pilots had difficulties in locating the traverse party. As a result the resupply missions were often delayed, and the traverse party made slower progress.

SANAE 13

South African expedition largest ever dispatched

South Africa's 13th Antarctic expedition—a R250,000 31-man team, the largest ever mounted—sailed in the research ship RSA for Sanae Base in western Queen Maud Land from Cape Town on January 6. The 2300-mile voyage was expected to take about 14 days, depending on the state of the pack ice, and the RSA was due back this month with the present Sanae team, which has spent 15 months in the Antarctic.

Included in the new group are 11 scientists who will carry out weather, topographical, and other surveys, seven artisans to man a base improvement and maintenance programme, and 13 logistic and administrative staff. The RSA also carried 20 tons of whale meat and several tons of imported dog food for the 25 Labrador huskies which remain permanently at Sanae.

The expedition leader is Mr R. J. Brandt, who will act as an administrative executive for the 15 months in which the group will be on the ice. A British scientist, Mr C. Read, is going to the base under a scheme in which scientists from other countries are invited to visit other Antarctic bases.

BUILDINGS BURIED

Because of the constant accumulation of snow the original living and working quarters, built in 1961, are now more than 50ft under the surface. New quarters were built last year, and these will be occupied and added to by the new team.

South Africa's contribution to scientific knowledge of the western Queen Maud Land region—where summer temperatures average minus 15deg C., dropping to minus 60deg in winter—has gained an international reputation. Australian and New Zealand weather forecasting draws heavily on South African data, and seismographical information is regularly transmitted to the United States.

Before the expedition sailed Mr C. J. J. van Rensberg, Under-Secretary for Transport, and head of the Antarctic Division, said: "We have a keen team, and morale is of the highest."

MARION ISLAND

The men on Marion Island in the sub-Antarctic welcomed letters and parcels from home, and some French visitors on December 16 when the French supply ship Gallieni arrived with members of the new team. The seven men on the island had been eagerly awaiting the arrival of the Gallieni, which was sighted before 3 a.m.

Preparations for landing the new team and stores began at first light. A helicopter landed the four biologists, an interpreter, the captain, and some members of the French expedition to Kerguelen Island, near Marion House. Stores and fresh fruit and vegetables were rapidly ferried between the ship and the island while the visitors looked around the base. Within an hour the Gallieni sailed eastward after what was apparently her last annual visit to Marion Island.

The new team members, Johan Grobbelaar, Valden Smith, Anthonie de Villiers and Roger Croome were heartily welcomed and soon settled in. Roger Croome is an Australian who arrived in South Africa recently from Tasmania. He spent some time at the Australia base on Macquarie Island, and

is familiar with conditions on a sub-Antarctic island.

Christmas Day was spent quietly, and the old and new members of the team enjoyed a gigantic Christmas dinner of crayfish, chicken, roast mutton, salads and ice-cream, washed down with champagne. The old year was ushered out in traditional style, and the men sent good wishes to their families, and their comrades at Sanae and on Gough Island.

AMERICAN ENGINEER STILL HOPES TO REACH POLE

An American's dream — to be the first man to reach the North and South Poles by land — may be realised next season provided Mr Walter Pederson can find a sponsor. Mr Pederson, an engineer, who was a member of the snowmobile expedition to the North Pole in 1968, had permission to make a 900-mile snowmobile journey to the South Pole from McMurdo Station this summer, but cancelled the expedition towards the end of December.

Twice the Antarctic Policy Group in Washington declined Mr Pederson's application to make the journey. In January last year he arrived in Christchurch but was refused permission to make the journey because of lack of planning and the lateness of the season. He returned to the United States, leaving behind in storage five snowmobiles, eight sledges, food, clothing, and equipment.

After the Antarctic Policy Group approved Mr Pederson's plans subject to certain conditions, he indicated that he intended to fly to McMurdo Station by way of South America using a ski-equipped Twin Otter chartered from an Alaskan airline, and transporting his equipment from Christchurch in a chartered Hercules.

Towards the end of last year Mr Pederson visited Christchurch again to discuss his plan with Rear-Admiral L. B. McCuddin, the United States Navy Antarctic support force commander. Then just before Christmas he advised Rear-Admiral McCuddin that he had cancelled his expedition because of unforeseen circumstances beyond his control.

In January Mr Pederson suddenly arrived in Christchurch again, and disclosed that the expedition had been cancelled 12 hours before his planned departure from the United States when his principal backer, who was to provide more than one million dollars, left the country.

The next chapter in the Pederson story was the sale of the snowmobiles, sledges, clothing, food, and equipment, to the Antarctic Division of the Department of Scientific and Industrial Research. Mr Pederson said that his next expedition would have new equipment, and the same team which had stood by twice before. He would also need a new sponsor who might be difficult to find.

That was the story Mr Pederson told to one newspaper in Christchurch. But he told the representative of a Sunday newspaper that he would come in from Chile to the Ross Ice Shelf, and then travel 650 miles alone by snowmobile to the Pole. The journey would take about two months; because of crevasses and pressure ridges he might take three days to travel a few yards.

