ANTARCTIC

A NEWS BULLETIN

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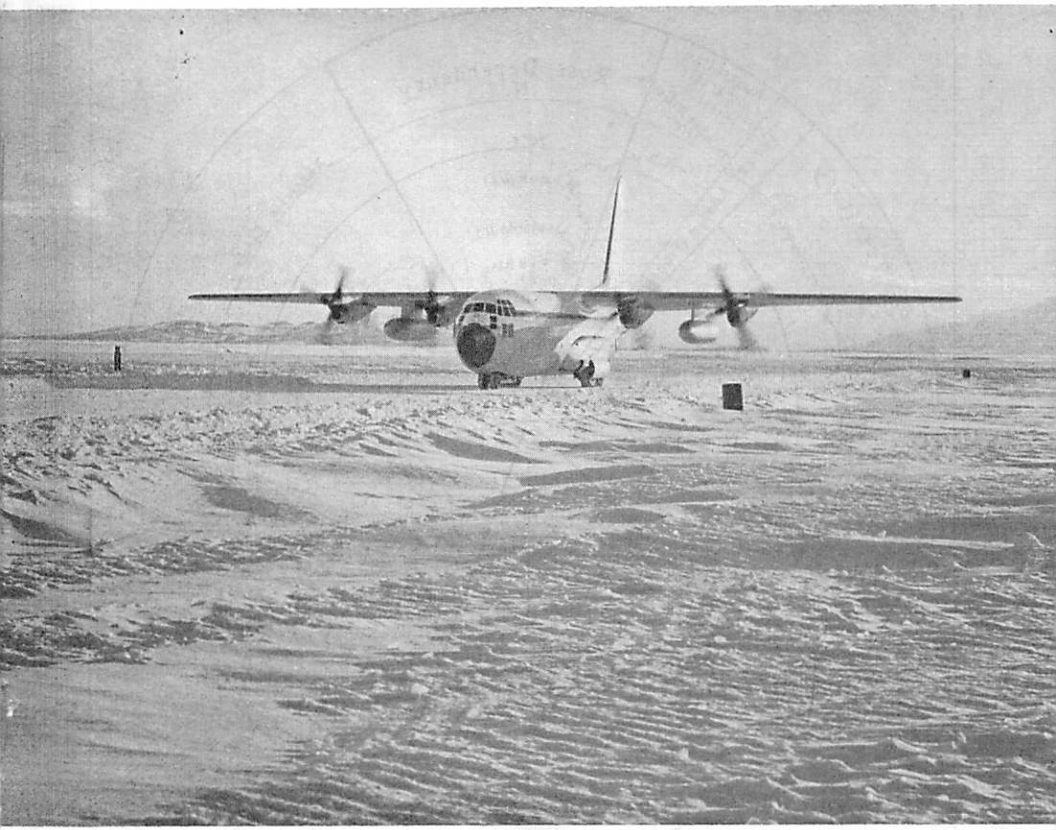
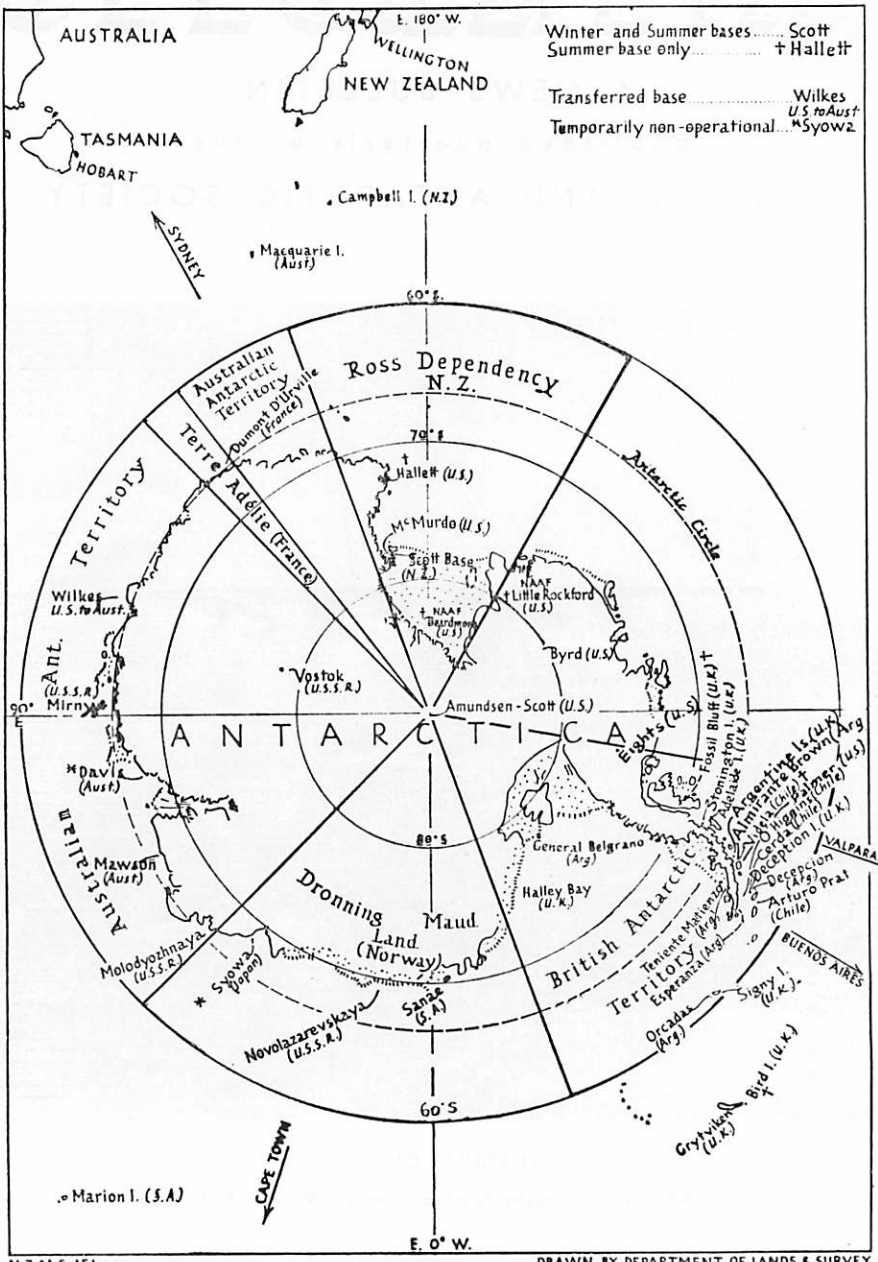


HERCULES ON ICE

An R.N.Z.A.F. plane touches down on Williams Field.

Vol. 4, No. 11 SEPTEMBER, 1967



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"ANTARCTIC"

(Successor to "Antarctic News Bulletin")

Vol. 4, No. 11 SEPTEMBER, 1967

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CONTENTS

NEW ZEALAND TEAM IN TRAINING FOR COMING YEAR

Practically all the men chosen both to winter-over and to form the summer parties, 1967–8, at Scott Base and in the field, spent the week August 18–25 at Waiouru Military Camp and on the slopes of Ruapehu undergoing the usual period of intensive training in preparation for their arrival in the Antarctic in early October.

The Governor-General, Sir Bernard Fergusson, told members of the Americans' admiration for the work of their predecessors. The awe with which the Americans at McMurdo regarded New Zealand's scientific achievements in the Antarctic was one of the most profound impressions he gained when he visited the Antarctic in 1963, he said.

SUMMER PROGRAMME

There will be two main field parties this summer. A six-man geological and survey team will work for 10 to 12 weeks in the upper Rennick Glacier area of northern Victoria Land, complementing the surveys carried out by earlier New Zealand fiield parties in this portion of the Ross Dependency. A geological party under Sir Edmund Hillary will carry out geological and topographical mapping of the Ironside Glacier (72° S., 169° 40′ E.) which flows into Moubray Bay from the Admiralty Mountains, and will attempt the climb of Mt. Herschel.

UNIVERSITY PARTIES

Staff and students from the Universities of Otago and Canterbury and from the Victoria University of Wellington, in independent groups under the control of the Antarctic Division, will undertake scientific work in several areas during the summer period.

VUWAE 12

A more than usually comprehensive programme is being undertaken this year by the Victoria University of Wellington Antarctic Expedition. Two physicists will continue the study of the heat flow through the bed of McMurdo Sound on a line between McMurdo Sound and Brown Island, with similar measurements in Lake Vanda, Wright Valley, and Lake Bonney, Taylor Valley.

Another team will collect fossil material from Bull Pass, Wright Valley, and from the Boomerang Range on the edge of the Polar Plateau south-west of the Skelton Nevé. They will also make further examination of the high moraines and elevated beaches on Black Island, some 20 m. south of Scott Base.

A third party with special equipment will investigate the ablation measurement of the Antarctic ice sheet by drilling at Byrd, South Pole and Plateau, and, using motor toboggans, carry out glacial moraine studies on Erebus. Further glaciological work will be done on ice tongues from the Plateau protruding into 'dry' areas. The salts contained in such ice tongues as those in the Wright Valley will assist in determining an ice budget of the Antarctic ice sheet.

CANTERBURY

Members of the Canterbury University Antarctic biological unit will continue the research programme in McMurdo Sound, Cape Bird and up to Cape Hallett.

Four of the seven have had experience in the Antarctic.

Stirling and East will work at Scott Base. It will be Stirling's third season. He will study changes in seal population. East will assist Stirling and also do work on seal scouring and moulting.

The rest of the team will work at Cape Bird, 60 miles north of Scott Base. Here the men will be based in the Harrison laboratory.

Dr. Young (leader) will study the

predation of penguins by skuas. Peterson will make a detailed study of changes in the composition of penguin blood in relation to bird behaviour. Factors influencing the structure of a penguin colony will be Spurr's concern, and Williams will look into skua chick mortality.

The zoology department's photographer, J. Darby, who will be second in charge of the team, will complete a film on skua predation and investigate the reasons for the way penguin chicks group together in creches.

OTAGO

Studies of the skuas, Adélie penguins and Snow and Wilson's storm petrels at Cape Hallett will be undertaken by biologists from the University of Otago, in continuation of the work previously undertaken by the Dominion Museum. Dr. T. S. Choate will be assisted by several highly-qualified young biologists from the university.

OTHER WORK

Studies of nuclear fall-out using samples of air and snow from an area extending from New Zealand to the South Pole will be continued.

As in past years, oceanographic surveys will be made on H.M.N.Z.S. "Endeavour" during its resupply trips to the Antarctic; in addition, an oceanographic cruise will be undertaken to study the eastern margin of the Campbell Plateau area.

New Zealanders will be included on the "Eltanin's" southern ocean cruise in January and February to carry out oceanographic and upper atmosphere research in conjunction with U.S. personnel.

MOUNTAINEERING AND SCIENTIFIC EXPEDITION

A party of nine men, led by Sir Edmund Hillary, who was leader of the New Zealand component of the Trans-Antarctic expedition of 1956–8, will carry out geological, survey, and meteorological work in the Ironside Glacier area, west of Hallett Station, in the northern part of the Ross Dependency. They will attempt the first ascent of Mount Herschel (11,475 ft.) in the Admiralty Range, attempting both the east and south ridges. Dr. Gill will carry out a detailed study of cold acclimatisation. Three types of radio equipment and some new types of insulated tents will be used and tested.

To take advantage of the sea ice at Cape Hallett for aircraft landings, the party will probably fly into McMurdo in early October and return to New Zealand before the end of November.

ICE BREAKOUT

The intensive study of the ice shelf between Ross Island, Black Island, White Island and the mainland, the McMurdo Ice Shelf, will be continued for the sixth consecutive year. This will involve men working from Scott Base with a Sno-cat, motor toboggan and dog teams. The object is to measure the rate and direction of the flow of this ice-shelf, the increase and decrease of snow levels at various points in different seasons and the mechanics of the summer ice break-out in the Sound. Markers and survey beacons have been erected to measure movement, and other markers record accumulation, ablation or a decrease in snow level due to evaporation and wind. In this way it is hoped to draw up a snow budget of the McMurdo Ice Shelf.

A contour map of the western portion, between Scott Base and White Island, will be initiated, utilising automatic levelling equipment. Density profiles are also required on a more accurate and extensive scope, and this will be done by drilling and coring at selected positions on the ice shelf.

In charge of this programme will be Arnold J. Heine, who will be making his eleventh visit to the Antarctic, and who helped American glaciologist Al Stuart, with whom he wintered at Scott Base in 1959, to make the first glaciological studies of the McMurdo Shelf.

PENGUIN ROOKERIES SURVEY

A more comprehensive effort than has previously been possible will be undertaken during December by C. J. R. Robertson of the Wildlife Division to consolidate and add to the available data on the penguin population dynamics of rookeries in the whole area from Possession Island to the King Edward VII coastline in 150° W. Since 1956 some 17 new Adélie rookeries and five new

NEW STATION AT LAKE VANDA

In the Wright Valley, 77° 32′S., 161° 30′ E., one of the "Dry" Valleys forming the McMurdo Oasis, about 60 miles west of Scott Base, lies Lake Vanda, an ice-covered lake about five miles long which thaws only in midsummer, and even then only on the beach line. In summer also, melt-streams enter the lake from nearby glaciers. The name Vanda was given to the lake by a Victoria University of Wellington team in 1958–9, whose leader, Dr. Colin Bull, had a dog of this name on a North Greenland expedition in which he participated.

The United States National Science Foundation had planned for a station here to be occupied by a team of American, Japanese and New Zealand scientists in the winter of 1968. This plan was deferred, but the very great value of winter data which would complete the studies previously undertaken only in summer, led New Zealand to the decision to establish a station here herself.

It was at first hoped to man the new station during the 1968 winter, but this proved impracticable for the time being because of the economic restriction. However, it was decided to erect the station during the coming summer. It will be invaluable for static field parties studying geology, geophysics and micro-climate in the Dry Valley region.

Two existing buildings, one from Arrival Heights (already dismantled) and the biological hut at Cape Royds, will be transported to the site. If R.N.Z.A.F. air-transport is not practicable or available, this will involve a ground party travelling from Scott Base across the sea-ice to Marble Point, thence over the Wilson Piedmont and up the Wright Valley. With this varying terrain, different types of vehicles, sledges and trailers will have to be used.

Assistance in the construction of the new base will be given by volunteers from the New Zealand Antarctic Society.

The ultimate continuous staffing of the base will lift the science content of New Zealand's Antarctic work, in proportion to support, to one of the highest for any of the nations participating in Antarctic exploration and research.

Emperor rookeries have been discovered.

ANTARCTIC SOCIETY MEN WILL HELP

Readers will recall the part played by members of the New Zealand Antarctic Society during the 1960–61, 1963–64 and 1964–65 summers in restoring the huts used by Scott and Shackleton at Hut Point, Cape Evans and Cape Royds.

Antarctic Society assistance is now to be given, again on an "un-paid" basis, in the erection of the huts for the proposed new station in the Wright Dry Valley. The Wellington and Canterbury Branches were each invited to nominate a man for this purpose, and from a large number of well-qualified volunteers the following have been selected by the branches and approved by the Antarctic Division:

Wellington: B. D. Norton.
Canterbury: G. N. Hamilton.

A Lyttelton boy, **Brian Norton** was a member of the Canterbury Branch before coming to Wellington three years ago. A technical officer on the TV side of the N.Z. Broadcasting Corporation, he was ionosphere observer in the team on Campbell Island in 1951–52, when he was also responsible for the maintenance of the radio equipment on the island. In his early years he was a keenly interested member of the Canterbury Mountaineering Club.

Neil Hamilton, a company director and a qualified builder and joiner, is a member of several mountain clubs and has climbed in Switzerland, Austria and Italy as well as in New Zealand. He has assisted in designing and building several mountain huts and has instructed many climbing and ski schools in Canterbury and Otago. Mr. Hamilton has been associated with Deep Freeze since its inception. Arising from this he was invited to attend an ice research pro-

ENRAPTURED AUDIENCE OF ONE
G. Hancox and J. Lawrence bring music to McMurdo Sound.
Photo: J. T. Murphy

gramme in Alaska two years ago. While there he travelled extensively within the Arctic Circle.

PALEONTOLOGICAL RESEARCH

It is hoped to collect more Devonian Fish remains to add to the collections made by the late Griffith Taylor in 1911–12 and by New Zealanders Gunn and Warren during the Trans-Antarctic Expedition of 1957–8. Dr. Errol White, F.R.S., of the British Museum, has studied this material and has recognised a new genus of great interest as evidence of the Devonian freshwater fauna of the Antarctic segment of Gondwanaland. Opportunity will probably be given to geologists attached to New Zealand parties in 1967–8 to re-visit the localities where previous collections have been made (e.g. the Boomerang Range, the Lashly Mountains and, easiest to visit, the Gondola Ridge Moraine) in order to make further collections.

More samples of Tertiary erratics will also be sought at Minna Bluff and Black Island, as the study of fossil pollens, spores, and dinoflagellates collected earlier from these localities have shed light on the geological history of the McMurdo Sound region and on the vegetation and climate of Antarctica during the early Tertiary.

H.M.N.Z.S. "ENDEAVOUR"

"Endeavour" is scheduled to leave Lyttelton for the Antarctic on January 4, 1968. It is proposed to continue magnetic measurements during the supply voyages as in previous years. This will involve the use of the dry laboratory on board and the services of two scientists per voyage.

R.N.Z.A.F.

The Royal New Zealand Air Force will be making three Hercules flights to the Antarctic this summer.

The New Zealand aircraft are to transport the material required for the construction of the new station at Lake Vanda, Wright Dry Valley, from McMurdo to the hut site.

FIRST IN

Mr. R. B. Thomson, Superintendent of New Zealand's Antarctic Division, and Mr. W. J. Webb, the prospective Scott Base Leader, 1967–68, are scheduled to fly south by U.S. aircraft on October 1. Most New Zealand personnel will follow later in the month.

New Zealanders in 1967-8 will Complete Exploration of Great Rennick Glacier

A large area of Victoria Land, Antarctica, which had not been penetrated at all after its coastal sighting by the "Terra Nova" crew in 1911 till American planes nosed into a giant depression in its northern coast in 1947, has in recent years been more closely examined, chiefly by New Zealand field parties in 1962 and 1963.

Next summer another New Zealand party under Dave Massam and including Maurice Sheehan, who was a member of both the previous New Zealand teams, will make a more intensive study of the region, including the great glacier which fills the depression.

The team, comprising two geologists and four field assistants, will work in two groups, using motor toboggans for transport. They will work in two main areas:

(1) The upper Rennick Glacier (Morozumi Range and Helliwell Hills).

(2) King Range, Freyberg Mountains and Navigator Range.

It is expected that the party will be in the field for from ten to twelve weeks. Their work should enable some accurate correlation to be established between three major rock categories, the Wilson Group, the Bowers Group and the Robertson Bay Group.

Readers will be interested in the following outline of the discovery and exploration of the giant Rennick Glacier.

The Rennick Glacier, which flows from south to north in approximately 162° E., is about 200 miles in length and one of the largest glaciers in the Antarctic. It rises in the Polar Plateau west of Terra Nova Bay and enters the sea just west of Cape Cheetham on the Oates Coast. It is 20 to 30 miles wide, narrowing to 10 miles near the coast.

Only in recent years has the Rennick Glacier appeared upon the map.

For 70 years that part of the Victoria Land coast which lies west of Cape Adare beyond Robertson Bay, seen in brief glimpses by Wilkes and d'Urville in January 1840, obstinately rebuffed even the most able and daring explorers, masking "a bleak, white unmapped immensity of blizzard-filled unknown".*

RENNICK BAY

Then in early 1911 Lieut. H. L. L. Pennell in "Terra Nova", was returning to New Zealand after landing the main shore party of Scott's Last Expedition at Cape Evans in McMurdo Sound. The ship rounded Cape Adare and landed Campbell's Northern Party at Ridley Beach, Robertson Bay. "Terra Nova" then edged her way N.N.W. to explore to the west beyond Cape North as far as her coal supply should allow. On February 22, in 69° 10′ S., 164° 30′ E., Lieut. Bruce "picked out some snow-capped mountains" and then "more peaks and lower land". Oates Land, as they named it, was "tantalisingly covered in cloud". At 9 a.m. the ship

* Byrd in Nat. Geog. Mag., October 1947.

was brought up by pack. In the morning, after an hour and a half of futile attempts to penetrate the ice, with clouds still covering all except the lower land, the attempt to get either to the coast or further west was abandoned.

Eight thousand yards off they could see a glacier tongue apparently running down from snow-covered rounded hills. Behind it a rugged range of hills ran down to a point which seemed to form the eastern point of a large bay. To this "bay" they gave the name of Lieutenant H. E. de P. Rennick, the officer who had been responsible for the soundings taken during this pioneering voyage.

HIGH JUMP

Rennick Bay was not seen again till the aerial photographs taken during the United States Operation Highjump of 1946–7 suggested that the "bay" extended inland as a fiord as much as 100 miles in length to 71° 30′ S. To Captain Charles Bond's photo-mapping sea-plane crews of the Western Group, operating from the "Currituck" near the Balleny Islands in early January 1947, both sides of the "bay" appeared to be lined by mountains 8,000 feet in height.* But the whole region was fog-covered and the photographs showed little detail, while lack of ground control made any reliable mapping impossible.

RUSSIAN VISITORS

Rennick Bay itself behind its almost impregnable ice-defences remained inviolate till the early part of the I.G.Y. period. Then during January and February, 1958, Russians on the vessel "Ob" explored the coast from the Soviet base Mirny on the Davis Sea, 92° 57′ E., to the Ross Sea, and with the aid of two AN-2 planes and one I AK-12 plane carried out air photo surveying along the Oates Coast. "Rennick Bay" was found to be "a gigantic ice-filled north-south depression" flanked by mountains. The depression was occupied by a "vast outlet glacier" which the Russians plotted inland, to the south, for 60 miles.

The Rennick Glacier reaches the sea just west of Cape Cheetham in approximately 161° 45′ E. West of the glacier front lies the Kooperatzia Piedmont, while east of Cape Cheetham lies the Lillie Ice-tongue.

The Russians comment: "The Depression assumes the form of an ice-shelf near the shore. . . . The upper part of Rennick Glacier rises gradually towards the south and seems to merge into the continental ice cover. At the sea end the glacier ends in the usual vertical cliffs. . . .

"From the south-running mountains of the eastern side of the Rennick Depression, flowing north towards the sea, into the region marked on the map as Cape Williams, are masses of ice forming a piedmont glacier, the seaward side of which assumes the form of an ice shelf." (This is the Lillie Glacier Tongue.)

"The Rennick Glacier does not appear to yield as many ice-bergs as might be expected."

AUSTRALIANS NEAR

A determined attempt by the Australians in the chartered "Thala Dan" to enter the area from the west in January 1958 had been frustrated by ice and bad weather. But in February the following year "Magga Dan" with Philip Law and his Australians on board had better luck. The Wilson Hills, 70 miles west of the Rennick, were sighted on February 20 and the ship anchored near a large glacier tongue which extended for 20 miles from a broad valley glacier. This was the Pennell or Matusevich Glacier in 157° 20′ E. Squadron-Leader D. Leckie made an air reconnaissance of the coast-line while a landing was made in 69° 9′ S., 157° 8′ E., the first landing in this area. The Australians were only 140 km. (87 miles) west of the Rennick.

FOOTSTEPS ON THE RENNICK

Up till this time no man had set foot on the great glacier itself. But in early 1960, the sno-cats of the United States Victoria Land Traverse, led by Franz Van der Hoeven, and including, in its team of eight, New Zealander Arnold Heine, were making their way from Adélie Land

* Report of Operation Highjump, Vol. 1, Annex 3, Photogrammetry.

towards the Ross Sea coast of Victoria Land at Cape Hallett. Three vehicles had left Scott Base on October 16, 1959, travelled up the Skelton Glacier and north-west to within 30 miles of the terminal point of a French traverse from Charcot Base in 1958–9. The three sno-cats now moved east towards Hallett Station, 600 miles away.

At the end of January 1960, the traverse party sighted their first mountain in 1,000 miles and hailed it as Welcome Mountain. A few days later they began to descend to the surface of the Rennick Glacier at about 72° 20′ S. On February 2 a U.S. reconnaissance R.4.D. dropped spares and mail to the party and selected a pick-up point on the glacier at 72° 37′ S., 161° 32′ E. Here two sno-cats were cached, the third having been abandoned 100 miles back to the west. On February 10 the party was evacuated to McMurdo after a recce-flight down the glacier to beyond 70° S. The sno-cats were left on the glacier.

Three seasons later, 1962–23, a United States team of topographic engineers, on the last leg of an operation called "Topo East and West", covered an area of 40,000 square miles to the west of Hallett using turbine-powered helicopters to land teams of surveyors on selected spots. This enabled reasonably accurate maps of the area to be produced.

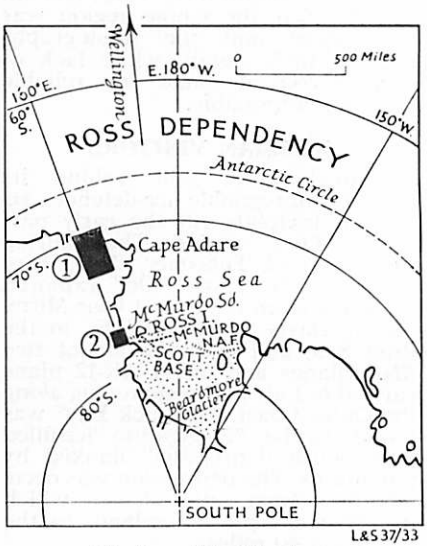
Australians on "Thala Dan" on February 11, 1962, reached the coast at Cape North, 80 miles east of the Rennick. A party landed, and Philip Law raised the New Zealand flag.

NEW ZEALANDERS EXPLORE

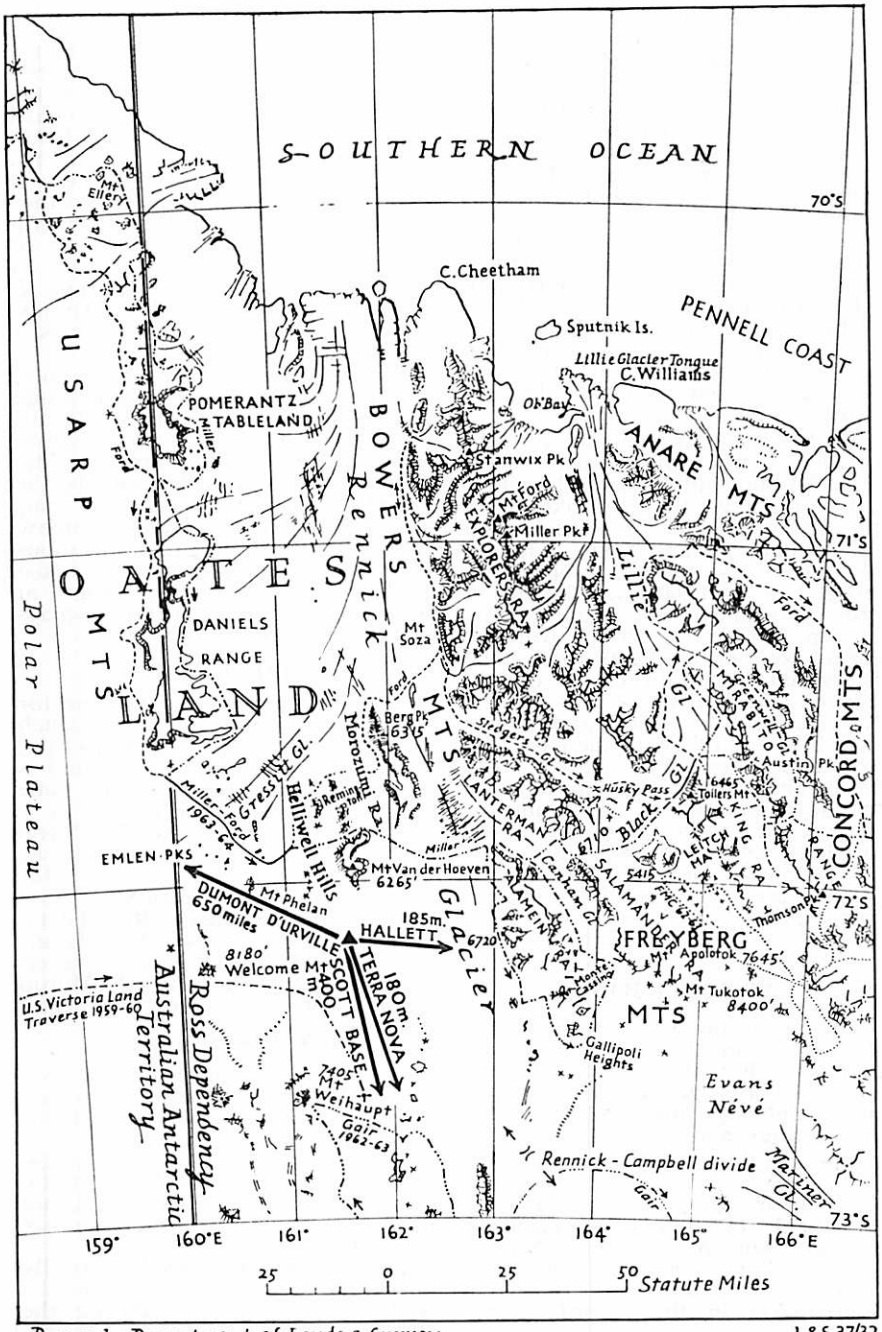
In the 1962–3 summer a New Zealand team carried out the first systematic ground-level exploration of the upper (southern) Rennick. This "Northern Party" of four men (H. S. Gair, K. P. Pain, M. J. Sheehan and J. A. Tobin) was flown in by U.S. aircraft on November 3, 1962, to 73° 15′ S., 163° E., at the head of the Rennick Glacier, at an altitude of 7,500 feet. They sledged 70 miles down the west side of the Rennick to 6,000 feet, and then back to their depot along the west side of a line of mesas which form the eastern boundary of the glacier.

The team now sledged eastwards to the Aviator Glacier and down the Campbell Glacier to their pick-up point. At their most southerly position Gair's team had been only about 70 miles north-east of the sledging route of David, Mawson and Mackay on their great journey to the South Magnetic Pole in 1908–9.

The first ground survey team to work systematically in the northern Rennick area was the six-man Northern Party of the New Zealand Antarctic Research Expedition, 1963–4, led by J. Holmes (Bob) Miller, who had with him M. R. Ford (deputy leader), M. J. Sheehan (of Gair's party), F. Graveson, A. Sturm and S. Carryer. They were flown with their 36 dogs and four sledges from Hallett Station in three flights on October 24 and 25, to link up near the head of the Pennell (or Matusevich) Glacier 80 miles west of the Rennick. After some geology here they sledged as two independent parties east and then south, one



(1) Rennick Glacier →
(2) Dry Valleys



Drawn by Department of Lands & Survey
Wellington, New Zealand. September 1967

L&S 37/32

along and one to the west of the USARP Mountains on the western flank of the Rennick, just north of 72° S.

Here, late in November, the parties re-joined at a depot previously laid not far north of the "Welcome Mountain" of the United States Traverse. They now crossed the Rennick by independent routes in the vicinity of the Helliwell Hills, which form the dividing line between the northern and southern sections of the Glacier. At this point the glacier was found to be 65 miles wide. Crevassing made the crossing hazardous, and this with soft snow and much atrocious weather caused a great deal of exasperating delay.

On December 28, after three weeks of good weather and intensive sledging, climbing, surveying and geological collecting, they moved down the Tucker Glacier to be picked up on January 28 and flown back to McMurdo. The various groups had sledged in all 1,600 miles largely in previously unexplored country, linking up, however, with the work of earlier New Zealand expeditions, the Federated Mountain Club's expedition of 1962–3 to the south, and the New Zealand Geological and Survey expedition of 1957–8 to the east. The expeditions outlined above were better able to plan their movements and anticipate difficulties because of many United States photographic air missions, the topographic results of which were made available to them in the typical Antarctic spirit of co-operation.

AT SCOTT BASE

The programme at the Base includes continuation of the year-round studies in auroral physics, earth currents, geomagnetism, ionospheric physics, meteorology, radio propagation, and seismology.

The scientific observations at Scott Base form part of an international network of stations, particularly in the field of upper atmosphere physics, seismology, and meteorology, and it is important that this work continue in order to avoid interruption in the records being obtained.

WEATHER CHANGE

The first two or three days of June were relatively calm in McMurdo Sound, a pleasant relief after ten days of almost continuous blizzard which made even the essential outdoor activities well nigh impossible. Now it was calm and the sky was clear. The more settled weather brought a sudden fall in temperature, from a rather balmy 30° of frost during the violent storms, to a 55° frost at 8 a.m. on June 2. Scott Base dog handler W. R. Orchiston was able to give the huskies a run in the moonlight.

Storms of a different kind were flogging the Antarctic in the same week. These were magnetic storms, the aftermath of severe solar flares, which seriously disrupted radio schedules with New Zealand. To the scientists at all Antarctic bases magnetic disturbances are of intense interest, but to the communications people they are a pest. The visual evidence of the mighty forces at work was some spectacular displays of the Aurora Australis.

BREAK OUT

This winter has been notable for the most unusual extent to which McMurdo Sound has been free of ice. Usually most of McMurdo Sound is ice-covered as far north as Cape Bird, and at this time of year it is possible to cross from McMurdo Station and Scott Base over this sea ice. It has been the practice, for example, for parties from Scott Base to sledge up the coast of Ross Island to inspect the old huts at Cape Evans and Cape Royds. This year, however, this would be impossible: McMurdo Sound is practically free from ice.

SUN RISES AGAIN

The Antarctic sun rose again on August 29 for the 12 New Zealanders who have spent the winter at Scott Base.

At noon, with the temperature 64° below freezing, the base leader, Colin Clark, raised the flag which had not flown over the base since the sun set more than 18 weeks before.

Violent blizzards have partially buried the base in drift snow and the cold has been intense during the winter months.

TO WINTER AT SCOTT BASE

The following men have been selected to winter over at Scott Base throughout the 1968 winter. Two more will be added later from the men working at the base or in the field during the summer.

William J. Webb, Leader (see June "Antarctic").

Ian P. Johnson (27), Gisborne, Senior Technical Officer. Mr. Johnson, born in Wanganui, attended Wanganui Technical College from 1952 to 1954. After serving his apprenticeship as a radio/TV serviceman, he spent two years at Campbell Island and then two years at Raoul Island as weather-station radio-technician. He also made a trip to the Chatham Islands as a radio operator before spending a year at Scott Base, 1966, as senior electronics technician. He is a ham-radio enthusiast.

David A. Henderson (25), Invercargill, Technician. Born at Gore, Mr. Henderson attended St. Kevin's College, Oamaru, and was a student at the University of Canterbury 1959–61. He worked at the sound studios of the N.Z.B.C. in Dunedin till 1966, and then at the transmitting station at Dacre. He is single.

John S. Talbot (23), Palmerston North, Technician. At present employed in the Plant Physiology Division, D.S.I.R., he was born in 1943 at Pretoria, South Africa, and educated at schools in Natal and Pietermaritzburg. Migrating to New Zealand in 1962 he took lectures at Auckland University for two years before joining the P.E.L. as a technical trainee in 1962. He was in the 1964–5 summer party at Scott Base. Single.

Warwick R. Fergusson (23), Bulls, Technician. A single man, Mr. Fergusson was born at Dunedin and attended Otago Boys' High School and Lincoln High School before joining the N.Z.B.C. as a technician. He holds a first-class certificate in radio-technology. He served for two years on Campbell Island as a telecommunications technician and, in his second year, was also responsible for the operation and maintenance of the ionosonde.

Russell E. Houliston (25), Oamaru, Fitter-Electrician. A Balclutha boy, Mr. Houliston served his apprenticeship as an electrician with the Waitaki Electric-power Board from 1957 and became fully licensed in 1962. He has had wide experience in the wiring and maintenance of domestic, commercial and industrial electrical installations and appliances, and has specialised in refrigeration work. He is single.