A more official version is that Mr Pederson will fly to Byrd Station by way of Palmer and Siple Stations, and start from there. The Byrd Station-South Pole route has been followed before by the first Americans to travel overland. In 1960-61 Major Antero Havola, a United States Army trail expert, led ten men in two D-8 tractors and a weasel on an 800-mile trip, in 35 days.

"The Wakes," in the English village of Selborne, Hampshire, where the Oates family collections are housed.

MUSEUM HONOURS "A VERY GALLANT GENTLEMAN"

One of the stately homes in the little English village of Selborne, in Hampshire, is "The Wakes," part of which dates back to the early 17th century. It is the former home of Gilbert White, the 18th century clergyman-naturalist and author of "The Natural History and Antiquities of Selborne."

In 1954 an appeal was launched for funds to enable the house and grounds to be purchased and endowed as a perpetual memorial to Gilbert White. Mr Robert Washington Oates, a cousin of Captain Lawrence Oates, the Antarctic explorer, who died while returning from the South Pole with Scott, made available substantial funds and with these the property was secured and "The Wakes" was opened as a museum on September 6, 1955. The collections in "The Wakes", therefore, are in two parts: those relating to Gilbert White and those commemorating the Oates family.

The Oates collections contain portraits and other personalia of the family dating from the 18th century, but are principally concerned with Captain Lawrence Oates and Francis Oates, F.R.G.S. (1840-1875).

Francis Oates, an uncle of the Antarctic explorer, was a zoologist who explored the Zambesi Valley and the area in the vicinity of the Victoria Falls

in Africa, where he died from fever. He amassed large collections of natural history specimens and his letters and journals were published in 1881 under the title of "Matabele Land and the Victoria Falls; a Naturalist's Wanderings in the Interior of South Africa". This book provides one of the first accounts, by a trained observer, of any part of Rhodesia. Francis Oates was the fifth white man to view the great Victoria Falls on the Zambesi.

EARLY DAYS

Lawrence Edward Grace Oates was born at Putney on March 17, 1880, the elder of the two sons of William Edward Oates. Two daughters completed the family of four.

Love of the untrodden places of the earth was Laurie's natural heritage. When he was 16 his father, a big-game hunter and traveller of note, left to join his brother in South Africa but died of fever in Madeira.

Laurie had from earliest boyhood wanted to be a soldier. After an education at Eton, he travelled widely before joining the Army, and in 1900, he was posted to the Inniskilling Dragoons. He served in the South African War and later in Egypt and India. His love of adventure made him apply for a position with Captain Scott's expedition to the South Pole in 1910.

HERO'S DEATH

The story of this tragic venture is too well known to need repeating, but it is sufficient to say that on the desperate march back from the Pole, Oates, weakened by scurvy and frostbite, and finding himself a hindrance to the chances of survival of his three companions (one man, Seaman Evans, had died earlier) walked out into the blizzard that kept the party tent-bound on March 17, 1912.

Material in the museum relevant to Captain Oates includes:

His portrait in uniform, and the portraits of his parents.

His sword and Queen's Medal with clasps, awarded for gallantry in the Boer War.

An envelope addressed to Captain Oates' mother from Victoria Land in 1911.

"On the Way to the Pole" sketched by Edward Wilson.

Photographs by Herbert Ponting, the expedition's photographer.

A memorial cross made from a portion of a bulkhead from the Terra Nova.

Bookcases containing Captain Oates' books on military history.

Painting of the yacht Saunterer which Oates bought in partnership with his brother Bryan, when he was 17. The two boys spent many happy times sailing it along the south coast of England.

In addition there is one of the sledges used by Scott's Polar team in 1911 and which was brought back by the search party.

Old crater as rubbish dump

For the next three years non-combustible rubbish from Scott Base will be tipped into the enlarged mouth of a former crater two miles and a half away. In previous years rubbish from New Zealand's main Antarctic base has been dumped on the sea ice from where it dropped into McMurdo Sound when the ice broke up.

Mr R. B. Thomson, superintendent of the Antarctic Division of the Department of Scientific and Industrial Research, says that rubbish which can be burnt will be taken to the high-temperature incinerator built at McMurdo Station this season. The non-combustible rubbish will be put into the crater mouth in covered layers. Enlargement of the crater mouth is expected to provide for the disposal of three years' accumulated rubbish from Scott Base.

JARE 12 REPORTS

Fuji meets tougher ice on Syowa relief trip

Last season Japan's icebreaker, the Fuji, was trapped in pack ice for 39 days after leaving Syowa Station. This season she made rather slow progress through fast ice about 6½ft thick near the station, and the formal change-over of the 12th and 13th Japanese Antarctic Research Expeditions was expected to take place later than the scheduled date of February 20.

A report from the Polar Research Centre of the National Science Museum in Tokyo on February 9 stated that the change-over of the two expeditions, which began on February 1, was expected to finish on February 10. Almost all the cargo from the Fuji had been airlifted by helicopters to the station, and only the heavy snow vehicles, construction materials, and bulk fuel had to be unloaded. Most of the JARE 12 winter party were now on board the Fuji.

The Fuji made a fairly easy penetration of the pack ice, and reached the edge of the fast ice on December 31 last year. Mail, fresh vegetables, fruit, and other fresh food were delivered to the station on the first helicopter flight, which was made on New Year's Dav from a site about 55 miles from Syowa. Mr Zenbei Seino, leader of JARE 13 and Captain F. Maeda, master of the Fuji, were on the first flight.

Cargo delivery, construction at the station, and field observations were being made on schedule early last month, and the Fuji was expected to arrive about February 12 after almost one month's icebreaking through fast ice. The ice was tougher than expected.

WORK OF JARE 12

This season JARE 12 launched six S210 and one S160 upper atmosphere sounding rockets. The last S210 rocket was launched successfully on December 3 last year. It reached an altitude of 80 miles, being in flight for 5min 47sec.

A glaciological party stationed at Mizuho, the small inland station about 185 miles south-east, since September returned to Syowa on January 24.

A party led by Mr H. Narita, the JARE 13 glaciologist, left Syowa on January 14 with cargo for Mizuho, which was reached on January 14, and joined the JARE 12 party. Both parties remained until January 20 and returned to Syowa on January 24. Mizuho was unoccupied early last month.

Earlier Mr Narita led a party of six to investigate the geology, geomorphology, glaciology, and biology of Hinode Point (68deg 07min S, 42deg 38min E) on the Prince Olav coast. The party remained there from December 31 to January 10.

RUSSIAN VISITORS

A Russian Ilyushin-12 landed on the sea ice near Syowa on December 21. A party of 12 Russians stayed at the station from midnight to the early morning of December 22, spending several friendly and pleasant hours chatting in sign language.

On January 29 a Russian helicopter, much like the Fuji's Sikorsky S61A, flew into Syowa on its way to set up a summer camp for two men on the Riiser-Larsen Peninsula. The helicopter left Molodezhnaya with ten men, and eight visited the Japanese station. On the return flight to Molodezhnaya the helicopter visited the Fuji.

Rain is rare in the Antarctic, but there was a fall at Syowa on January 8 when the positive air temperature was between four and five degrees Centigrade. This was the third fall of rain to be observed. Rain fell previously on January 10, 1958, and January 21-22, 1959.

Preparations for the 14th Japanese Antarctic Research Expedition have begun already. Candidates for the expedition have been assembled, and they will begin their winter training early this month in the Japanese Alps on Honshu Island.

TOURIST SHIP AGROUND IN SOUTH SHETLANDS

Antarctica is still a dangerous place. Tourists on a luxury summer cruise to South Georgia and the west coast of the Antarctic Peninsula last month were sharply reminded of this when the 2500-ton Lindblad Explorer, caught in a 60-knot gale, ran aground in Admiralty Bay, King George Island, South Shetlands.

Wealthy international tourists, mostly Americans, who had embarked on a "cruise that is different" spent eight hours in freezing temperatures and high winds at an old British Antarctic Survey base on the island. They were rescued by the Chilean Navy transport Piloto Pardo and then had a stormy trip to Punta Arenas in cramped conditions and with limited food.

Hit by the storm on February 11 as she cruised near King George Island, the Lindblad Explorer began taking water before daybreak. Her engine-room was flooded, and when she grounded on the rocks her propeller and rudder were badly damaged, and she was holed in several places.

All the passengers, and most of the crew, were put ashore in the ship's life-boats. Meanwhile a radio call for help by Captain Bjarne Aas had been answered by the Piloto Pardo and the Chilean ocean-going tug Yelcho, which reached the Lindblad Explorer a few hours later.

Before the Chilean ships entered Admiralty Bay Captain Aas decided his ship was safe enough for the passengers to be brought back from the island. When the Piloto Pardo arrived she took aboard 104 passengers and 40 of the crew. Captain Aas and seven men remained aboard to assist the Yelcho in her efforts to refloat the Lindblad Explorer.

By February 14 ships from four other nations had joined the Chileans. They were the Argentine Navy's ocean-going tug Commandante General Zapiola, the Royal Navy's ice patrol ship Endurance, and unidentified Soviet and American ships.

Two attempts by the Yelcho to refloat the Lindblad Explorer failed. A third attempt by the Yelcho and the Zapiola was abandoned when 30-knot winds and pack ice threatened the ships' safety. The Yelcho was forced to abandon a fourth attempt when a huge iceberg drifted dangerously near her.

When the Yelcho sailed for Punta Arenas on February 15 in company with the Piloto Pardo, Captain Aas and seven of his crew remained aboard the Lind-blad Explorer to await the arrival from South Africa of a West German salvage tug. A Chilean Navy report on Febru-ary 28 said that the Norwegian ship had been refloated and was under tow.

Summer caretakers work on 'Mayfair Dwellings'

By R. G. McElrea

There was not a cloud between New Zealand and Scott Base. Not that we had much opportunity to observe the scene from the few portholes in the Starlifter. But our cameras recorded endless glaciers and mountain ranges, a dazzling white and blue. Soon the pack ice came into view and the coast fell away on our starboard side.

The five-hour journey gave me and my companion, Harry Burson, time to consider the tasks ahead, as "caretakers" to the historic huts. These buildings are pages from the past; unique, irreplaceable. Their condition is a tribute to the men who built them and those who 50 years later, restored them.