Alan J. Magee (23), Invercargill, Fitter Mechanic. He was born at Invercargill. After leaving school he served his apprenticeship as a fitter and turner, had wide experience in electric and gas cutting and welding and obtained his trade certificate. His main spare-time interest is in cars and mechanical gear. At the time of his appointment he was engineer on the vessel S.T.S. "Athelviscount". He has had extensive experience with diesel engines. He is single.

Carey Irwin (23), Blenheim, Fitter Mechanic. Mr. Irwin was born in Christchurch. He was educated at Marlborough College and then served five years as an apprentice mechanic, and is at present a service station manager. He is interested in travel and while working at his trade in Australia tried his hand at crocodile-hunting.

George R. Edlin (46), Invercargill, Postmaster. He was born at Napier. He was a ship's radio officer for two years and then in 1942 joined the Commandos and served till after the war.

Ian W. Wratt (27), Wellintgon. Cook. He was born at Matamata and has a farming background. He is at present a Navy leading cook on H.M.N.Z.S. "Waikato".

Antarctic

Copies of some previously unobtainable issues of **"Antarctic"** have become available. See page 588.

SUMMER SUPPORT STAFF

The following men will work at or from Scott Base during some part of the 1967–68 summer.

AT BASE

I. Smith: Deputy Leader.
B. McAleer: Assistant Radio Operator.
B. Procter: Public Relations Officer.
T. E. Reilly: Carpenter.
R. Tatham, Assistant Maintenance Officer.
J. R. Lythgoe: Assistant Maintenance Officer.
D. K. Campbell: Storeman.
R. J. Cowan: Field Assistant.
J. Parker: Post Office Technician.

GEOLOGICAL SURVEY TEAM
(Rennick Glacier area)

D. G. Massam: Field Leader.
J. A. S. Dow: Senior Geologist.
V. E. Neall: Geologist.
M. J. Sheehan: Field Assistant.
G. Dingle: Field Assistant.
G. R. Champness: Field Assistant.

McMURDO ICE SHELF TEAM

A. J. Heine: Field Leader.
W. R. Lucy, Surveyor.
N. B. Pitts, Assistant Surveyor.
R. V. Barton, Field Assistant.

VICTORIA UNIVERSITY

Prof. H. Wellman, Field Leader.
Dr. A. Wright: Geologist.
C. Vucetich, Pedologist.
Dr. A. Wilson, Physicist.
C. Hendy: Chemist.
I. Calheim: Physicist.
J. Cousins: Physicist.

CANTERBURY UNIVERSITY
(Harrison Laboratory, Cape Bird)

Dr. E. C. Young, Field Leader.
J. Darby, Photographer-Technician.
J. Peterson, Zoologist.
E. Spurr, Zoologist.
M. Williams: Zoologist.

(At Scott Base)

I. Stirling: Zoologist.
D. Mossop: Zoologist.

HILLARY SCIENTIC AND GEOLOGICAL TEAM

Sir Edmund Hillary: Field Leader.
Dr. M. Gill: Doctor.
Dr. L. Harrington: Geologist.
N. Hardie: Surveyor-Mountaineer.
G. Hancox: Geologist.
M. Ellis: Mountaineer.
M. White: Mountaineer.
J. Wilson: Mountaineer.
B. Jenkinson: Mountaineer.

INTERTIDAL CREVICE FAUNA

Dr. Kensler: Marine Biologist.
H. K. Schminke: Zoologist.

ROOKERIES SURVEY

C. J. R. Robertson: Zoologist.

OTAGO UNIVERSITY
(Cape Hallett)

Dr. T. S. Choate.
B. Johnson.
B. Turnbull.

Also to work at Scott Base for portion of the summer:
M. Cunningham: P.E.L. Trainee.
R. E. Christensen: P.O. Rigger.
R. T. R. McMurray: P.O. Rigger.
T. O'Neill: Technician.

FAR AFIELD

M. M. Prebble, leader Scott Base in 1965–66, has gone to the other extreme. While researching at the Scott Polar Research Institute in Cambridge, England, he has been heading north, and when last heard of was at the Tarfala Glaciological Station in North Sweden, in nearly 70° N. Mike is to represent New Zealand at the Assembly of the International Association of Scientific Hydrology in Berne, Switzerland, from September 28 to October 4.

YANKIWI FAMILY

Two members of the Johnstone family of Taihape have served for lengthy periods with United States expeditions in the Antarctic.

G. N. (Johnny) Johnstone was an engine fitter in the R.N.Z.A.F. Antarctic Flight in 1959–60 and stayed on to winter at Scott Base. His skill attracted the attention of the Americans at McMurdo and 1961 found him in a team of three who were to occupy a satellite auroral sub-station in the heart of Marie Byrd Land. This project had to be abandoned but Johnny stayed on at Byrd Station itself throughout the 1962 winter. He subsequently saw considerable further service with U.S.A.R.P.

Now his brother Ray has also become a confirmed Yankiwi. He has already served for two years at McMurdo and will be returning to the Antarctic in October after a six-weeks visit to the United States.

AN EARLY MORNING CATCH

Ian Calheim and Dr. D. A. Christoffel accepted this offering from a seal which used the hole they had cut through 8-10-foot ice to measure temperature changes in the water beneath the McMurdo Ice Shelf.

ANTARCTIC KIWI STRIKES TROUBLE

Who but Ron Hewson, Timaru-born and Inglewood-bred surveyor, who at 23 was a member of the New Zealand Antarctic team wintering over at Scott Base in 1962? He was in Walcott's Northern Party working west of the lower Beardmore Glacier area in December 1961–January 1962. After the winter he was again in the field, this time as leader of the Southern Party which experimented with toboggans to travel up the Victoria Land coast and strike inland to camp at the head of the Davis Glacier. From here they were air-lifted to the head of the Priestley Glacier. They followed the 1908 Magnetic Pole party's route down the Larsen Glacier to Terra Nova Bay. En route, Hewson went 30 feet down a crevasse on to a providential ledge. In all, the party sledged 850 miles in 111 days.

Well, a London press-message of August 1 tells how this same Ron Hewson, now a refugee from war-torn Nigeria, where he had been with a British surveying team and, later, an American oil-exploration group, arrived at London Airport clad in a T-shirt and a pair of shorts, with (again) long hair down to his shoulders. Two months earlier he had been working in a small dinghy which was overturned by an unusually large wave and Ron was "cut savagely about the buttocks" by the revolving propeller. His life was despaired of, but European doctors gave him first-class treatment at a Shell Company hospital in Port Harcourt and in August — still heavily bandaged — he was looking for something a bit adventurous.

EXPEDITIONS POLAIRES FRANCAISES

Our correspondent with Expéditions Polaires Francaises, summarising the 1966–67 summer season, reports that the planned programme was carried out in its entirety, and the rocket-firings were a complete success. However, the disruption of the planned voyages of "Thala Dan" following the vessel's immobilisation in the ice for three weeks off Wilkes Station brought numerous difficulties, the most important being the unavoidable cancellation of one of the four projected voyages. As a result, the repatriation of personnel at the end of the season was effected only under difficult conditions, and the timing of the transport of relief personnel was disrupted, entailing the extremely late arrival of the final wintering-over men, who had very little time for the take-over from their predecessors.

The disruption of plans also compelled the cancellation of planned visits to Dumont d'Urville of several influential personalities. In the outcome, only M. Gribelin, technical adviser to the committee responsible for France's overseas territories, was able to make a very brief visit to Terre Adélie.

Among the principal objectives which were achieved during the summer were the following: unloading, fitting up of living and sleeping quarters for summer personnel, production and distribution of fresh water, installation of scientific equipment (meteorology, ionosphere), foundation work (anchoring of cableways, extension of the rubbish disposal mono-rail system, etc.), topographical work, etc. All this entailed 21,322 man-hours, not counting the activities associated with the rocket-firing programme.

FUTURE PLANS

No specific details can be given as yet regarding the principal project envisaged, the setting-up of a new station on the polar plateau. This is not expected to eventuate before 1970 and plans have not yet been fully worked out.

Preparations are in train for the next expedition, TA 18, but at present the E.P.F. organisation is concentrating on the 1967 summer activities of the International Glaciological Expedition in Greenland.

The proposal to use a Breguet 941 aircraft to reach Adélie Land is still under study, in close collaboration with the Australians since actually a touch-down on Macquarie Island is envisaged. It is anticipated that the Breguet will land on l'Ile du Gouverneur, a low, rocky islet a mile or so west-south-west of l'Ile des Pétrels, on which Base Dumont d'Urville is located, off the Adélie Land coast. The first flight is expected to be in 1969.

As Dumont d'Urville is now a scientific observatory which functions regularly and without untoward incidents, very little of "news" value is reported to Paris during the winter months.

During the coming year, however, it is expected that a new laboratory building will be constructed for observations of radio activity and cosmic radiation. Also the building of new winter sleeping quarters will be commenced. The foundation and the metal frame of the building will be constructed this coming season but the building will not be available for occupation till after the 1968–69 summer.

WINTER 1968

Twenty-seven men will winter-over under Fernand d'Amate. "Thala Dan" should be loaded by mid-October. The ship will make two trips as usual.

WELL DONE, E.P.F. !

1967 is the twentieth year of Expeditions Polaires Francaises: Missions Paul-Emile Victor. We offer our cordial congratulations and best wishes on behalf of our readers to M. Victor and his staff.

EXCITING DAYS AS MAWSON MEN RISK FIELD JOURNEYS

We are happy to be able to draw on the monthly News-letters from station leaders despatched by ANARE to the dependants of men wintering at the Australian bases, for these lively narratives of life on station and, particularly, in the field during the past few months.

From the beginning of March the Church Mountain party, under Manning, worked to the east of Fischer Nunatak. Two surveyors, Manning and Lawson, climbed Mt. Rivett — the first humans to set foot on it. They reached the summit on March 17 at sunset in a temperature of 44° F. below freezing. The party then began to work its way back towards Mawson with Manning and Jaques taking tellurometer distance and theodolite angles every few miles. They reported the country around Mt. Rivett heavily crevassed.

The support party, under station leader Eskine, used two D-4 caterpillar tractors with sledges to carry the Church Mt. party and their vehicles the first 20 miles of their journey. The D-4s, being heavy vehicles, were in difficulties with crevasses right from the start. At one stage Wood said cheerfully, "Let's give the game away after we get a D-4 slotted one more time", expecting just to get a track break through over a hole. The next minute his machine with him in it disappeared from sight — the tail and the tip of the blade caught and held a little way down the bottomless hole. Reiffel brought his D-4 around on the ice with the big machine picking its way between slots like a ballet dancer, and after a lot of work with ice axes, the slotted machine was hauled out. This is the first time D-4s have been taken east of Fischer Nunatak, and it may be the last.

DIFFICULT RETURN JOURNEY

The Church Mountain party, after accomplishing the first successful ascent of Mount Rivett, worked their way through almost constant blizzards to an ice feature they called Frustration Dome. Here, in the extreme cold of the Antarctic winter, they were unable to continue while still 60 miles from the Base. Their last full message asked for search and rescue support from Mawson if they had not arrived at Fischer Nunatak Depot by May 7. The message then cut off in the middle, the radio having iced up, and from then on radio contact was lost.

In great haste a relief expedition was organised. Mechanics worked throughout the night to prepare the vehicles, and many who could not go spent hours packing dog sledges. Two tractors, the dog team and the little Skidoo toboggan were taken.

The relief party planned to travel with the tractors till the country became too difficult for heavy vehicles, then to continue on with the light team, leaving the tractors as a base. They struggled up the snow slope to Fischers where they camped for the night during a blizzard. They then moved out east into the real crevassed country. They made a whole four miles the next day and camped with the engine running during the night and lights pointed up to the sky for Manning's party to see and take fresh heart. It was a lovely camp — the tractor train, little Beche tent, line of dogs picketed out on the neve, whispering snow streaming past in the vast frozen wilderness and 52° of frost!

STRANGE MEETING

Meanwhile, the stranded survey party carefully packed a sledge with essential food, cooking fuel, tent and sleeping bags. Then, roping themselves to it in the manhauling tradition of former Polar exploration, they began the long trek home. On the fourth day, after marching

through appalling weather, they saw through the Antarctic dullness the headlights of the tractor as the two parties slowly converged. Late in the afternoon, as the tractor and dog parties continued to push along to the east, they saw four figures roped to a sledge plodding out of the drifting snow towards them — a very moving experience. The two parties rushed together. Such a shaking of hands and patting on back and the O.I.C. running to the dog sled to break out the flask of rum he had brought to celebrate. The tractor party did not really know the others were manhauling or even nearby, and yet they met head on in this enormous land! The four manhaulers still had ample food and kerosene in reserve. They were a strong confident team with an air of purpose and guts and would undoubtedly have got back to the Base by themselves.

OTHER ACTIVITIES

On May 19 a three-man party planned to spend a week at Lake Lorna, a frozen melt lake in the Masson Range, to look for samples of Glaciossyllus Antarcticus. This interesting animal is the Antarctic flea which is said to live in the ice-lined hollows used as nests by the lovely white bird, the Snow Petrel. Entomologists throughout the world are clamouring for specimens to study.

The glaciologists made a trip to Rumdoodle for a couple of days to put in a line of glaciology stakes for measuring ice ablation, and planned to use the tractors to move from point to point, taking quick compass bearings as they put in each stake.

By the end of April the sea was frozen over with ice two feet thick, strong enough to drive a bus on.

INTERNATIONAL CHESS

Mawson has been challenged at chess by the Russians at Mirny. The chess board remains set out in the recreation room, and each day Bennett with his radio link produces a slip of paper with the Russian move on it. The game has been steadily proceeding throughout the winter.

WINTER PASSES

Soon it was the very middle of winter with continual night. Astonishingly for the whole of one week a nearly full moon circled continuously around the cloudless horizon.

On June 26 a big Emperor penguin strutted into the leader's hut. It was a magnificent bird, 3½ ft. high, with glossy black and white plumage, apricot yellow neck, big red curved beak, a proud disdainful expression and a harsh "awk awk . . . get-out-of-my-way" voice. He had been picked up by Little and Forecast when they had been out mapping the edge of a recent sea ice breakout where many Emperors were feeding from a large pool of open sea. Later the penguin visitor was taken back to his home.

The sea ice on which much depends for winter travel had broken out twice, preventing them from setting out for the Auster Rookery as planned. By the end of June it was refreezing nicely, and many were travelling twelve to fifteen miles to test the ice, to establish depots and to practise sea ice travel with dogs and motorised toboggans. Bishop often travelled towards the Rookery Islands 40 miles from Mawson on the western route to Taylor Glacier, hoping to prove it a safe route all the way.

Surveyor Manning has a tent permanently erected on Bechervaise Island, where he makes extremely accurate astronomical fixes on five or six nights of perfect observations. This took most of the winter to achieve.

The Snow Petrel men (Cowell, Gillies and Cheney) finally got up to Lake Lorna. A six-day blizzard started the day they were due to leave Mawson but they got away during a lull, their sledges being pulled up the 2,000 ft. high edge of the ice sheet by tractors. They set up camp on the ice fifteen miles out., then with packs on their backs they clambered single file among the peaks searching for the scooped out hollows under rocks, protected from blizzards, where the Snow Petrel builds her nest.

The midwinter twilight did not stop the annual Mawson sea ice race on Midwinter Day — a handicap race open to all comers, all vehicles, it covered a two-mile course round Hump Island and two icebergs. They had a skier towed by a motor-cycle; a footrunner who ran a magnificent race against a tough handicap but was unplaced; a motorised toboggan; a motor-car and motor-cycles; dog teams, the "whites" driven by Dent and Erskine, and the "blacks" by Manning; a wheelbarrow and an old lorry.

On the day before Midwinter Day, a party of four went for a twenty-mile run on the sea ice to place a depot on a rocky island.

AUSTER ISLAND ROOKERY

Two sea ice trips were made during July. The first party, consisting of Manning, Lawson and Reiffel, took the skidoo towing a dog sledge with the object of putting a depot as far as possible towards Auster Island. This trip was very successful and the skidoo went so well that they set up camp at Auster Island itself. The trip was unusual in that the weather was perfect, and the sea ice smooth instead of hummocky or snow covered as so often is the case. There are now three depots, including ones previously put out by dog sledge, along the route. As an experiment a Volkswagen and a motor-bike were used for serious work on the sea ice, supported by skidoos with a sledgeload of supplies. With the skidoo acting as one base and Mawson as the other, the Volkswagen carrying full survival gear shuttled back and forth on the sea ice, doing in an hour what dogs or skidoo would take several days to accomplish. The motor-bike went as scout with the skidoo, and if the bike should get into trouble it could be loaded on to the sledge.

THE PARTY LEADER REPORTS

"We used the Polar Pyramid as they are fine tents when pitched properly. We departed Mawson at first light, escorted by the motor-bike. The surface was slow due to the warm still weather, 26° below freezing. The Volkswagen caught us up at the first depot, where the snow was hummocked and soft, so the Volkswagen and bike went in closer to the coast on fast firm snow, making several wide sweeps in the maze of icebergs. The skidoo and bike pushed on at 6 m.p.h., and we set up camp in the fading light on a good camp site at the north end of the island. The next day we headed S.E., proposing to penetrate the iceberg belt to reach the rookery, a grim bleak lonely place, ringed by grounded icebergs held in the grip of the frozen sea. There we counted 15,500 male birds, each one tending a precious egg, waiting out their six weeks' vigil of starvation, and hunched in a tight circle against the freezing wind. The skidoo and bike stopped that night at an unnamed island, the most southwesterly island of the group where a depot of food and fuel was established. Reiffel affixed a brass plaque to the summit of the island, naming it Carole Island. We kept well in to the ice cliffs to avoid the fierce wind which blew the sledge around at right angles to the direction of travel.

"We have an enormous admiration for the Emperor Penguin, who faces the toughest survival problem of all animals in the world. The female lays her egg during May, then leaves to seek food in distant waters, and the male remains without food while hatching the egg throughout the Antarctic winter. Mother penguin returns primed with food which she feeds in a regurgitated paste to the hatched chicks, and only then does the emaciated father depart northward."