What then, were we to do? Our principal task at Scott's 1901-04 Discovery Hut was to snowproof the building, thus preventing time-wasting hours in the spring, digging out snow. At Cape Royds and Cape Evans we were to work primarily on the surrounds of the huts, extracting valuable relics and discarding the residue of litter.

Our appointment was to one of the few non-scientific positions under the New Zealand Antarctic Research Programme. Our interests being mainly historical, we had constantly to guard against destroying valuable relics.

From the sea ice road, leading from Williams Field, we spied the Discovery Hut nestled on Hut Point Peninsula. Three hundred yards away, where the Discovery had been moored for two winters, smouldered the McMurdo Station rubbish dump.

The pollution had started 70 years before; " . . . now the traces of man are all too obvious; here is a little heap of dirty rubbish, there an empty tin with a gaudy label, and everywhere the soil of traffic staining the purity of the snow." So wrote Scott in "The Voyage of Discovery".

That night I spent two hours skiing on the Scott Base ski-field. Two miles from that distinctly New Zealand outpost, past the dog team and skirting the snow-covered volcanic slopes, the snocat covers the distance in 10 minutes.

The interior of the Discovery Hut eloquently tells the story of grim days. Inside it is stark and dirty. Teddy Evans called it a "Mayfair Dwelling".

Seal carcases are piled against the wall, and nearby is the crude blubber stove. The layout is almost identical to that described by Griffith Taylor in "With Scott: The Silver Lining". We emerged filthy, covered in blubber soot from the sacking which surrounds the kitchen and lines the "sanctuary," the only partitioned room in the main part of the hut.

The bulldozer has carved a main highway around the perimeter of the building and the magnetic and other outbuildings have disappeared.

Tidying under the verandah of the building we came across some charred spars, possibly relating back to that day on March 1, 1909, when Shackleton was desperately trying to attract the attention of the Nimrod. " . . . At 9 a.m. we got the magnetic hut alight, and put up the flag. All our fears vanished when in the distance we saw the ship, miraged up."

We cut a piece of 70-year-old timber to repair a floorboard. It smelt like freshly milled wood.

Twenty miles north at Cape Royds, the sea ice had recently broken out, with spectacular effects of icefloes, penguins and seals.

We spent two days of bleak weather

working in and around the hut. The third day was cloudless and the scenery superb as we made a count of nesting Adelie penguins, for the D.S.I.R.

The "Mrs Sam" stove, the centrepiece of Shackleton's hut, received a thorough brushdown by my companion. A tiny laboratory behind the stove is in sharp contrast to Scott's extensive laboratory area in the Cape Evans hut.

Hams hung on the wall in the kitchen, and Ernest Joyce's name can be seen on a cloth hanging from a shelf in what was known as "The Rogues' Retreat."

With the gradually warmer temperatures of recent years, many of the boxes scattered around the Cape Royds hut are coming free from the permafrost and are being left to the mercy of the wind. The resulting litter is undesirable but the stores in their wholesome condition tell a story, as do the few boxes near Derrick Point and Back Door Bay, part of the 180 tons of stores landed from the Nimrod. We packed into a wooden box some 40 items of food from an outlying food dump to prevent further deterioration. We felt like 19th century grocers.

Many hours were spent clearing broken glass, rusted tin and other debris from and around Pomy Lake in front of Shackleton's hut. From under the ice we retrieved a dog's skull, now placed back in the kennel, and a petrol tin probably used with Shackleton's pioneer Arrol-Johnston car. In all, 44 types of items were placed in the hut and more than a half a ton of rubbish disposed of.

Scott's last expedition hut at Cape Evans is silent, brooding. We did not sleep in any of the historic huts, but a copy of "The Worst Journey in the World" by Cherry-Garrard was useful bedtime reading, helping to bring the hut alive.

From the debris outside the Cape Evans hut, we retrieved a Morse keyboard and another memento from Shackleton's Aurora party: a box marked "Trans-Antarctic Expedition, S.V. Aurora, Hobart."

Most of the relics originated in Scott's day. Clothing, implements, books, scientific and medical equipment and even two bicycle wheels. A sheet of paper recorded in pencil a game score of three of Scott's men, Gran, Hooper and Crean.

These huts, each reflecting something of the different personalities and approaches of Scott and Shackleton, and the desolate beauty of their environs, will long remain in our memories.

Soft snow foils Mt Terror climb

Deep, soft snow foiled an attempt by three men from Scott Base to climb Mount Terror, the 10,500ft extinct volcano at the eastern end of Ross Island. They made their attempt at the end of December, and after hours of ploughing through knee-deep snow were forced to return to their base camp when 1500ft from the summit.

A party of five, led by Mr B. E. Jefferies, deputy leader of the Scott Base summer party, left with two motor toboggans and sledges on December 26 for the attempt on Mount Terror. They began their climb from the Ross Ice Shelf at Cape Mackay, 28 miles from the base. Snow conditions were so bad at the foot of the mountain that the party barely reached 1000ft by the end of the second day.

Both toboggans hooked in tandem were needed to pull each sledge in relays up the steep snow terraces. By the middle of the second day the party had gained only another 500ft and the toboggans could climb no higher.

The base camp was established at this point, and Messrs Jefferies, L. R. McGhie (Dunedin), and R. D. Parkinson (Tai Tapu) continued on foot. They left R. Chambers (Dunedin) and J. Foster (Winchester) at the base camp. After the climbers returned to the base camp, the party had a day's rest and then returned to Scott Base in two days.

Antarctica observed by a New Zealand painter

By R. M. CONLY

The opportunity of going to the Antarctic comes rarely to the artist. When asked to prepare a series of paintings on the role of the Royal New Zealand Air Force and New Zealanders in the southern continent I first viewed the prospect with some excitement and several misgivings.

Visions of the work by previous artists sprang to mind—from Edward Wilson, a superb artist and recorder of nature, who left a rich heritage of sketches and subtle watercolours on the Antarctic, to more recent American and New Zealand artists, who have portrayed on canvas the stark splendour and beauty of that forbidding land.

Here was a challenge unlike any I had undertaken before. I had come to terms with painting in New Zealand and in the islands, in Malaya and Vietnam in tropical heat. But what would it be like working in snow and ice with freezing temperatures and the infamous cold wind?

The clothing supplied by the Antarctic Division certainly made one realise that working conditions could be chilly — "and if you are working on Williams Field, the temperature is 20deg colder out there!" I was told. Being issued with four sets of gloves — from knitted ones to the massive canvas mittens — caused speculation on how to wield my paint brushes. Only time would tell.

And so on one hot nor'-westerly summer's day, we left Christchurch in an R.N.Z.A.F. Hercules packed to the back doors with cargo and mail. Seven uneventful hours later, we stepped out at Williams Field into driving snow and bitterly cold temperatures. Antarctica!

Low cloud and wind-blown snow blotted out all signs of habitation and the surrounding landscape; and only the warmth of the greetings from the leader, Jim Barker, and his men from Scott Base gave me encouragement for the task ahead.

I had only three weeks to collect as much material as possible, to see as much as I could — subject to the whims of a climate renowned for dictating the terms under which men worked.

In the next few days I was to experience first-hand the changing moods of the weather, and the kaleidoscope of colours offered by an environment unlike any other. Twenty-four hours of daylight produced a variety of light and shade, the night-time sun casting a softer and more interesting texture on the countryside.

"CHILL FACTOR"

I was also to experience the "chill factor" brought about by the wind, which could whip up the snow and cause the temperature to drop rapidly, making it impossible to paint outdoors despite the clothing. The uncanny clarity of the atmosphere was a mystifying element: 30 miles seemed like 10 miles, and heights were difficult to estimate.

The awesome Western Mountains in the distance, with its serrated peaks and glaciers flowing down to the Ross Ice Shelf, was a continuing source of attraction. Bathed in the gentle rays of the night sun, converting the skyline into a tapestry of unpaintable pastel shades, it was often shrouded in blue-greys of mist and low-lying cloud.

In the immediate foreground the sombre dark colours of the volcanic rocks contrasted sharply with the icy blues of snow and ice, relieved by the subtle greens and mauves of the pressure ridges circling Scott Base. Above, the cobalt blue of the sky contained cloud patterns blown into interesting formations by the wind.

My first impressions were lasting.

How insignificant the collection of huts at Scott Base seemed in comparison with the magnificent vista from the hills, looking across the vast ice shelf to Williams Field in the middle distance, and the snow-capped hills beyond. The colour was relieved only by the constant play of sparkling light and shadow, and the stark white line of the edge of the permanent ice shelf stretching to the huddle of huts forming the Williams Field base.

Dominating all was majestic Mount Erebus, its slopes alive with colour and capped with a white plume which streaked across the sky past the black mass of Castle Rock. And how deceptively high Mount Erebus was, more than 13,200ft.

BRIGHT COLOURS

Life at Scott Base and Williams Field was a continual source of colourful activity, with the bright reds and yellows of the vehicles contrasting with the green of the painted buildings. The multi-coloured clothing of the men, and the day-glo reds of the visiting helicopters all served to add interest to any picture. The men of Scott Base provide wonderful subjects for the portrait painter. Such magnificent heads, weather-beaten to a rich tan, with a variety of beards and hair-styles each expressing vocation and character.

Here were subjects to match any medium—oils, pastels, conte and even water-colours. For quick colour sketches, I found that water colours were possible, as, like Wilson, I felt they gave a clarity and translucency that suited the purity of the subject. With a thermos flask of hot water and under suitable conditions, I could work to my satisfaction—but with some shattering results at times.

With the temperatures constantly below freezing point, I soon found that brushes froze solid, or slivers of coloured ice attached themselves when least expected, and sometimes washes lifted off the paper in layers of sparkling frost.

Rarely was a subject without some evidence of animal life, which was a continual interest, both to watch and to paint. The seals, basking on the ice in front of Scott Base, moved only to scratch themselves with a flipper, or to warn off the skua gulls. The huskies had powerful bodies, sturdy legs and heads revealing individual character. They tugged at their chains, eager for exercise.

COMICAL PENGUINS

Surely the comics of the Antarctic, the penguins were ever inquisitive and exploring. With their waddling walk and hops and jumps, they moved about chattering incessantly discussing, presumably, the strange intruder on their land. Overhead, the skua gulls swooped and wheeled, watching for prey and hoping for a victim to stray from the rookeries. Such subjects provided a fund of material for any artist.