WOULD NOT HAPPEN WITH DOGS

A second trip was made with the object of spending a week at the rookery instead of just a hurried reconnaissance. This time a dog team went with the skidoo. One night the skidoo hauled its sledge up on to an island to camp, and after the dogs had been helped to pull their sledge up, one man set off on the skidoo to look for fresh ice for drinking water, as snow on the island was contaminated with wind-

blown salt off the sea-ice. The skidoo bounced and threw its rider: everyone rushed to catch the skidoo, but the ice was too slippery and it puttered off into the darkness. Next day they followed the slight tracks it had made for five miles and during the next four days tracked it for many more miles out to sea. Mawson was radioed and a second dog team was sent out. The tracks were followed until it became hopeless, shifting camp as the search progressed, but after six days the party returned to Mawson cold, tired, unhappy and minus the skidoo.

FUTURE INLAND STATION

Lockhart built a small experimental hut to be taken to pieces and re-erected on the plateau. The idea is to see how it stands up to conditions, so that A.N.A.R.E. can design an inland station. It looks strong and neat in the workshop, and it is a shame to think of the battering it will get from wind and snow during the next few years. It will be taken 15 miles out on to the plateau and anchored into the ice.

Illingworth went to Lake Lorna and brought back specimens of strange plants growing out of the solid block of ice which is called a lake. We were rather sceptical because the lake only has a few hours of partial melting each year, but the specimens really look like toadstools seven inches high. Photos of the specimens have been sent to Melbourne biologists via the radio facsimile apparatus.

At the end of July the first rays of the returning sun just touched the jumble of icebergs in front of the base, tinting the ice cliffs edging the Plateau with a glistening pink and a background revealing the chill purple of the David and Casey Ranges which thrust their bleak rocks up out of the white waste.

We regret to announce the death on May 9 of **WILLIAM A. BRIESEMEISTER,** the American cartographer, who will long be remembered for his maps of Antarctica and for his knowledge of the exploration of its ice-sheet and mountains.

WILKES

RECORD HIGH TEMPERATURE

At Wilkes the temperature on May 30 rose to 41.8° F., possibly unprecedented for the time of year and certainly one degree higher than the maximum temperature recorded for the whole of last year, including the summer. For those who returned from seven weeks in the field on May 23, this represented a change of almost 82° in four weeks. In the middle of May Wilkes recorded a maximum wind speed of 111 m.p.h. Fortunately little damage was caused, apart from uprooting the "World" signpost and blowing down a couple of aerials, which were soon repaired. Drift accompanied the high winds that were experienced generally throughout May, and the station buildings are mostly drifted up to the eaves and well insulated against the changing world outside.

FURTHER RESEARCH FOR INLAND STATION

During the month, at a site on the plateau five miles from the camp, a small hut ten feet long by four feet wide by eight feet high, was mounted on a tubular metal substructure, so that the floor level is five feet above the snow. The object is to aid the design of future A.N.A.R.E. inland stations by observing and photographing at regular intervals throughout the year, recording any displacement or movement of the substructure, as well as a study of drift profiles on and around the structure.

By the end of July things were looking brighter as the days lengthened. Resumption of field trips, though comparatively early, appeared to bring the end of the year in sight and morale had risen accordingly. The scientific staff were now thoroughly familiar with their work and had begun to consolidate results. Radio conditions were improving as they moved into the second half of the year. These showed up in ionosonde results as increasing critical frequencies and the return of another ionospheric layer. There has been correlation be-

tween auroral layers and sightings of aurorae by the "Allsky" camera.

Burns suffered by Jackson short-staffed the met. men, whose work had been rather arduous because considerable winds this month have hampered balloon launching for upper atmosphere observations. They report a record low barometric pressure for the station, and extensive cloud coverage has contributed to abnormally high temperatures for this time of the year. An 80-knot wind damaged the amateur radio antenna again but the cubical quad antenna was quickly restored to a new position with stronger wiring.

JULY JOURNEY

The first spring trip got under way on July 29 to S.2 (an outstation about 50 miles from Wilkes), where Carter and Olrog will camp. They will be studying temperatures and ice movement, collecting samples at various levels in the 100-ft. deep pit, and testing new electronic radio echo-sounding equipment. The remainder of the party will continue on some 25 miles to the top of the ice-dome to establish a fuel depot for future trips and to take readings with the gravity meter.

FIRST ANTARCTIC AUSSIE IN SPACE

Melbourne-born Dr. Philip Chapman, a seventh-generation Australian, graduated from Sydney University in 1956 as a physicist. In 1957 he spent 15 months at Mawson Base, Antarctica, as an auroral radio physicist with the Australian National Antarctic Research Expedition (ANARE). Since 1961 he has been attached to the experimental astronomy laboratory of the Massachusetts Institute of Technology.

Now, aged 32, he has been selected to undergo final selection for training as a United States astronaut, the first non-American or non-Russian to be chosen to train for space flight. He hopes to be in the first moon-crew — in five or six years' time. Dr. Chapman became a United States citizen four months ago.

FOURTEEN MONTHS IN ISOLATION

Beginning in January 1968, a four-man party of Australians will spend 14 months in isolation studying the glaciology of the Amery Ice Shelf.

The party members will sail in "Nella Dan" at the end of 1967, taking caravans, tracked vehicles, stores, radio and scientific equipment.

The Amery Ice Shelf is a floating sheet of ice about 1,000 feet thick and 100 miles wide at the mouth of the Lambert Glacier between 70° and 80° E., about 300 miles east of the nearest occupied Antarctic settlement, Mawson, from which for several years tractor parties have travelled to observe the shelf. Expedition members must now live there throughout the year to find out what happens during the winter and to have time to drill holes to the bottom of the shelf.

Study of this area is expected to yield valuable information on many aspects of the glaciology of Antarctica, including ice movement, snow accumulation, ice thickness and heat budget.

The party will consist of glaciologist, electronic engineer, senior diesel mechanic and medical officer. The first three have been selected already but a medical officer is still required.

Maxwell J. Corry (26) will be glaciologist and leader of the party. He is a surveyor and has already spent a year in Antarctica as surveyor with the 1965 ANARE party at Mawson.

Alan H. Nickols (28) has been selected as electronic engineer and radio operator. Mr. Nickols is an Army captain. In 1961 he graduated Bachelor of Engineering with First Class Honours at the University of New South Wales.

Neville J. Collins, B.E.M., will be senior diesel mechanic. He was a member of the ANARE expeditions at Mawson in 1957 and 1960, and at Wilkes in 1962. On two of these expeditions Mr. Collins took part in long tractor journeys into the interior of Australian Antarctic territory.

THE FUTURE OF ANARE

Since the resignation a year ago of Dr. P. G. Law, now Vice-President of the Victorian Institute of Colleges, and three years ago of Dr. F. Jacka to become Director of the Mawson Institute of Antarctic Research, Adelaide, no appointment of a Director of ANARE (the Australian National Antarctic Research Expedition) has been made. In fact, no advertisement for a successor to Dr. Law appeared until February this year, nine months after Dr. Law's resignation.

There has been considerable speculation regarding the reasons behind this delay. It is understood that the report of a Committee which has been enquiring into the scope and nature of the scientific investigations and logistic support which have been carried out by ANARE for the past nearly twenty years, is being prepared for presentation to the Department of External Affairs, which at present has ANARE under its wing.

A possible outcome is the raising of the whole status of ANARE to a similar status to that of CSIRO. On the other hand, it could be that ANARE will become merely a body providing financial and logistic support for research initiated and carried out and the results published by such independent bodies as the Universities.

Antarctic men everywhere must sympathise with ANARE in its obvious lack of support from the top in a country which claims a third of the Antarctic Continent, and yet has never had its own expedition ship or adequate provision for flights between Australia and the Antarctic. Hardly a single Australian Federal politician of note has ever bothered to visit the vast Australian Antarctic Territory — so sparsely populated with voters — yet of such vast potentialities for the future of Australia.

The following two meetings will be held in Tokyo in 1968:

June 3–8: Logistics Experts, Antarctic Treaty powers.

June 10–15: Tenth SCAR Assembly.

ANTARCTIC SOCIETY GIFTS TO GOVERNOR-GENERAL

On August 10 four representatives of the New Zealand Antarctic Society were received by the Governor-General, Sir Bernard Fergusson, at Government House in Wellington, and presented him with a farewell gift of two books and a portrait from the Society as a tribute to his great personal interest in the Antarctic and in New Zealand's work there.

The chairman of the Wellington Branch, Flight-Lieut. W. C. Hopper, introduced the members who made the presentations: Mr. Howard Mallitte, who painted the portrait of Sir Bernard in Antarctic clothing, Dr. Trevor Hatherton, editor of the Society's publication "Antarctica", and Mr. L. B. Quartermain, author of "South to the Pole".

The Governor-General will take a piece of Antarctica back to Britain when he leaves New Zealand later this year.

It is a paperweight shaped from a lump of kenyite lava taken from the summit cone of Mount Erebus, one of the two active volcanoes on the continent.

Sir Bernard, who visited the Antarctic in the 1963–64 season, will be given the paperweight by the Canterbury branch of the New Zealand Antarctic Society, when he makes his last visit to Christchurch next month.

Mr. A. Beck, of the geological survey, collected the kenyite in the summer of 1958–59.

He was one of the members of a geological and mapping party led by Dr. H. J. Harrington that made the first ascent of Mount Erebus since 1912.

Kenyite is a type of basalt.

It is dark brown and has large white crystals of anorthoclase running through it.

The lump of kenyite, which will be polished, is several thousand years old.

TWELFTH SOVIET EXPEDITION ROUND-UP OF ACTIVITIES

To summarise the 12th (1967) Soviet Antarctic Expedition, "Ob" left Australia for the Antarctic on January 29 carrying 73 expedition members who had arrived in Australia by air. On the Fremantle-Mirny crossing the oceanographic team made 16 stations. After the change-over at Mirny, "Ob" left for Molodezhnaya carrying 1,000 tons of cargo. During this cruise the West Ice Shelf and Amery Ice Shelf were investigated and the Cheluskintsev Peninsula was more precisely delineated. Taking on 730 tons of fresh water from the lake, the "Ob" made for the Princess Astrid Coast to supply Novolazarevskaya station. A hurricane made the unloading difficult. During this period the wind velocity reached 40 m/sec.; the temperature in two days rose by 20°. On April 2 the unloading was accomplished and the "Ob" made her way for the homeland. She reached Leningrad on May 11.

The "Ob" delivered to the Soviet Union the cross-country vehicle which travelled more than 6,000 miles in Antarctica, including the three-month trek from Molodezhnaya via the Pole of Inaccessibility to Novolazarevskaya. This vehicle will be put on show at the Exhibition of Economic Achievements of the U.S.S.R.

FRUITS OF RESEARCH

During the summer a geological-geographical team of the 12th S.A.E. made investigations of the Yamato, Sor Rondane and Wohlthat Mountains and visited the mountain ridges of Scherbakova, Rose Luxemburg, Gorkogo, Zavaritskogo, and the Kurchatov, Mikheev, Sinitsin and Vysotsky Mountains. Support was given by the AN-6 plane. To the almost inaccessible regions of the Alexander Humboldt Mountains geologists were transported by the cross-country vehicle "Penguin". One thousand five hundred samples of rocks were gathered, and field, geological and geomorphological maps were compiled.

During the march across the Pole of Inaccessibility the ice thickness at the point 76° S., 48° E., was measured by seismic sounding methods. According to preliminary data the depth was 3,600 m.

During the 2,000-mile trek from December to March, seismologists established that hills and mountains, ranging in height from 1,200 to 5,000 feet above sea level, exist under the ice in those regions. There are also valleys going down to between 30 and 800 feet below sea level. The ice is between 7,200 and 12,300 feet thick on the Antarctic plateau.

Rock Samples. Members of a geological party extensively explored the mountainous areas of Queen Maud Land, which form the upper part of the Antarctic crystalline foundation, and they brought over 1,500 rock samples back to Leningrad on the diesel-electric ship "Ob".

Scientists have found that the fauna of the Davis Sea is very rich and varied. They have discovered nearly 500 types of organisms in the sea, mainly sponges, ascidians, echinoderms and coelenterates.

The lower surface of the shore ice provides good cover for deep water fauna, whose degree of development depends on the thickness of the snow above the ice, which cuts out solar radiation.

Biologists working at Mirny have found living organisms — large numbers of diatoms — in the lower part of a six-foot layer of ice. The sun's rays which pentrate through the ice, and the salt solution of the ice itself are sufficient to keep them alive.

This discovery has been made by Yevgeny Propp and Igor Pushkin, who have skin-dived 162 times beneath the ice near Mirny. They have

frequently gone down to considerable depths and stayed down for at least an hour at a time before returning to the surface.

Under the ice they saw large numbers of molluscs and a multitude of small lobsters, which at once sought refuge in the porous ice when they approached. The ice serves as a feeding ground — lobsters and molluscs eat the diatoms.

ICE-FREE CHANNEL

Amidst the ice-covered seas of Antarctica, one big channel has turned out to be completely free of ice. This unusual phenomenon observed by Soviet scientists 10 years ago, has only now been explained by the marine section of the 12th Antarctic expedition. The temperature of the water at the surface of Prydz Bay (in the "Sea of Friendship", between 70° and 82° E., longitude) reaches more than two degrees. The explanation of the mystery lies in the peculiar relief of the sea-floor. The deep waters here rise to the surface and break up the ice. The ice-free water surface absorbs solar energy, thereby raising still further the temperature of the water.

ICE MANTLE

It was reported on July 1 that Soviet scientists have invited their French colleagues to take part in the 13th Expedition. The aim of the research project is to measure the ice mantle covering the Antarctic, which is important for an understanding of the weather. The leader of the expedition will be Oleg Vinogradov, a glaciologist. It is proposed to process the results of the research projects immediately on a computer. The first measurements of movements in Antarctic ice were carried out in 1963/64 by Russian glaciologists headed by Professor P. Shumsky. Repeat experiments will be necessary. A Soviet-French team will conduct them between Vostok and Mirny stations.

In the crossing from Australia to the Antarctic deposits of manganese ore were discovered by scientists on the "Ob".

MORE ABOUT MOUNTAINS

Prof. M. G. Ravich told a correspondent of "Leningrad Pravda" that Soviet scientists working in Queen Maud Land last summer covered more than 10,000 kilometres by air, carried out dozens of landings and took more than 1,500 rock samples. Solovyeva's team of geologists ascertained that in their geological composition the Sor-Rondane Mountains (21°–25° E., 72° 15′ S.) are markedly different from the other mountains of Eastern Antarctica, but similar to the transantarctic mountains. This indicates that the geological composition of the Antarctic is significantly more complex than was hitherto believed.

In the Humboldt Mountains, 250 miles further west, a geological survey on a medium scale was first carried out. The geologists were able for the first time to classify the most ancient Antarctic deposits (more than 2.5 milliards of years old) and study great outcrops of coarse-crystalled rock associated with relatively recent (in the geological sense of the word) activation of cataclysmic processes. The age of these "young" rocks is approximately 500 million years.

Geological research was also carried out during the expedition from caterpillar-sledges. By means of seismic soundings not only was the depth of the ice determined but also the geological rock structure of the continent at a depth of several kilometres. It was demonstrated that under the ice is a mountain mass with heights of the peaks varying by as much as 1,800 metres. The thickness of the ice shield, properly speaking, over the route from Vostok to the Pole of Relative Inaccessibility and on to Novolazarevskaya varies from 2,200 to 3,760 metres.

BULGARIAN

A Bulgarian meteorologist, Tsonko Chapakor, is the first Bulgarian scientist to work on the frozen continent. Chapakor is concerned with the higher levels of the atmosphere.

RUSSIAN SCIENTIST AT THE SOUTH POLE

P. Astakhov, wintering with the Americans at the South Pole, sent this message recently by radio: "In the Antarctic the second half of the winter has arrived. Night reigns at the South Pole, where at this momen 21 'Polar Men' are keeping a scientific watch. In the sky above us, a round and very high moon is visible. It is light enough to photograph the arid landscape of the frozen desert extending around 'Amundsen-Scott', the American station. Along with members of the American expedition, I am conducting geophysical surveys here.

"Recently, like the other stations scattered over the sixth continent, we celebrated the winter solstice. This is an event marked in a special way here. A symbolic walk around the point of the geographical South Pole took place. Camera enthusiasts 'captured' the Polar lights, which are observed quite often. To photograph them one has at times to remain outside for up to 15 minutes in a 70° frost.

"At the end of August, we expect the arrival of the first rays of the sun and a hardening of the frosts. At the Amundsen-Scott station still lower temperatures outside are the custom usually at the end of the winter."

MAY DAY

Spring festivities breaking through storms at the 40° latitude and violent blizzards have come to the shores of the Antarctic. Soviet Polar scientists working at the Mirny Observatory and at Vostok, Molodezhnaya and Novolazarevskaya, met the 1st of May with progress in their work.

On May Day at all the Russian stations the huts were decorated with flags. Loudspeakers carried broadcasts from Moscow. Parties were held, to celebrate the day. With the advent of spring, Soviet scientists received congratulations from their foreign colleagues wintering on the frozen continent.

At Molodezhnaya, the sixty Polar scientists have an American scientist, MacNamara, working with them.

MIDWINTER

V. Gerbovich, reporting by radio from Mirny on June 22, said: This is traditionally a holiday. Expedition members congratulated by radio those of other countries who are busy with research.

At Vostok (the South magnetic pole and the "pole of cold") 77 degrees of frost can be observed. At the shore stations of Molodezhnaya and Novolazarevskaya and at Mirny it is not so cold, but winds reaching at times a speed of 35–40 metres per second significantly increase the harshness of the weather.

In some sections, meteorologists and geophysicists are ahead of schedule in their researches. Mechanics were repairing the caterpillar tractors. All is ready for the difficult trip from Mirny across the ice plateau into the heart of the continent.