Unfortunately, I could allow only three days to visit the historic huts at Cape Royds and Cape Evans. Shackleton's hut framed in the protective hollow of dark volcanic rock, and backed by the towering white bulk of Mount Erebus, deserved more time. The textures of the smooth blizzard-worn walls of the hut, and the orderly clutter of the surrounding provisions, gave a sense of time and nostalgia. Two of us spent an isolated New Year's Eve here and exchanged greetings over the radio with other field parties, speaking above the chatter of the Cape Royds penguins.

DIFFERENT SETTING

While flying into Cape Evans by helicopter, one is immediately conscious of a different setting, chosen by Scott for his base hut. Situated on the beach, in what appears a bleak, austere location, the hut is surrounded by the untouched evidence of earlier explorations—tins, packing cases, old skis, seal carcases and bones, bottles and glass, and the anchor of the Aurora still firmly embedded on the sandy volcanic beach.

Outside, bales of hay can still be seen in the stables; a locally-made wheelbarrow stands by the front door; and on entering, one feels very close to the atmosphere which must have surrounded

those heroic men 60 years ago. What a challenge to interpret on canvas for all to experience! The sky was sullen and ominous, befitting the subject.

The weather for the last five days at Scott Base did not permit me to fly to the Wright Valley to collect material on the work of the field parties. Perhaps this must wait for some future journey.

The Antarctic is a challenge to the explorer, the scientist and the artist. For me, it released in rich measure its bountiful store of icy beauty and majesty. To depict this on canvas is the artist's challenge.

I am indebted to the superintendent and staff of the Antarctic Division, D.S.I.R., to the R.N.Z.A.F., for their help and for making my trip possible; and to the leader and men at Scott Base, who made my stay such an enriching experience.

OBITUARY

RODERICK CARR SAILED WITH SHACKLETON

One of the veterans of Shackleton's last expedition in the Quest, Air Marshal Sir Roderick Carr, died in England towards the end of last year. He was 80. A New Zealander from Feilding, Carr was engaged as pilot of the expedition, but he never had a chance to fly his aircraft because certain parts had been sent to Cape Town and the ship was unable to collect them.

Carr served with distinction in both world wars, first with the Royal Naval Air Service, and then with the Royal Air Force, which he joined on its formation. He served with the New Zealand forces, and then learned to fly with the R.N.A.S. In 1918 he went to North Russia with the British force which supported the White Russians against the Bolsheviks.

Shackleton first met Carr in North Russia, where, as a major, he was flying the only fighter in the British squadron. Later he became chief of the Lithuanian Air Staff, and was planning to leave this post and go into business when Shackleton invited him to go to the Antarctic. With Sir Hubert Wilkins he worked on the preparation of an Avro Baby floatplane which was equipped for photography and navigation over ice. Wilkins had been engaged as biologist to the expedition, but Shackleton had also offered him the opportunity to fly the aircraft.

When the aircraft could not be used Carr turned his hand to nearly every task in the expedition, geology, meteorology, helping the surgeons, skinning specimens, sounding and repairing the sounding machine, and general jobs. The frequency with which his name appears in Frank Wild's book is an indication of the man.

In 1927 Carr commanded the first R.A.F. attempt on the world non-stop flight record from England to the Persian Gulf, but only achieved 3,400 miles. Before the Second World War he served as a carrier pilot in H.M.S. Eagle on the China station. He was in the advanced air striking force during the retreat across France in 1940, and towards the end of the war was Deputy Chief of Staff (Air) at Supreme Headquarters, Allied Expeditionary Force. His last appointment before his retirement in 1947 was Air Officer Commanding-in-Chief, India.

ANTARCTIC BOOKSHELF

"THE VOYAGE OF THE CHALLENGER"

by Eric Linklater

Publication in September to mark centenary.

September, 1972, marks the sailing 100 years earlier of a most important oceanographic expedition.

The Challenger expedition was sponsored by the British Government and organised by the Royal Society in collaboration with Edinburgh University where the science of oceanography originated. H.M.S. Challenger was a three-masted corvette with auxiliary steam specially designed and equipped for research. She was manned by naval men under Captain George Nares, and the scientific team was led by Professor Wyville Thompson and Professor John Murray who succeeded him.

She put to sea in September, 1872 and her voyage, lasting three years and a half, encircled the world, crossed the equator eight times, visited high latitudes in both hemispheres. She was the first steamship to cross the Antarctic Circle.

The Challenger's mission was to explore the ocean, measure depths and movements of seas, and investigate the nature of the sea floor. But her objectives were soon extended. Her dredges pulled up minerals from the sea beds, new animal species came up with the nets, icebergs and volcanoes were encountered and studied and in over a hundred landfalls, the flora, fauna and the primitive people of five continents were described. The first manganese nodes, so important as indicators of the ocean's riches, were discovered on this voyage. It was a pioneer exploit of overwhelming marine importance.

To commemorate the Challenger centenary John Murray will publish in September "The Voyage of the Challenger" by Eric Linklater. This important work is not a summary or resumé of previously published material, but a new book in its own right.