On certain days, a rare phenomenon of nature can be observed at Mirny. The day will be clear, the thermometer showing 16° of frost, the wind about 10 metres a second. At midday, the edge of the sun will appear at the North over Haswell Island, near the Pravda coast. A green light will flash. One can see it for quite a while.

We hold football matches on the congealed ice. The Leningrad men at the Pole won 2 of the 3 matches. But this isn't the final result. The Moscovites intend to play them back. A chess match by radio is going on with American scientists from the stations of MacMurdo and Byrd, with the Australian base at Mawson, and the French at Dumont d'Urville.

The harbingers of spring should soon be flying in to Mirny. Last year biologist Kamenyev radioed on October 14 that the first two petrels were observed on September 26, one a snow petrel and the other a silvery grey. The main group began to fly in on October 5, and by the 13th there were already about 100 in the vicinity of Haswell Island.

The Antarctic petrels arrived on October 2 and by the 13th they numbered about 10. The first Adédlie penguin arrived on October 9.

MORE ABOUT THE BIG INLAND TREK

While "Ob" was crossing the Indian Ocean on her way home, a correspondent of the Moscow "Economics Gazette" made radio contact with a member of the team which travelled from Molodozhnaya to Novalazarevskaya last summer and was given some further first-hand information about the trek.

"There is in the icy continent a remote spot situated in the centre at the greatest possible distance from all coasts. This is the Pole of Inaccessibility at 82° latitude South and 55° longitude West.

"The aims of our expedition were to travel a distance of 3,500 kilometres and link Mirny and Molodezhnaya through the centre of the continent. Our programme included work in the fields of seismic sounding, gravimetry, geodesy, magnetism, meteorology and glaciology. We had to draw up a plan of the relief of the terrain under the ice, obtain data on climate, solar radiation and the thickness of the ice crust. So the 16 members of the expedition were of many professions: geodesists, radio operators, gravimetrists, magnetologists, seismologists, drilling experts, physicists and, naturally, drivers.

"Our route maps were on the whole blank, showing nothing but meridians and parallels. The journey began on December 29, 1966, from Molodezhnaya Base, established in 1962, 2,115 kilometres west of Mirny in one of the Antarctic Oases. From the outset this base was intended to be the starting point for expeditions towards the interior of the continent.

"Our caterpillar sledge train consisted of two 'Kharkov' over-land vehicle and one tractor. The former are huge cross-country vehicles specially built for work in the Antarctic. Inside their bodies there are several rooms: the driver's and navigator's cabin; a general room in which six men can live and where scientific equipment can be kept; the radio room; generator room; toilet and lobby. This self-propelled laboratory is equipped with the most perfected forms of radio and navigational apparatus. Caterpillar tracks a metre broad give the huge machine its stability.

"Ahead lay a white sea of snow with cruel high waves and a swell of crumbling snow in drifts as if it had been inflated. The vehicles skidded in newly formed drifts some metres deep. The over-land tractors dragged their heavy loads with difficulty.

"For the first two weeks progress was slow, not more than thirty or forty kilometres being covered every 24 hours. Head winds carried clouds of snow, like dust, into our faces. Nothing was visible more than a few paces away. Navigation was carried out by instruments. Despite the severe conditions, the expedition members worked almost round the clock in two shifts.

"On February 22, after 56 days of travel, we reached the Pole of Inaccessibility. Before us stretched a dazzling white plain adorned with capricious lacelike patterns. Breathing was difficult, for we were at a height of 3,710 metres above sea level.

"On March 15, an aircraft from Molodezhnaya Base visited the expedition. When the black speck appeared on the horizon, our joy was unbounded, for we had seen nothing for many days except white, lifeless desert in front of us. Flying low with a roar, the IL-14 approached. Turning around, it dropped close to the tractor-train a container with spare parts, fresh vegetables and mail.

"On the following day, inspired by the encouragement and support of our comrades, we set a special record for speed. The expedition travelled 160 kilometres in 24 hours."

THE AMIABLE KILLER

An Oslo correspondent of the Hobart "Mercury" says that an American scientist who has studied a Killer whale in captivity found it to be humorous, playful and affectionate.

"BELLINGSHAUSEN"

NEW STATION PLANNED ON ANTARCTIC PENINSULA

In one of the rooms of the Arctic and Antarctic Institute, according to "Lens-Tass" (Leningrad branch of "Tass"), June 4, there is a slab with the inscription "13th Soviet Antarctic Expedition". Widespread preparations are being made in Leningrad for sending a new relay of Polar men to the Antarctic.

On the north-west coast of the Antarctic Peninsula, it is planned to select a site and build a new Soviet Antarctic Station which will bear the name of the famous Russian traveller and Antarctic discoverer, F. F. Bellingshausen. For the first time in this region, geological surveys will be conducted by a Soviet Polar expedition on islands and along the coastline.

V. G. Averianov, head of a branch of the Arctic and Antarctic Institute and a graduate in the geographical sciences, told a Tass correspondent about the problems of the 13th Expedition:

"It is the Expedition's task to select a site and build a new Soviet Station which will bear the name of Bellingshausen," he said.

"On board the 'Ob', which will cruise around the whole of the Antarctic, it is intended to carry out a series of oceanological projects and hydrographic experiments. Members of U.S.S.R. Academy of Sciences Zoological Institute, with the aid of aqualungs, will carry out a series of hydro-biological experiments and will collect information about underwater plants and animal life.

"On this expedition also, taking part for the first time, will be a new research vessel of the U.S.S.R. Hydrological Service, the 'Professor Wiese'. This 'science vessel' has a remarkable laboratory. On board the vessel, hydrological and meterological surveys will be carried out."

ARGENTINA

Argentina informed New Zealand in June that owing to an accidental fuel leakage in the General Belgrano Base, the All-Sky Aurora Camera and the Ionospheric "Sondes" were out of order. At that time two Riometers and an auroral Photometer had not been restored.

SHIP MOVEMENTS

SUMMER 1966–67

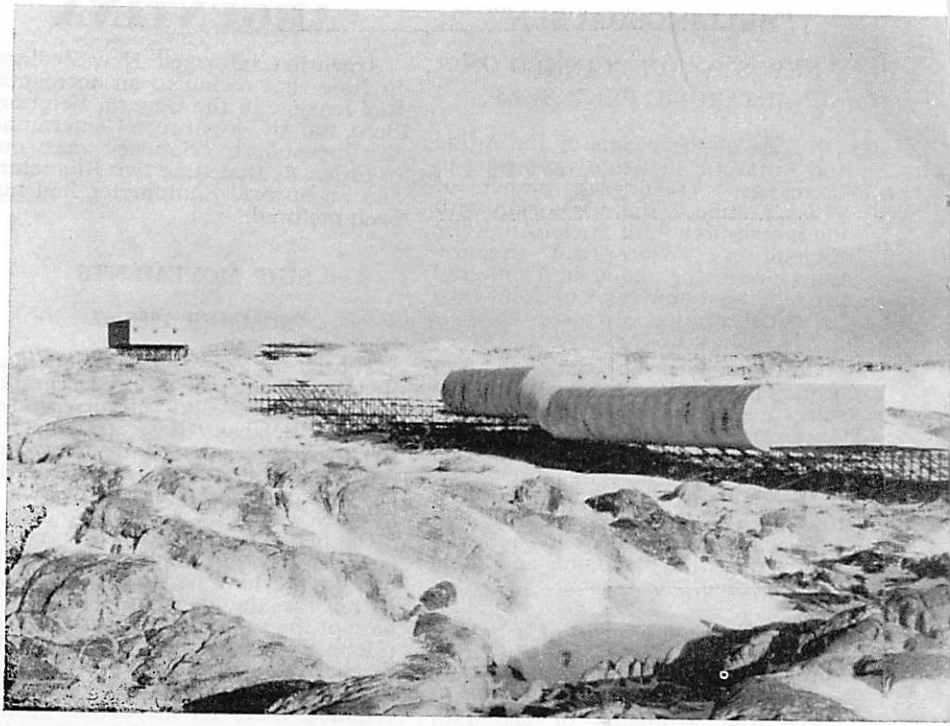
The ice-breaker **General San Martin** left Buenos Aires on December 20, relieved and reprovisioned General Belgrano Base, transported the men relieved at Luna Bay and Aguirre Bay, and returned to Ushuaia on January 27, 1967.

On her second voyage the vessel left Ushuaia on January 30, disembarked the new party and cargo at Petrel for the construction of the base of the same name. At Esperanza (Hope Bay) as it was impossible to reach Matienzo Bay, relieving personnel were disembarked and provisioned. After an inspection of the naval detachment at Islas Orcadas the ship left there on February 25 and reached Buenos Aires on March 3. Total mileage, 12,512 miles, south of 56° S. for 59 days.

The transport **Bahia Aguirre** left Buenos Aires on November 25, relieved the men at Esperanza, disembarked men and cargo to erect Petrel Aeronaval Station, relieved and reprovisioned Almirante Brown and Decepcion before arriving back at Ushuaia on December 31.

Leaving again for Orcadas on January 7, the staff were relieved, reprovisioning carried out and men left for construction work. The ship returned to Ushuaia on January 21.

For the third voyage the ship sailed on February 13 for Luna Bay, Esperanza and Petrel, and was back at Ushuaia on February 25 and Buenos Aires on March 2; 10,572 miles were covered, with 78 days south of 56°.



The new Wilkes Station

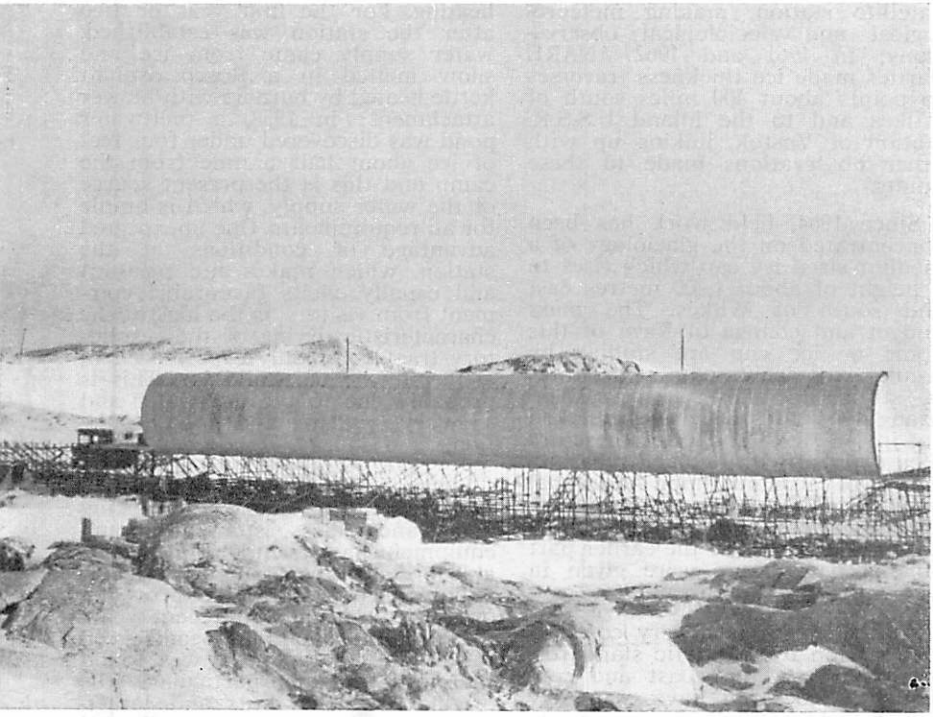
ANTARCTIC STATIONS

10

WILKES

In February 1957 the USNC–IGY Station at Wilkes was established at 66° 15′ S., 110° 31′ E., in a position which had been selected by a survey team during the previous summer. About 11,000 tons of buildings, fuel, scientific equipment and other supplies were landed from the U.S.S. "Arneb" and U.S.N.S. "Greenville Victory" on a peninsula on the eastern side of Vincennes Bay in Wilkes Land; building was commenced immediately and the base was soon operational. The peninsula on which the station was built is rough and rocky, and access from sea is not easy; a ramp was levelled with explosives and earthmoving equipment, and this has been kept comparatively free of ice and snow to facilitate landings each summer. Similar rocky peninsulas extend southwards along this side of Vincennes Bay which is flecked with numerous islands, including the Windmill group.

Carl S. Eklund was Scientific Leader during the first year and Lieut. j.g. D. R. Burnett was in charge of naval personnel; the station was relieved in late January 1958 by a new party with Willis L. Tressler as Scientific Leader and Lieut. R. S. Sparkes, U.S.N.R., Officer-in-Charge and Medical Officer. During 1958, some concern was expressed that the station might be abandoned at the end of the International Geophysical Year and, as the result of talks between the Governments of the United States of America and Australia, it was announced in May that the two nations would continue technical studies, research and scientific observations without interruption after the end of the year. In February 1959, the base was trans-



ow under construction. ANARE Photo

ferred to the custody of ANARE and, since then, has been manned each year by Australians with scientists from the United States of America carrying out specialised work in biology and meteorology until 1963.

During the first two years, IGY studies by United States scientists included meteorology, ionospheric physics, aurora, cosmic rays, geomagnetism, seismology and glaciology; in addition, projects were undertaken in physiology, biology, survey and glaciology. At the conclusion of the International Geophysical Year, work in these disciplines was taken over by the Australians and has been continued successfully ever since. From the party of 19 under Robert J. Dingle, which took over the base in 1959, the size of the party has been increased to 25 as projects have been extended and fields of study broadened in line with the work and results from previous years.

Shortly after the Wilkes Station was set up, a small party travelled south and established a satellite base for meteorological and glaciological studies, about fifty miles from the main base. This consists of a Jamesway hut, a snow pit extended to a depth of about 120 feet, a small generator room and two storage areas which are all joined by tunnels. This base has been regularly used for observations and, during 1966, was completely rehabilitated by a construction party in preparation for winter occupation and work by glaciological teams.

The first glaciological traverse from Wilkes was made in 1958 when an American party heading south and west covered 400 miles in about sixty days, carrying out snow and ice observations en route. Since then, there have been many traverses inland from Wilkes: in 1960, an Australian party journeyed 460 miles to a point about 180 miles south of the

satellite station, making meteorological and glaciological observations; in 1961 and 1962 ANARE parties made ice thickness traverses to points about 400 miles south of Wilkes and to the inland U.S.S.R. station of Vostok, linking up with other observations made to these points.

Since 1964, field work has been concentrated on the glaciology of a medium-sized ice cap which rises to a height of about 1,400 metres east and south of Wilkes. The mass budget and change of form of this dome or ice cap are studied by regular remeasurements of the rates of strain and flow at points on triangular routes which were staked out in 1964, 1965 and 1966; these are then coupled with detailed measurements of accumulation. Additional strain grids are being set up during 1967 in preparation for further observations. Details of the earlier part of this programme were given in "Antarctic" of December, 1966.

Wilkes, which is a very comfortable station by Antarctic standards, is situated on the coast and consequently does not have extremely low air temperatures; these occasionally rise as high as 43° F. and seldom drop below −37° F. Light rain falls occasionally and wet snowfalls are common; average wind speeds are surprisingly high.

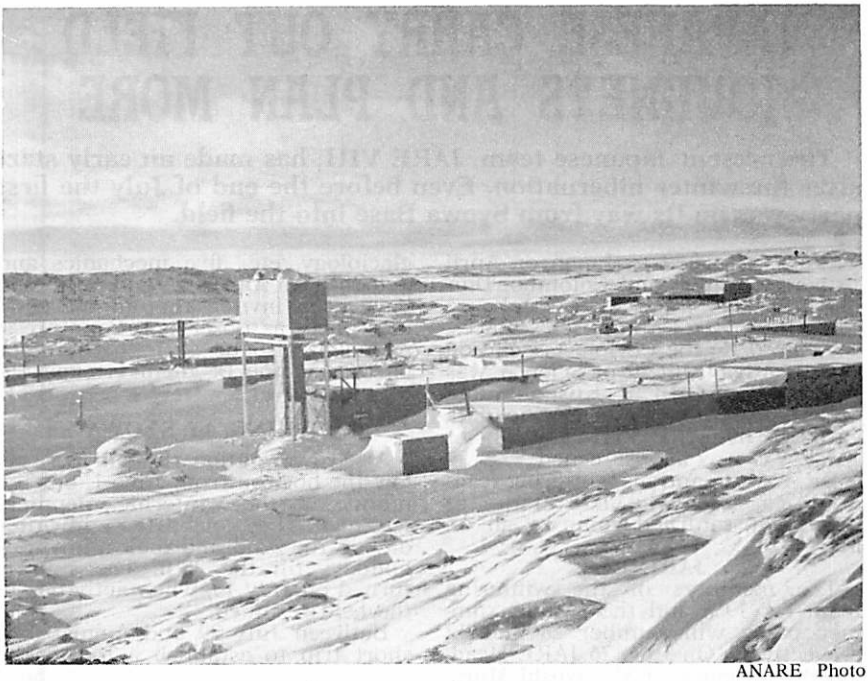
The station is basically made up of a cluster of Clements huts, some of which have been considerably altered and modified for the conditions; interspersed with these are several buildings designed for scientific purposes. Storage space is provided in Jamesway huts which were transferred from the temporary camp which was used by Navy personnel while the base was being built, and by tunnels of one-inch sheathing set on two-inch frame and sealed by tarpaulins and composition. Jamesway huts, set some distance from the main camp area and once used for emergency stores, are now virtually covered by ice.

Light and power are supplied by Caterpillar diesel generators, and oil stoves are used for general internal heating. For the first year or two after the station was established, water supply came from ice and snow melted in a Rosco asphalt kettle heated by burners with blower attachment; in 1958, a meltwater pond was discovered under four feet of ice about half a mile from the camp and this is the present source of the water supply, which is ample for all requirements. One unexpected advantage of conditions at the station, which makes life pleasant and usually elicits favourable comment from visitors, is the lack of the characteristic drying of the respiratory tract commonly experienced in artificially heated buildings. This is probably due to the meltwater and snow everywhere, and good insulation.