It will contain 32 pages of four-colour plates and 176 monochrome illustrations in the text. The price is expected to be about $12. The American publishers will be Doubleday & Co.

Publication date will coincide with the International Oceanographic Centenary Congress which will be held in Edinburgh in September.

STORY OF VOYAGE INTO ICE BY RSA

During the years before the Second World War, and for more than 20 years after, hundreds of young South Africans have been to the Antarctic. They have sailed south in whale catchers and whaling factory ships or on scientific expeditions.

But few, if any, have made any serious attempt to record their experiences in Antarctic waters or at Sanae Base in Queen Maud Land. Now at last, Captain K. McNish, master of South Africa's own polar ship, the RSA, has described in "The Eternal Ice", something of the dangers, the monotony, and the awe-inspiring beauty of a voyage into the ice.

Captain McNish commanded the RSA on her first hazardous voyage to Antarctica with South Africa's third national Antarctic expedition in the summer of 1962. He took the 13th expedition south early this year.

"The Eternal Ice" is published by Tafelberg-Uitgewers, Cape Town.

MARION AND PRINCE EDWARD ISLANDS

"Marion and Prince Edward Islands," a voluminous and richly illustrated report on the South African biological and geological expeditions of 1965-66 to Marion and Prince Edward Islands in the sub-Antarctic, has been produced by Professor E. M. van Zinderen Bakker. His co-editors were Messrs J. M. Winterbottom and R. A. Dyer.

Fifty-one scientists from various countries contributed to the interpretation of the scientific observations made by the six members of the expedition, which was financed by the South African Department of Transport.

To mark the publication of the book Dr C. Brink, president of the Council for Scientific and Industrial Research, which is affiliated to the Scientific Committee for Antarctic Research, presented copies to the Minister of Transport (Mr B. Schoeman), the Deputy Minister (Mr H. Martins) and the Secretary for Transport (Mr J. Driessen).

NEW SOUTH AFRICAN RESEARCH JOURNAL

A review of the first ten years of Antarctic research by South Africa appears in the first issue of the "South African Journal of Antarctic Research," a new publication produced by the Council for Scientific and Industrial Research under the auspices of the Scientific Committee for Antarctic Research. The purpose of the journal is to disseminate information on South African Antarctic research and related activities.

Other items in the journal include scientific results of the South African Antarctic ionosphere programme, 1962-70; studies of clothing and thermal comfort in Antarctica; the effects of a partial solar eclipse on the ionosphere at Sanae; gravimetric determination of ocean tidal effect on the Fimbul Ice Shelf, Princess Martha Coast, Queen Maud Land; and geomagnetic secular variations at Sanae.

The journal also contains reviews of a publication on quaternary studies of the Antarctic, and of a monograph on the South African expedition to Marion and Prince Edward Islands in 1965-66.

The "South African Journal of Antarctic Research" is obtainable from the Distributor of Publications, C.S.I.R., P.O. Box 395, Pretoria, at a cost of R2 a copy.

Scott anniversary medallions

A medallion to mark the 60th anniversary of Scott's journey to the South Pole in 1911-12 has been struck in London for sale in the Commonwealth this year. It has been designed and sculptured by Scott's son, Peter Scott.

Another medallion has been struck by the Franklin Mint in Philadelphia to commemorate the anniversaries of the arrivals of Amundsen and Scott at the Pole. This medallion, designed by a New Zealander, James Berry, bears a likeness of Amundsen on one side. On the other is a facsimile of the Scott statue in Christchurch superimposed on a scene depicting the other members of Scott's party.

The 5000 British medallions will be inserted in a commemorative first-day cover. These covers were flown over the Amundsen-Scott South Pole Station, and then date-stamped at Scott Base, on January 18, the day on which Scott reached the Pole. A new set of stamps for the Ross Dependency was issued on that date, and each cover bears the new 18c stamp showing a tabular iceberg. These covers were later sent by air from Christchurch to London.

Part of the proceeds from the sales of both medallions will go to the appeal fund for the extensions to the Canterbury Museum, which will include a national Antarctic centre.

GEODETIC DOME COMPLEX AT SOUTH POLE IN 1974

Early in 1974 a $3.5m geodesic dome complex will replace the Amundsen-Scott South Pole Station, now buried under 20ft of ice and snow. Built in 1956 and opened on January 23, 1957, the fabricated buildings of the present station have gradually been crushed by the weight of drifting snow.

This season Seabees of the United States Navy's Mobile Construction Battalion 71 completed one-third of the building of the geodesic dome complex. The geodesic dome design, tested with a one-tenth scale model last year, was chosen because of its resistance to the drift of snow. It is expected to last 10 to 15 years.

TheSeabees started work on the new station in November last year. Minus 50deg temperatures and blowing snow delayed the air delivery of supplies and equipment from McMurdo Station, and the Seabees had to work under most difficult conditions. Quite often they could remain outdoors for only half an hour because of the temperature, and the altitude of nearly 10,000ft made them gasp for oxygen when straining to move heavy steel structures. Special tools were designed to facilitate work in heavy and cumbersome polar clothing.