Since the station was established in 1957, living quarters, working areas and offices, store huts and equipment have been kept in reasonable order by constant and regular maintenance. Despite the provision of extra tradesmen in recent years to rehabilitate buildings and keep the station in repair, it was found that most sections, particularly the original Clements huts and Jamesways, were deteriorating rapidly and the point was being reached where their replacement was essential. In 1963, it was decided that the most practical and economic course to take would be to completely rebuild the base on another site close to the existing station and, after a preliminary survey, an area on Bailey Peninsula about a mile and a half from the present Wilkes Base, was selected.

"REPSTAT"

The plan was for preliminary work to be commenced in 1965, the station to be built in four stages to be ready for occupation by 1969, full use being made of summer periods to bring specialised rigging and construction teams to press on with the work while ANARE ships were in the area. Mr. D. F. Styles, present Acting Director of the Antarctic Division, is responsible for organisation and control of the project and, under his guidance, construction



ANARE Photo

The Present Wilkes Station.

work is progressing well. In the planning stages, ANARE technical staff were assisted by consultants from the Commonwealth Department of Works, the Aeronautical Research Laboratories of the Department of Supply, University of Melbourne and other bodies with problems of design; the Commonwealth Department of Works prepared detailed building designs and arranged contracts for their construction; an architect and road-construction experts from the Department of Works also assisted the ANARE construction teams at the station during the summer. Site construction is being supervised by Antarctic Division technical staff.

Buildings are arranged in a long line across the direction of the prevailing wind, supported well above ground by tubular framework, with a semi-circular fireproof tunnel giving a streamlined effect on the windward side to assist with the control of draught and to allow easy movement of expedition men from one building to another. Power supply, water reticulation and central heating are integrated in one system to make best use of labour, to save fuel and minimise the fire hazard.

During the summer of 1964–65, the site was surveyed and building areas selected preparatory to construction work being commenced. Meanwhile, with explosives and earthmoving equipment, a landing area was cleared for Army DUKWs, which were to be used for unloading stores, and road areas were cleared in the very rough terrain for access to the selected site. When the expedition ship left Wilkes in February 1965 the preliminary work had been completed and two buildings erected. In the following summer, work was continued on roads, and six huts, with a portion of their connecting corridor, were erected. Temporary living facilities, provided in two of the buildings, were used by the con-

JAPANESE CARRY OUT FIELD JOURNEYS AND PLAN MORE

The present Japanese team, JARE VIII, has made an early start after the winter hibernation. Even before the end of July the first party was on its way from Syowa Base into the field.

"Fuji" returned to Japan on April 19 via Capetown and Colombo. During her anchorage at Colombo, a symposium on Antarctic sciences, sponsored by the Ceylon Association for the Advancement of Science, was held on April 1. Dr. K. Kusunoki and others presented the scientific data gathered by JARE VIII. The film of JARE VII was also screened.

Dr. A. Muto and his wintering team of JARE VII, who left "Fuji" at Capetown, returned home by air on March 20.

JARE IX

The members of the wintering team for 1968 and the 1967–68 summer party will number 28 and 12 respectively. On June 26 JARE Headquarters appointed **Masayoshi Murayama** as leader of JARE IX and Zanbei Seino as deputy-leader. Mr. Murayama at 49 is already a veteran of five Antarctic expeditions.

The winter party will include three meteorologists, workers in the fields of ionosphere, geophysics, geology, glaciology, etc., five mechanics and a doctor. An American and a Russian have been invited to join the summer party as observers. Four pressmen will also be with the summer party and one of them is expected to winter over.

SPRING AT SYOWA

At Syowa station the sun was below the horizon from June 1, but the morale of the wintering members was high. They celebrated midwinter day on the 22nd and took midwinter holidays till the 25th. The sun returned on July 13, when activities in the field resumed.

Between July 29 and August 3, a short trip to establish a fuel cache on the continent at a site about 130 km. from the station was successful. Preliminary observations on meteorology, geomagnetism, and radio wave propagation were conducted during this trip.

A party of nine men departed on August 16 to the eastern part of Prins Olav coast. The party hoped, if possible, to visit the Russian station Molodezhnaya, and they arrived at Molodezhnaya at 1300 hrs. on August 23. They are conducting research in meteorology, geomorphology, glaciology, biology, geochemistry, gravity, and the measurement of radio wave intensity. Possibly they travelled on the sea ice along the coast.

Three more trips will be made:

(1) About two weeks starting from the middle of September. Six to eight men doing seismic prospection, gravity and surface morphology. For about 250 km. from the station they will extend the trails made in the July–August trip. About 15 tons of fuel will be cached at the destination.

(2) About three weeks from the beginning of October. Six to eight

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struction party. Unfortunately, during last summer the two ships being used for the relief of stations were delayed in ice outside Wilkes and only a small proportion of the building materials was landed. Work was continued on foundations for new buildings, roads were widened and improved, and a bulk fuel supply was installed.

It is planned to complete most buildings during next summer and to finish the installation of plumbing, water supply, heating, power and light reticulation, and all services during the year. The work will be finished during the summer of 1968–69, and the transfer of scientific and other equipment will then be made to have the new base operational during 1969. — Frank McMahon, July 1967.

men. Survey of the western part of Prins Olav coast, making observations of geomorphology, glaciology, biology, and geochemistry.

(3) About 75 days' trip from the beginning of November. Eight to ten men. This inland over-snow traverse to about 75° S., 45° E., will cover the following observations: glaciology, surface feature, gravity, seismic prospection, geomagnetism, and geochemistry, and will be preparatory to the Pole journey mentioned below.

TO THE POLE ?

Also scheduled is an over-snow traverse to 90° S. and back by a party of 12 men led by Mr. Murayama. The trip will be made between September 1968 and February 1969, covering the route from Syowa to 45° E., 75° S., and from there to 90° S. The return route will be the same. Scientific disciplines covered will be seismic prospection, gravity, glaciology, ice echo (radio) sounder, geomagnetism, meteorology, VLF reception, and altimetry, including position determination. Four over-snow vehicles will be used (KD-60s). The journey will be one of about 6,000 km. (3,700 miles).

During the summer relief season, three buildings will be erected: living quarters (20 by 5 m.), extensions to the garage (10 by 10 m.), and a generator shed (12 by 13 m.).

On July 3, a symposium on the long-range planning of the JARE programme was held at the National Museum of Sciences. Members of all the working groups of the Special Committee on Antarctic Research, Science Council of Japan, and others interested in the subject, discussed the future of JARE. At the meeting, the construction of another inland station, the use of aircraft in winter, the introduction of rocket observation, and other projects were considered.

AT SYOWA

Dr. T. Torii and his wintering team at Syowa Station are doing well in their routine work. The building area has been doubled, and vehicles have been increased in number (three large KD-60s and six other snowcars).

WHALING

THE 1966–67 SEASON

Norsk Hvalfangst-Tidende (the Norwegian Whaling Gazette) gives the comparative catch figures for the past three seasons, in "blue whale units".

1964–5	1965–6	1966–7
6,986	4,091	3,503

The permissible catch in blue-whale units was 3,500. All the expeditions commenced the taking of fin and sei whales on December 12, 1966, and ceased operations as the stipulated quotas were reached, viz., Norway, 800 blue whale units, Japan 1,633, U.S.S.R. 1,067. Actual catches were: Norway 801, Japan 1,633, and U.S.S.R. 1,069.

The total catch in whale species was:

Blue whales: 1.
Fin whales: 2,882.
Sei whales: 12,350.

In the sectors between 130° East and 170° West (Areas V and VI) covering Ross Dependency waters (160° E. to 150° W.), blue whale units taken were 603.

INTERNATIONAL WHALING COMMISSION

In spite of their strong arguments that the fin whale is in real danger of extermination, the scientists failed to persuade the International Commission, which met in London on June 26–30, to ban the taking of fin whales in the Antarctic. The Commission agreed to a small reduction in the total number of whales that may be caught, but refused to discriminate between the fin and sei whale. The scientists maintain that the fin whale, being the larger and more valuable. will be taken in preference to the sei. and thus will come rapidly closer to extinction.

Blue and humpback whales are already protected, but it is too early to say categorically that as a result of the ban on catching the great blue whale, the species will survive. The Greenland whale, almost eliminated by the whalers during the 19th century, has been left alone for 50 years, but is still extremely rare.

SOUTH AFRICANS IN THE FIELD

We are pleased to publish in this somewhat condensed form a lively report in "Antarktiese Bulletin" by geologist E. de Ridder, describing the geological field journey from SANAE last summer.

Members of the combined geomagnetic and geological field party waited impatiently for the end of the Antarctic winter in order to set forth on the expedition to the mountains, where their actual sphere of interest lay.

The expedition had a multi-disciplinary composition because it wanted to collect concurrently, information over as wide a field as possible in a practically hitherto unknown portion of this ice-covered continent, where only the Norwegian-British-Swedish expedition of 1949–52 and members of SANAE VI (1965) had worked before on foot. The geomagnetist wanted to estimate at predetermined points the absolute magnetic forces; geological cartography and sampling of new and hitherto unexplored nunataks could assist to lift the veil over the past; boreholes and pits for measuring snow accumulation over past decades had to be sunk; a survey of ice contours to determine the movement of the ice-cap — all these determinations and subsequent studies could assist the glaciologist to elucidate the drift and nature of glaciation. Such information would help to establish whether the ice-cap was increasing or decreasing. Geophysical work in the field would be done with a gravimeter and a magnetometer to give an idea of the nature of the rock surfaces underneath.

The route along which and the area where this multi-disciplinary survey would be carried out were towards and at the Borga mountain range, a mountainous area of approximately 1,500 sq. km. about 340 km. south of SANAE. The weather only settled early in October, and two men left by dog-sled on the 10th. Five days later the mechanised transport party of three men followed, using one muskeg and a Polaris mechanical sled. The intention was to join up as soon as possible and thereafter to travel together, the one party being a support to the other.

Weather conditions soon changed to the foulest so that the sledging party had to spend much time in their sleeping bags. Radio contact was poor, erratic and sporadic, so that news from the base and the other party could only be received with the greatest difficulty.

The dogs proceeded unfailingly but slowly, and only on November 6 did the other party catch up at 72° S., 2° 40′ W. Their Polaris sled was missing owing to irreparable damage sustained en route and the muskeg had been kept going only by the genius of the diesel mechanic.

Work started in earnest in the immediate vicinity, which was well known to many a South African expedition. After one week of geological sampling, depot-laying and other activities, the journey was continued to Pyramiden, a nunatak about 280 km. south of SANAE. Way off we could distinguish its characteristic flat table-top summit.

The paths of various expeditions have crossed and met at this lonely outpost. It was visited for the first time on January 18, 1950, by members of the Norwegian-British-Swedish expedition by air from their base at Maudheim. During November and December of the same year they established their main advance depot on its slopes and from there carried out field-work in that area and for 250 km. away to the south. They left behind at this depot substantial supplies after their return to Europe. On December 31, 1960, four members of the Vth and VIth Russian Antarctic Expeditions landed there again with an AN-6 plane. In 1965 members of SANAE VI added to the store of supplies. This point was the most southerly of their traverse.

The first thing we did on our arrival was to examine the depot itself. We listed the articles and during the rummaging a broken bottle, partially buried under rubble and snow was found. It contained a note describing the origin and history of the depot. Amongst the supplies we found some home-made bread which we heated on a primus and it was quite tasty, in spite of its Antarctic sojourn of 16 years. We pitched camp at this historical spot and, inspired by the reminiscences of bygone expeditions, completed our surveys in that locality within one week. Then off we went once more further south.

We crossed the Viddalen, a 40 km. wide glacier, on our way to the Borga Mountains. From far off we saw the towering heights of the Borga peaks and the nearer we advanced the more impressive they became. The gently rising slopes of snow reach a height of 2,000 metres above sea level. Perpendicular rock faces, 500 to 700 metres high, and some of them a few miles long, spanned the horizon. Moraine stretches for miles across the plains and is reminiscent of ploughed fields. Glaciers slide down the steep rugged slopes, pushing their icy tongues ever downwards until finally they disappear into the depths of the snow below. In terms of geological time, this is a quick-changing part of the globe, renewing scenic outlays more than those parts of the world where contours are not moulded in ice. This is indeed God's newest country!

By November 22 we had deposited our 8 tons of supplies at the provisional main camp and we started with our work. Here too we found signs of the Norwegian-British-Swedish Expedition's activities of long ago. The network of stakes erected by them in the blue-ice area to measure from time to time the rate and direction of movement of the ice-cap was still, after 16 years, in excellent condition. Their positions were determined and we extended the net, such follow-up studies over a long period being of inestimable value in determining glacier movement.

Having celebrated our Christmas, the last shift of sampling and surveying was carried out. The amount of material was impressive, the rock specimens being numerous and bulky, and much information was obtained to enable greater detail to be added to the maps. On December 31 we bade farewell to the Borgas in fine sunny weather.

The warm weather during the previous weeks had softened the surface thus impeding travel, but clear days and uneventful mechanical and dog behaviour were on our side. On the evening of January 3, 1967, the mechanised party arrived back at SANAE and two days later, after a "constitutional" of 88 days, the dog-sledging party clocked in too.

AT SANAE

IONOSPHERIC RESEACH

During 1967, the Rhodes University representative on the SANAE 8 team will carry on the programme of research into the Antarctic and South Atlantic ionosphere that was initiated five years ago. The "ionosphere" is that portion of the upper atmosphere which lies above an altitude of about 50 miles. In this region there are not only electrically neutral atoms and molecules, but also unattached particles carrying electric charges, viz., ions and electrons. The presence of these charged particles enables the ionosphere to act as a reflector of radio waves of appropriate wavelength.

A standard technique for carrying out measurements on the ionosphere is to "sound" it from the ground with radio waves that have either been sent straight upwards or arranged to strike the ionosphere at an oblique angle. Both methods have been in use at SANAE since 1962, and are currently being continued. The "vertical incidence" soundings yield information about the ionosphere directly above SANAE, while the "oblique incidence" transmissions, which start in SANAE and are received in Grahamstown, yield information about the ionosphere over the South Atlantic. The latter transmissions are now being supple-

mented by a "two-way" transmission experiment between Alice (South Africa) and SANAE; pulses of radio waves sent out from Alice are received at SANAE, where they trigger off similar transmissions that are received at Alice.

The behaviour of the ionosphere over Antarctica has been notorious for its unpredictability and general peculiarity. Information obtained from previous SANAEs has enabled research workers at Rhodes University to establish a correlation between disturbed ionospheric conditions over SANAE and the bombardment of this ionospheric region with electrons from the Van Allen radiation belts. (Because the earth's magnetic field is unusually weak in the South Atlantic area, electrons from the radiation belts are able to come particularly close to the earth in this region.) The ionosphere programme for SANAE 8 is intended to consolidate these discoveries.

In this connection, an event of the first importance will occur on November 2, 1967, namely, an eclipse of the sun in the Antarctic area. This eclipse, although only partial on the ground at SANAE, will actually be total at ionosphere heights. It will provide a unique opportunity for confirmation and extension of the correlations already observed.

Since 1962, monthly bulletins of data obtained from "vertical incidence" ionospheric soundings at SANAE have been sent to interested research workers and organisations all over the world. This activity is being continued by SANAE 8.

ERRATA

We regret that in a review in our last issue the publication of **"Climatology of the Troposphere and Lower Stratosphere"** was credited to the wrong organisation. This Antarctic Map Folio 4 was published by the **American** Geographical Society, Broadway at 156th St., New York 10032.

Vol. 4 No. 9, p. 450. The reference here should be to the Smithsonian **Institution.**

BELGIAN OFFICE STILL BUSY

Although activity has for the moment ceased at Base Roi Baudouin the office of "Expéditions Antarctiques Belgo-Néerlandaises" in Brussels is still open. There is still good hope that Belgium will resume her Antarctic work at the end of the year on a limited basis and in collaboration with other nations. Some months ago the Belgians contacted the Chilean Antarctic authorities to propose an eventual collaboration between the two countries in Antarctic research; but it was not possible to formulate a plan for the project in time for implementation this year. So there will be no Belgian-Chilean expedition in 1968.

The main activity of the Brussels office at present concerns the study, at the various universities and other institutions, of data gathered during the past year, and the publication of the results. (See reference under "Antarctic Bookshelf".)

IN GERMANY

The 6th "International Polar-meeting" of the German Society of Polar Research is to be held at Stuttgart from October 8 to 11, 1967. Among the papers of Antarctic interest are the following:

M. P. Hochstein (New Zealand): Moraines under the Ross Ice Shelf in the vicinity of Roosevelt Island.

F. Burdecki (South Africa): Temperature Gradients in the Antarctic.

P. M. Buis (Holland): Atmospheric Electricity at Base Roi Baudouin, Antarctica.

H. Miller (Germany): Geological and Glaciological Studies in West Antarctica, 1964.

The most un-Antarctic-minded person should surely also be interested in Dr. Silvio Zavatti's paper: "An Ancient Eskimo Graffito discovered in Greenland". Dr. Zavatti is Director of the Italian Polar Geographical Institute, and a good friend of this journal. A graffito is described as "a scrawled mural inscription".

BRITISH ANTARCTIC SURVEY

CHANGE OF CONTROL

As from April 1, 1967, the Survey has become a component of the Natural Environment Research Council, under the overall control of the Ministry of Education and Science. It was, until recently, under the aegis of the now superseded Colonial Office. A committee has been established under the chairmanship of Admiral Sir Edward Irving (formerly Hydrographer to the Navy), to advise on the scientific programme to be carried out by the Survey, and this committee will work closely with the British National Committee for Antarctic Research.

PLANS FOR THE FUTURE

The Survey is hoping to build a new ship which will replace R.R.S. "Shackleton" in the 1970–71 season. Plans are at present being prepared and will go out to tender in early 1968.

Another single-engined Otter aircraft is being sent south in the 1967–68 season; the one already there showed signs of severe metal fatigue at the end of last season and was therefore grounded. At present only one aircraft, a Pilatus Porter, is operational, and this is wintering at Deception Island as usual.

NEWS FROM THE BASES

Work continues satisfactorily on the new Halley Bay base and on a new building at Adelaide Island. Further buildings will be sent to Halley Bay next season to re-house the scientific apparatus which is still operating at the old base.