SNOW PRESSURES

Falling snow is no problem at the South Pole station; only two inches a year have been recorded. But drifting snow soon became unmanageable. It clogged the areas between the buildings. Covered passageways and storage tunnels were built, but the snow then piled up on the buildings, causing tremendous pressures. Eventually the weight of snow and ice crushed roofs and ruptured walls of the buildings below.

In 1963 some tunnels and storage areas were re-roofed with steel arches to extend the life of the station, and snow was removed several times from the tops of the buildings and tunnels. Then in 1969 and 1970 the snow was removed, and a box-like structure called a top-hat was built above the buildings from the roof tops, creating a void between it and the snow surface in an effort to reduce the pressure of the snow which had built up to 20ft.

When the aluminium framework dome is finished and ready for use it will be 164ft in diameter and 50ft high. It will be covered with a thin aluminium skin over ribbed corrugated steel arches, and will house three two-storey steel panel type buildings. The largest will be a science laboratory and living quarters. Another will hold the galley, post office, and meeting hall, and the third will serve as the communications centre, ship's store, and library

Two connecting tunnels will lead from the dome, one to a sky laboratory and lounge, and the other to a tunnel 726ft long and 46ft wide which will house a mechanic's shop, generators, a bio-medical facility, and a fuel storage section. Underneath these structures will be a tunnel system to carry all the utility lines for the station. This tunnel system is now 80 per cent complete.

The dome and tunnels will not be heated. They will serve as an insulated "balloon" against the extremes of temperature outside.

Before the new station is finished the Seabees will also build an emergency camp a short distance away. This will be capable of sustaining 16 men for eight months of winter if necessary.

Twenty-one Seabees also worked on the construction of a new Siple Station. The new station, about a quarter of a mile from the existing site, will be occupied in the 1973 winter.

STOP PRESS

Fuji Caught In Fast Ice

For the third time in three successive seasons the Japanese icebreaker Fuji was caught in fast ice after relieving Syowa Station. On March 7 she reported that she was about 20 miles from Syowa, low on fuel, and making about one mile a day in her efforts to reach pack ice 30 miles ahead. Her position was 68deg 44min S—38deg 35min E.

When advice of the Fuji's plight was received by the United States naval support force headquarters in Christchurch, the Coast Guard icebreaker Northwind was ordered to stand by at Lyttelton. In Japan the Maritime Self-Defence Force had the destroyer Takatsuki, the training ship Katori, and the oiler Hamana in readiness.

By March 13 the Fuji was making better progress. She reported that she was only three miles from pack ice. In the 24 hours to 10 p.m. on March 13 she had covered 5.7 miles, compared with half a mile the day before.

At midnight on March 14 the Fuji was still three miles from the edge of the fast ice. Her position was 68deg 33min South.

U.S. ANTARCTIC BUDGET

Funds allocated for United States research activities in the Antarctic have been reduced only slightly in the United States Budget for 1973. Provision has been made for the spending of about $US25.5 million ($NZ21.7 million). This is $US1.3 million ($NZ1.1 million) less than the amount allocated for the 1972 financial year, which ends on June 30.

The reason for the estimated lower expenditure in the new financial year is a reduction of $US1.8 million ($NZ1.5 million) in the cost of the logistic support provided by the United States Navy. In the 1973 financial year the cost of this support is estimated to be about $US17.5 million ($NZ16.9 million). The navy is responsible for the re-supply of Antarctic stations, construction of bases and field camps, and all transport.

Future research trends

The main trend in future scientific research in Antarctica will be towards integrated international programmes aimed specifically at solving major problems. Mr J. O. Fletcher, head of the Office of Polar Programmes for the National Science Foundation, says that basic exploratory work in the scientific disciplines is gradually coming to an end in the Antarctic.

Mr Fletcher, who visited the Antarctic this season to see the science programme in action, said on his return that the foundation's Antarctic research programme had enough planned work ahead to last it for the next 20 years. But for the time being the main thrust of the scientific programmes would be devoted to trying to understand the role of the Antarctic in global ecology—such as its influence on oceans and the circulation at the atmosphere.

When he arrived in New Zealand Mr Fletcher said there was a greater tendency these days to think in terms of "Spaceship Earth." More knowledge was needed to understand its life support system, and Antarctica was a region which could make a significant contribution to such understanding.

Mr Fletcher believes there is a common desire among scientists for more frequent access to the Antarctic throughout the year, rather than for intense activity in the summer months only. He plans to discuss with the United States Navy, which provides the logistic support for the scientific effort, the possibility of regular access to the continent instead of the occasional mid-winter flights.

"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.

Subscription for non-members of the Antarctic Society, NZ$3. Overseas NZ$3.50, includes postage (air mail postage extra). Details of back issues available may be obtained from the Secretary, New Zealand Antarctic Society, P.O. Box 1223, Christchurch, New Zealand.

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 membership fee is NZ$2.00 (or equivalent local currency). Subscription to "Antarctic" is a further $2.50.

New Zealand Secretary

Miss J. Garraway, P.O. Box 1223, Christchurch.

Branch Secretaries

Canterbury: Mrs E. F. Cross, P.O. Box 404, Christchurch.
Wellington: Mr F. O'Leary, P.O. Box 2110, Wellington.

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