News from the bases is scanty, apart from detailed reports of midwinter celebrations. Halley Bay residents (with the advantage of unusually large numbers — 38 in all) surpassed themselves with a 1½-hr. entertainment by the "Halley Bay Theatre Group" following the midwinter dinner, as well as a special edition of the local newspaper.

NEWS OF SURVEY PERSONNEL

We were sorry to say goodbye recently to **John Green** who had been with the Survey for 18 years, first as base commander at Deception Island and the Argentine Islands, then as head of the office in the Falklands and later as Operations Officer in London. He is now on the staff of the Outward Bound School at Aberdovey in Wales, and we hope that he will keep us supplied with good recruits.

Dr. Stanley Greene, the Survey's Supervisor in Botany, is at present leading a small expedition on Disko Island, west Greenland. This is part of a bipolar botanical project, which aims to compare the performance of plants at several localities in the Arctic and Antarctic. He plans to continue the work on South Georgia in the 1967–68 summer.

Wally Herbert, who wintered at Hope Bay in 1956 and 1957 and at Scott Base in 1961 and 1962, is now busy organising a Trans-Arctic Expedition, scheduled to leave London in the autumn. He intends to set out across the Arctic Ocean from Point Barrow, drift across the Pole while in his winter station and complete the journey to Spitzbergen the following spring. Together with three companions he has just successfully completed a preliminary 1,200-mile journey from north Greenland, across Ellesmere Island to Resolute Bay, Cornwallis Island, after wintering in Greenland.

A RECORD ?

A husky, named Mac, has been brought to Britain after having established a record by pulling sledges 40,400 miles in eight years in Antarctica.

Mac arrived with a geologist, David Matthews, who landed at Southampton with other members of the British Antarctic Survey. After six months in quarantine, Mac will join David at his father's home at Shrewsbury.

FIRST SCHEDULED WINTER FLIGHTS TO McMURDO

The 1967 winter was made memorable by the successful accomplishment of the first regularly scheduled mid-winter flight between New Zealand and the Antarctic in the twelve years' history of Deep Freeze.

The City of Christchurch reached out to McMurdo Station on June 18 last, taking seven new residents, two teams of scientists and a technician, for the blacked-out Antarctic and bringing two medical evacuees back.

Only two days later than the earliest scheduled date, the U.S. Navy's ski-equipped Hercules, City of Christchurch, made the first-ever regularly scheduled winter flight in twelve years of Deep Freeze history, departing Harewood, New Zealand, at 6.15 a.m. and arriving at a brilliantly-lit Williams Field at 2.20 p.m. The weather was clear and the temperature was – 29° F.

Three tons of mail and 12 dozen specially-baked (by women of the Canterbury branch of the N.Z. Antarctic Society) biscuits for Scott Base residents, were carried by the aircraft, in addition to the 22 men aboard, one of whom was Rear Admiral J. Lloyd Abbott, Jr., Commander, U.S. Naval Support Force. The pilot was Commander F. Snyder, C.O. of VX-6.

During most previous years of Antarctic operations, scientific and support personnel who have wintered over at McMurdo have been isolated there from late February or early March until late September or early October. The few winter flights that have been made have been occasioned by medical emergencies at Byrd Station, in 1961 and 1966, and at McMurdo, in 1964 and 1966. Now, for the first time, new personnel have joined the scientific complement at McMurdo Station during the winter months. Senior scientists will be able to carry out field research in Antarctica during a period of the year that is often more convenient to them — the Northern Hemisphere summer.

After six hours on the runway, which was illuminated for its first 1,000 feet by electric lighting and for its remaining 3,000 feet by gasoline lanterns, the City of Christchurch took off on her return trip to New Zealand, with unscheduled passengers Chief Petty Officer R. O. Hilton, who was suffering from a lung condition, and Hospital Corpsman 1st Class L. Goodrich, whose gall bladder complaint required his evacuation. Touch-down at Harewood was at 3.37 a.m.

Another winter flight is planned for the last week in August, for the purpose of bringing back the scientists just taken to the Antarctic and replacing them with a new team. The primary advantage of mid-winter flights, according to Rear Admiral Abbott, is the opportunity they provide for Antarctic visits by research scientists unable to spend the summer there. The possibility of Antarctic winter visits during the northern summer extended vacations will open up a vast reservoir of scientific talent to the National Science Foundation. Not more than two flights a winter are foreseen.

SECOND FLIGHT

The second flight this winter from Christchurch to the Antarctic and back ended successfully about 7 p.m. on September 3, when the Hercules, City of Christchurch, landed at Harewood after a record-breaking trip.

The Hercules first left for McMurdo about 1 a.m. on September 2, but met head winds which gusted up to 115 knots and averaged 95 knots.

At the end of its 2,200-mile flight

the aircraft would have had only enough fuel for one or two circuits of McMurdo Station if the weather had been poor, so a decision to turn back was made about 800 miles from the Antarctic. The Hercules landed at Christchurch at 11 a.m., and the crew of 16 had lunch and a sleep before leaving again at 11.45 p.m.

On the second flight the aircraft carried about 20 per cent. more fuel, and arrived at McMurdo with enough for it to stay in the air for three hours. It was a good trip, although the aircraft met strong head winds.

The aircraft was on the ground for about four hours, and 7,000 lb. of fresh provisions, mail, and spare parts was unloaded. It returned with three scientists who went to the Antarctic on the first winter flight on June 18, and two injured men — Lieutenant R. Shoemaker, who has strained ligaments in a leg, and Petty Officer J. Muzzer, who has a twisted knee.

Aided by tail-winds up to 100 knots, the aircraft completed the trip in six hours two minutes, 10 minutes better than the record for Hercules aircraft set last summer by the R.N.Z.A.F.

NOT ENOUGH ICE !

Captain Kelley said on his return from McMurdo on the second Hercules flight that there seemed to be little ice in McMurdo Sound this winter, and because of this there could be difficulties with the ice runway when the Antarctic season started in October.

It had appeared almost as though an icebreaker could force its way into McMurdo Sound already. The ice runway was built each year on annual ice.

FIRE DAMAGE AT McMURDO

Fire at McMurdo destroyed a new toilet block on August 25, the commander of Antarctic support activities (Captain H. A. Kelley) said on his return to Christchurch in the Hercules' second winter flight.

Had the fire not been contained it could have damaged or destroyed other parts of the station, Captain Kelley said. It was thought to have started when an oil heater blew back.

MIDWINTER UNDERWATER

Scuba diving, through seal holes to the waters beneath Antarctic ice, is not expected to be any colder than scuba diving in any water. The shock will come when the divers come out of the water.

The director of the Institute of Oceanography in Norfolk, Virginia, Dr. J. S. Zaneveld, expressed this opinion in Christchurch, New Zealand, in June, on his way to the Antarctic per mid-winter flight with two graduate students, expert scuba divers, Messrs. David Bresnahan and Leonard Nero, with whom he planned to investigate occurrences of algae and their adaptation to extreme winter conditions.

Little adaptation was, apparently, planned for the divers. A tent, as near as possible to the selected seal holes, with hot water, towels and hot coffee was all that was to be provided for the under-ice swimmers. Scuba divers have operated in the Antarctic before, but not in winter.

Nor was Dr. Zaneveld's party alone in the waters. Dr. C. C. Lee, of the Institute of Marine Sciences of the University of Miami, Florida, was also at work, with his colleague, Mr. W. J. Boggs. Studies started during the summer of microscopic plants and one-celled animals in the Antarctic pack ice belt will be continued by these two men.

The scientists seek ultimately to provide a basis for estimating the amount of inorganic matter transformed into organic matter by means of light energy (primary productivity) throughout the belt.

Such productivity forms the basic link in aquatic food chains. Further studies in this area would be made in the future from ice-breaker ships, Dr. Lee said.

Dr. Zaneveld stayed in the Antarctic until mid-August, but Dr. Lee will stay until the ice begins to break up.

Dr. Zaneveld said on his return on the second winter flight, that the midwinter diving up to 112 feet below the surface had proved that the seaweeds and algae continued to grow during the winter. They may have some way of storing sunlight for the winter, he said.

The programme also showed that the fantastic amount of sea life under the ice continued to reproduce during the winter, when the water temperatures were as low as 30° below zero centigrade.

Dr. Zaneveld, and two graduate students and expert divers, David Bresnahan and Leonard Nero, went to the Antarctic on the first winter flight on June 18. Dr. Zaneveld worked in the Antarctic on two previous occasions, and in 1964–65 divers were used. But they did not dive in the winter.

This year's team had planned to dive mainly at Cape Royds, entering the water by using seal holes in the ice. But the ice at Cape Royds was in bad condition. On one occasion the men had to jump for safety when ice gave way beneath them, and Dr. Zaneveld severely sprained an ankle.

So the diving was done near McMurdo Station, through man-made holes in the ice, which was up to 5 ft. thick. The divers had no serious problems, and stayed 110 ft. down for up to 20 minutes at a time.

Photographs were taken and samples collected. There was far more light under the water than had been expected, although underwater lights had to be used. Usable light, for humans, ended about 70 ft.

The greatest danger from cold occurred when the divers were entering or leaving the water. They had to go into the water immediately, before they and their equipment froze.

The programme had been very valuable from the oceanographic aspect, and also from the knowledge gained of diving in the extremely low temperatures, Dr. Zaneveld said. The divers had found some types of equipment, for instance air regulators, that were unsuitable for the conditions.

END OF SEASON

Rear-Admiral J. L. Abbot, Commander of the Support Force, left Christchurch for the United States aboard a Skylifter on March 7. Rear-Admiral Bakutis, the former Commander, left the previous day by Super Constellation. The Starlifter also carried 33 wives and eight children, dependants of American servicemen. These included seven New Zealand brides of sailors from the "Thomas J. Gary", which was based at Dunedin during the season.

Two other Skylifters assisted, carrying about 95 passengers each, mostly Deepfreeze men returning home. Earlier, in January and February, over 300 scientists and servicemen had been flown home.

The only Navy aircraft to remain at Christchurch during the winter will be a Super DC-3. A skeleton staff at the airport Navy Base will be commanded by Cdr. L. M. Johnson. From March 9 only 46 servicemen remained at Christchurch.

The communications blackout which isolated McMurdo from January 27 to February 4 by cutting out most radio communications, proved the efficacy of the Automatic Picture Transmission (APT) installation which continued to receive weather information from passing satellites.

This information proved to be so accurate in the compiling of weather forecasts for the McMurdo vicinity that only minor modifications would have been made had more complete information been available.

WE HAVE VISITORS

February 17 saw the final flight of the season into Plateau station, but that was not the last visitation Plateau received. On March 3, a Soviet traverse party in two vehicles came knocking at the door.

No one in either party could speak both the languages necessary for easy communication, but an exchange of gifts and national emblems took the place of words, and the traverse party and the station complement attended a movie

together before the Soviet party left again, having renewed their fuel supplies from Plateau's stocks.

GOOD YEAR

The first accident-, if not incident-, free year in the Antarctic records of VX-6 was Deep Freeze 67. Six near-accidents were prevented from eventuating, including one to the Hercules aircraft that made its landing at Harewood, New Zealand, despite an unretractable port ski; another aircraft, an LC-130F, was stranded in mid-runway for seven hours after severe blowing snow prevented it from either taking off or returning to its taxi-off position.

1967 was not entirely accident-free for other aviators in the Antarctic. The U.S. Army aviation detachment lost a UH-1D helicopter supporting the Byrd Land Survey team, and a Coast Guard UH-13 helicopter crashed near Coulman Island, but 1967 was nevertheless below average in aircraft mishaps.

Quite apart from accidents beyond the Antarctic itself, and accidents which neither destroyed nor forced the abandonment of an aircraft, a total of 33 aircraft have been destroyed or abandoned in 12 years of Deep Freeze aviation, with the loss of 25 lives. Hardest hit were the military versions of the DC-3, 10 aircraft and 6 lives having been lost; Navy P-2Vs lost only two machines, but 9 lives went with them; two Air Force C-124s have crashed, with the loss of 6 men; and three of the frequently-used field-party transport Otters cost two further lives.

Helicopters, land or ship based, have a light record of mishaps. In 12 years, only six ship-based machines have been lost, with no lives involved; VX-6 has lost three shore-based helicopters and one man; four Army machines have been wrecked but two were recovered and returned to the U.S.

From the crash of the third Otter in February, 1963, a new method of search and rescue technique emerged. The Otter was thought to have crashed in an area inaccessible to fixed-wing aircraft, and the survivors, 40 miles along on their 100-mile trek to Little America, were in fact found in such an area. A helicopter was used to rescue them, and the lessons learned in that rescue prompted the formation of an Antarctic para-rescue team.

This team was first organised in October, 1956, and this summer VX-6 will train another group of 12 men for air-dropping in Antarctic regions where aircraft cannot land. The parachute drop, the provision of limited medical care and portage of survivors by traverse to a site which will allow aircraft landings will all be part of the training scheme.

The para-rescue team is composed of 12 volunteers from VX-6, whose assignment is in addition to the men's normal duties. Three four-man sub-teams are provided from the 12 volunteers and each of the sub-teams is located in areas where quick mobilisation for independent operation is easiest. Two are at McMurdo, the third normally in Christchurch, New Zealand, and each comprises a jumpmaster, a hospital corpsman, a parachute rigger and a specialist from some other field in the squadron. Cross-training so that each man knows something of his colleagues' special skills, with particular emphasis on first aid, should further assure success in rescue efforts. Traverse techniques, climbing, crevasse procedures, igloo construction comprise some of the practical training, and classroom training in theory is also practised, covering such topics as safety procedures, wind-drift indication, parachute canopy control, first aid and self help.

Once in the Antarctic, training becomes even more intense. Flights of experienced climbers from the Federated Mountain Clubs of New Zealand are arranged by VX-6 to and from the continent. There, climbers devote their annual vacations to training not only the para-rescue team but also scientists visiting the Antarctic for the first time.

The para-rescue team, now 10 years old, has not yet been called upon to fulfil its rescue function,

but the knowledge that the team is there and ready for any emergency is an encouragement to fellow-VX-6 personnel and the scientists whom VX-6 support across the continent.

"ELTANIN"

More than five years of operations in the Southern Hemisphere will end for U.S.N.S.N. "Eltanin' when she returns to the U.S. in October–November this year for dry-docking.

Cruise 30, scheduled to begin at Brisbane, Australia, in early August, will complete with docking and yard work. Cruise 29 was carried out between Chile and Australia with emphasis on hydrographic studies, while Cruise 30 will stress geophysical observations including magnetic, seismic and gravity measurements.

SIPLE HONOURED

The United States Department of State has conferred upon Dr. Paul A. Siple the

SUPERIOR HONOUR AWARD

in recognition of his superior service and exceptional dedication to duty as Scientific Attache in Canberra, Australia, from July 1963 to September 1966.

Dr. Siple has rejoined the Army's Chief of Research and Development after a painful illness which hospitalised him in Wellington, New Zealand, from June 6 till July 15, 1966. His many friends in New Zealand wish him a speedy and complete recovery.

Dr. Siple began his long and distinguished Antarctic service as "A Boy Scout with Byrd" (the title of his first book) in 1928, served on all five Byrd expeditions and was scientific leader at the Pole Station throughout its first year of occupation, 1957.

ABOUT SUPPORT

Cargo movement may be the most mundane of the many operations involved in the logistic services provided by the U.S. Navy in support of Operation Deep Freeze, but it is one of the most fundamental to the success of operations in the Antarctic.

More than six million gallons of bulk liquid fuels were delivered to New Zealand and the Antarctic during Deep Freeze 67, as well as fourteen thousand measurement tons of general cargo.

Liquid fuels consumed in the Antarctic include diesel fuels for electric-power generation, heating and vehicle operation; aviation gasoline for piston-powered aircraft and helicopters, and different petrolum products for turbine-powered aircraft; automotive gasoline for some vehicles and small generators; and jet fuels. The bulk of the liquid fuel deliveries, 6,073,000 gallons, went to McMurdo first, with 219,000 gallons to other American stations. Transportation to McMurdo is effected by tankers, and from there by aircraft of Air Development Squadron Six. Some fuel is also delivered in drums.

General cargo, which includes spare parts, food, clothing, construction materials, scientific equipment and drummed fuels, is conveyed mostly by sea, in ships from MSTS and from commercial shipping lines and in Coast Guard icebreakers. More than 14,000 measurement tons (i.e. of volume equal to 40 cubic feet) of such general cargo was carried to New Zealand and the Antarctic in these vessels, 41% resupply materials, 39% construction materials.

Air-freighted cargo was also carried, some 450 short tons of general cargo, excluding passengers and personal luggage, being air-lifted to New Zealand and the Antarctic, with 740 short tons being carried from McMurdo to other Antarctic stations.

Dr. A. P. (Bert) Crary has handed over his duties as Chief Scientist, Office of Antarctic Programs, to Dr. Louis Quam, formerly of the Office of Naval Research, but retains the position of Deputy-Director of the Division of Environmental Sciences, of which Dr. T. Jones is Director.

Campbell Craddock, formerly on the faculty of the University of Minnesota, Minneapolis, has been appointed Professor of Geology at the University of Wisconsin, Madison, effective June 1967. Dr. Craddock has led or directed seven geological expeditions in Antarctica.

FROM THE SUB-ANTARCTIC ISLANDS

CAMPBELL ISLAND

(New Zealand)

With the winter months behind us and the knowledge that the U.S.S. "Calcaterra", the first ship to visit for seven months, is due to arrive at Campbell Island on September 28, morale is very high. Midwinter's day was observed in the traditional manner with a good binge and dinner, with an impressive toast list to our many benefactors. At noon, while the sun shone on the surrounding snow-covered hills, led by Officer-in-Charge Robin Foubister, Gerry Therkleson and Bruce Dreaver took the plunge into the 41.9° F. of Perseverance Harbour, all swimming the qualifying distance from the boat-slip to Admiralty Steps. During the day, musical requests and previously recorded messages were broadcast by our old friends Radio 4ZA in Invercargill. Also during June radio schedules were kept with midwinter Hercules flights to McMurdo Sound and the first of many interesting schedules was made with our Australian colleagues on Macquarie Island.

Excuses for social occasions have not been allowed to pass unheralded and the birth of the Officer-in-Charge's fourth son in London was no less an occasion. Thorpe and Coombe Maternity Hospital in London received the longest telephone call in its history as soon as possible after the news reached Campbell Island on July 17.

WHARF EXTENSION

In exactly 31 days, using 44-gallon drums and 80 cubic yards of boulders, rock and gravel collected from nearby beaches, and bordered by a concrete plinth, a 325 square feet extension to the wharf area was built by the station staff during July. It is envisaged that this new facility will speed up the Annual Servicing ship's turn-round time because it will allow the crawler tractor to turn on the wharf while drawing a sledge to clear drums of diesel fuel that always seem to collect at the bottom of the railway hampering the efforts of the men working there.

HUCKLEBERRY FINN COMES TO CAMPBELL ISLAND

To assist in carrying the large quantities of shingle on to the wharf extension site, a raft named Perseverance 3 was built and launched in a snowstorm using a bottle of locally brewed beer. Building the raft from 44-gallon drums gave as much fun to Hip van Berkum and Gerry Therkelson as it has to the rest of the party who have got much pleasure from it rowing round Perseverance Harbour in the calm weather.

FIRST FIELD HUT

Campbell Island's first field hut was established during August at a sheltered point on the Mount Faye ridge approximately one mile from the extensive Mollymawk nesting colonies on the cliff ledges near Bull Rock. The hut has been named after J. H. Sorensen who contributed much to the knowledge of the wildlife of Campbell Island during his period as a coastwatcher during the last war and will be known as the Sorensen hut.

Prefabricated at Beeman Cove from surplus materials from the unused buildings at Tucker Camp, the hut was carted to the site and re-erected by the station staff. Apart from the essential role it will play in establishing study colonies amongst the Mollymawks, it will also be possible to study the nesting habits of skua gulls and Royal Albatross from the hut. The hut is of A-frame construction with a floor area of 64 square feet. It has been designed to accommodate up to three persons for periods of two to three days comfortably but this could be extended by increasing the size of the water storage tank which, because of existing circumstances, is only 12 gallons. Establishing the hut at this point seven miles away from the

camp over a 1,300 ft. saddle in adverse weather conditions called for a high degree of endurance from the station personnel, and thanks must go to them for a job well done.

The 1966–67 expedition to Campbell Island has had an exceptional year and the party will go away remembering the good times amongst good mates and forgetting the bad moments which, after all, are only to be expected when 10 men from different walks of life and diverse views are thrown together for 12 months with little outside contact. We all say with feeling, "Thank you, Campbell Island, for a most enjoyable year".

The members for the 1967–68 Expedition are as follows:

Officer-in-Charge: R. H. Blezard.
Mechanic/Handyman: R. E. Adkin.
Radio Technician: W. L. Johns.
Senior Ionosphere Observer: D. E. R. Bustin.
Ionosphere Oberver: R. K. Staples.
Chef: C. G. Surrey.
Senior Met. Observer: V. W. Sussmilch.
Met. Observer: J. R. Powell-Phelps.
Met. Observer: B. T. Dowie.
*Met. Observer: M. L. Hodgson.
*Met. Observer: A. M. Bromley.

* For the summer season only.

MACQUARIE ISLAND

(Australia)

May began with the fleeting visit from H.M.A.S. "Perth" described in our last issue, to take to hospital the party's cook. Now cooking, of course, has become a communal affair, each man doing a week in the kitchen. Graeme Smith, the first cook, excelled himself and has set an almost impossible standard. Nevertheless, others are maintaining a high standard.

Chapman is still digging trenches across the Isthmus and in the wallows for cable; wading in Buckles Bay to fix the tide guage, and building structures to house its instruments. He was last seen, complete with radio mast, wending his way up Gadgets Gully en route to Bauer Bay with Champness, who is starting his campaign to improve wireless communication on the island.

Shennan, Evans, Ormay and Ryder started the fuel lift over to Bauer Bay in preparation for the biologists' spring programme there. Returning the following day via Sandy Bay they filled our larder to the brim with a bag of seven rabbits.

Well, midwinter has come and gone. The lack of a full-time cook did not hamper celebrations; indeed the party was much more successful because everyone lent a hand. Special mention must be made of Svensson's sterling efforts. His five-course meal and his cold table for the following day were excellent, and the disappearance of his 20 lb. fruit cake within the week mute evidence of success. The cake was iced with marzipan and suitably decorated with an almost life-sized model of a Royal penguin.

July was notable for the reasonable mild weather: the seas were calm, and for Macquarie the winds were gentle breezes. Even the sun shone a bit more, giving over 21 hours as opposed to six in June, which the team think is a record — the lowest ever.

On tour down the island to do a stock inventory and also a bit more work on the Dominican gull programme, the doctor enlightened his two companions on rats and their habits. He had plenty of opportunity for the study, including a night in the same bunk with a few!

Met. are sending up high altitude sounding balloons daily. So far this month the highest is just over 108,000 feet.

"Spring is almost with us," writes leader Walker, "and as time goes on the changeover seems almost too close. Most of us have that feeling that we will, in fact, run out of time before all our jobs are completed; nevertheless, there is that determination to complete everything prior to departure."

IN AUGUST

The main occupations for August have been getting the Gnat, plus fuel and stores, to the plateau for moving

to Bauer Bav for the biologists' summer sojourn amidst the Royal penguins. "Nella Dan" could not get into Bauer Bay during either the relief trip in December or the March visit, so all provisions have had to be sent from the main base. Several men have spent many hours in back-breaking toil hoisting about 50 gallons of petrol, 200 of kerosene, half a ton of miscellaneous stores, plus the vehicle up the side of Gadget Gully, where a track gives access to the top of the cliff.

The wasteheat recovery installation from the generators to the boilerhouse via the sleeping quarters is proceeding smoothly and should be in operation early next week. We should then start to save fuel. Painting of buildings, inside and out, has gone ahead: fortunately winds have been less boisterous than usual. Merilees managed a flying trip along with Major down to Lusitania Bay to inspect and photograph the King penguin rookery.

HISTORY

A history of Macquarie Island by Dr. John Cumpston is now with the Australian Government Printer and should be available this year. Up to 70 photographs are likely to be included in the volume. Dr. Cump ston regrets the unavoidable omission of much material relating to New Zealand's sub-Antarctic islands.

TOURISM

The question of tourism to the Antarctic, of who could or could not visit McMurdo, is not one to be answered by either the U.S. Navy or the U.S. Government, in the view of Rear-Admiral J. L. Abbott, commander of the U.S. Navy's Antarctic Support Force.

Conditions under which tourists could go, however, would be controlled, he added. Self-sufficiency and safety would be necessary bases for any such trip as the proposed "expedition" this summer, referred to elsewhere in this issue.

MORE VETERANS PASS

Year by year the ranks of the Antarctic veterans thin. There are now only three survivors of Scott's "Discovery" expedition, 63 years ago, while Shackleton's men, Amundsen's men and the men of Scott's Last Expedition are by now few in number. Here we pay tribute to two honest toilers in the ranks, loved and honoured by those who knew them, who have recently laid down their arms.

CLARENCE HARE

(See "Antarctic", June 1966, p. 306)

Hare was a New Zealander born and bred who never lost his love for the land of his birth, though for many years resident in Australia, where he died on May 31.

Born in Invercargill in 1880, a banker's son, he was educated at East Christchurch School and was a choirboy of St. John's Church of England in Latimer Square. After leaving school he worked with a firm of leather merchants for five shillings a week, doubled his pay as assistant in a library and then tried his hand at office work. Not liking it, he ran away to sea and worked his passage round the islands till he left his ship at Suva to work as customs clerk for a firm of traders. Showing an early love for music, he became organist at the Native Church and also taught in the Sunday School. He eventually worked his way back to Sydney and after many and varied experiences in New South Wales and Queensland, finished up "broke" in Rockhampton and worked his way back to New Zealand, his homeland.

It was while he was employed as a clerk in Sheppard's Grocery in Lyttelton that Scott's "Discovery" arrived in that port on November 28, 1901, to prepare for the famous voyage south. C. R. Ford called at the shop to arrange for the supply of stores and the two young men became friends, with the result that Scott gave Hare a berth as "Assistant Steward" and his own personal attendant. Hare joined the ship on his 21st birthday.

Reference was made in our article on "FOUR DISCOVERY MEN" to the alert enquiring mind and ready pen of the young New Zealander, and these are reflected in his diary, which is now treasured in the Alexander Turnbull Library and was used extensively by the present writer in his "SOUTH TO THE POLE". The toughness of the young explorer when he survived 44 hours alone and unprotected in a blizzard on Hut Point Peninsula during Barnes' pioneer sledging journey amazed Scott, Wilson and others. Wilson wrote, "How he survived no one, not even himself, can tell. . . . His escape is a very wonderful thing." Young "Skinny" Hare, as his messmates called him, always popular, was now something of a hero among them.

His one-year engagement terminated, Hare joined the relief-ship "Morning" in March 1903, returned to Lyttelton, and went on to England on "Discovery" a year later. He returned to New Zealand in 1904. He took various jobs on sheep and cattle farms before returning to office work in Christchurch, were in 1910 he married. He had made a study of piano-tuning, and the young couple sailed in July 1910 for Melbourne. After meeting Scott again when "Terra Nova" arrived in Melbourne, Hare regretfully declined an invitation to join the new expedition. The couple now went to Sydney, where he was employed by Beale's Piano Factory. Back in Melbourne he became Head Tuner and workshop foreman for Wertheim's Piano Co. After 25 years' service, when Wertheims closed down, he formed a partnership with a former workmate which lasted 18 years. In 1957 he retired and later went with his daughter Raemar and her husband to Queensland, where Mr. Cogdon had purchased a pineapple (later citrus) farm, and he lived there until his death.

He is survived by his three daughters, eight grandchildren and a great-grandson, who recall with thankfulness his faith, wit, intelligence, kindness and love of music and flowers.

L.B.Q.

MORTIMER McCARTHY

One of the few surviving members of Scott's last expedition (1910–13), 89-year-old Mortimer McCarthy, died on August 4 from burns suffered when his Lyttelton home caught fire just before midnight.

Born in Kinsale, County Cork, Mr. McCarthy went to sea at the age of 12.

He came to New Zealand in 1906 and sailed from Lyttelton as an able seaman in the "Terra Nova" on November 26, 1910. When the ship was in the Bay of Whales, he sighted Amundsen's ship, the "Fram", from the rigging. Later, the crews met and some were given pocket knives by Amundsen.

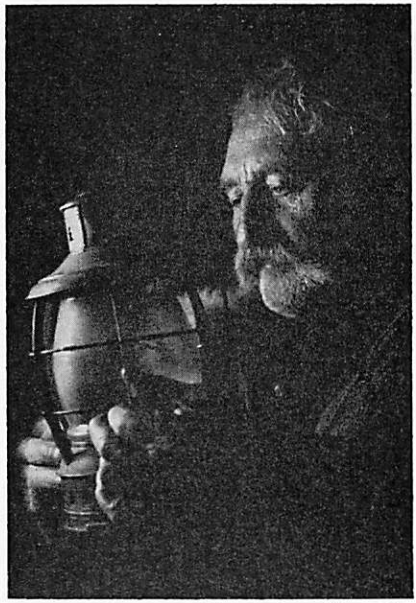

Photo: Guy Mannering

Mr. McCarthy during his visit to Scott Base examines a lantern used in Scott's time.

Mr. McCarthy later accompanied an expedition to the Arctic, but he returned to New Zealand in 1920.

In the last 40 years he served in many New Zealand ships, and was well known by travellers in the inter-island steamer express ships "Ranga-

tira" and "Wahine". He was a member of the crew of the new "Maori" on its maiden voyage to New Zealand. His seafaring career ended only five years ago.

When he visited the Antarctic in the "Arneb" as a guest of the United States Navy in 1963, Mr. McCarthy became the oldest man to set foot on Antarctica.

Mr. McCarthy was at sea during the Boer War, the First and Second World Wars, and three times was shipwrecked off the New Zealand coast. After 70 years at sea, he still made coastal voyages to fill vacancies.

For some time before his death he worked as a night watchman aboard ships at the port. Flags above the Lyttelton Harbour Board's Port Building and the Watersiders' Centennial Hall were at half-mast in his honour.

Mr. McCarthy was an honoray life member of the Canterbury branch of the Antarctic Society.

He is survived by three sons.

His brother Timothy was a member of Shackleton's 1914–16 expedition and one of the six who made the famous boat journey from Elephant Island to South Georgia.

Among the messages of sympathy received was one to his relatives and to the Antarctic Society from Rear-Admiral J. L. Abbot, Commander U.S. Naval Support Force, Antarctica.

ARGENTINE TOURISTS

The tourist ship **Lapataia** left Ushuaia on February 3 for the Melchior Archipelago, where the naval base, temporarily closed, was visited; then made for Gerlache Strait as far as Lemaire Island and anchored in Paradise Bay in front of Almirante Brown station, where the tourists went ashore to inspect the station. After visiting the United States Palmer Base and the team at Primero de Mayo Bay, the condition of the ice prevented any further advance beyond Hope Bay so after calling at Media Luna Island and visiting the naval base Teniente Camara (temporarily closed down) the ship made again for Ushuaia and the tour ended on February 18.

McMURDO'S FIRST TOURISTS

Subject to the final approval of the New Zealand and United States authorities, arrangements have been made by Lindblad Travel Inc., New York, for two parties of American tourists to visit New Zealand, a number of the southern islands and McMurdo Sound, Antarctica, in early 1968. Both groups will follow the same itinerary and travel from New Zealand and back on the Holm and Co. (Wellington) chartered polar ship "Magga Dan" (1,957 tons).

The first party of 20 is expected to arrive in Auckland by air (B.O.A.C. Boeing–Rolls-Royce jet) on January 4, depart from Lyttelton on "Magga Dan" at 4 p.m. on January 8, and have five days in McMurdo Sound. On the return journey they will arrive at Wellington on February 4, leaving for San Francisco by air on February 5.

The second party's period in New Zealand will extend from February 1 till March 4.

Incidentally, each "Expedition" member will pay from 4.495 to 6,195 U.S. dollars for his (or her) experience, plus air fares between the United States and New Zealand, and in New Zealand.

"TOUGH" !

The promoters claim that this is not a tour for those who just want to say they have set foot on the Antarctic continent, and state bluntly that it will be "much too uncomfortable and involved" for people of that kind.

All the tourists are said to have a genuine interest in the Antarctic and to have been "specially selected".

Nations represented by the 20 tourists in the first cruise party are the United States, Canada, Denmark, Norway, Italy, Germany, Switzerland, Japan and Sweden.

The crew of "Magga Dan" will consist of four Danes and 21 New Zealanders. The wife of the Captain

(Fenn Bang) and their nine-year-old daughter will also be on board.

ITINERARY

On the voyage south from New Zealand "Magga Dan" will proceed via the Chatham Islands, Bounty Island, Antipodes Island, Campbell Island and Scott Island, and reach the Ross Sea and Ice Shelf on January 19. Leaving McMurdo Sound on January 23, the expedition will then call at Terra Nova Bay and other spots along the coast of Victoria Land, Cape Hallett, the Balleny Islands, Macquarie Island, the Auckland Islands, the Snares, Stewart Island, and Milford Sound.

Many of the tourists will spend about 12 days in New Zealand on their return from the cruise.

INSTRUCTION

A very full tour programme is being organised. Lectures will be given under seven categories: the history of Antarctic exploration, marine biology, meteorology, ornithology, wildlife conservation, geology and glaciology. There will be special emphasis on marine biology, ornithology and wildlife conservation.

At the sub-Antarctic islands with permanent stations scientists will tell the tourists about the work they are engaged on, and while travelling through the Ross Sea the tourists will study the lives of seals, whales, penguins and petrels. At McMurdo Sound they will make journeys of up to two miles on foot. They will also meet scientists at the station there and at Scott Base and learn as much as possible of their studies. It is not intended, however, that the expeditions will ask the United States Navy or the New Zealand party in the Antarctic for any assistance.

THE SHIP

The "Magga Dan" has on board much more radio and navigational equipment than is normal for a vessel of her size, with a special accent on equipment for the detection of ice bergs and ice floes, and she will carry a motor sledge for use in case of emergency. She can make her own fresh water — as much as 12 tons a day — and is fully air-conditioned. A well-equipped laboratory will be installed in the vessel, as will also a sizeable library of scientific as well as entertainment films.

STAFF

The expeditions will be led by Mr. Lars-Eric Lindblad, principal of the travel agency.

The tourists will have the expert

IT HAS TAKEN A LONG TIME

Tourism has come at last. Twenty years ago, on March 8, 1947, William London wrote in the Auckland "Weekly News":

"What is there in the Antarctic for the ranging sons of men?

"Flying boat experts affirm this country has ideal hopping-off places. Primeval men and kindred spirits from all the world would make New Zealand their base with Antarctica as a tourist Mecca. Boarding house landladies would rub their hands. We could advertise one of the newest and most unique trips in the world:

Emulate Antarctic Saga Heroes
Fly across Confetti-laden Seas
Touch down on a New Continent
Place your Hot City Feet on a Patch of Snow Untrodden since the Creation Morn
Come to the Seal Barbecue

"No woman has ever been in the Antarctic — no Eve has ever entered this Eden. Here is a short-cut to fame, girls. Who'll be the first?"

THE READER WRITES

Sidelights of Antarctic Research

Letters, preferably not longer than 500–600 words, are invited from readers who have observed some little known facet of Antarctic life or who have reached conclusions of interest on some Antarctic problem. — Ed.

SEALS KILLED

Sir,

Our earlier contributions to "Antarctic" ... (Stonehouse, ... June ... 1965, Thomson, September 1965) disagreed over the numbers of seals killed for dog food by official New Zealand parties in McMurdo Sound. In view of the importance of these figures for present and future joint research projects, we have compared sources, discussed possible errors, and reached agreement on the following figures:

1956–57	350
1957–58	105
1958–59	150
1959–60	110
1960–61	60–100
1961–62	100
1962–63	100–130
1963–64	80–100
1964–65	72

Doubt over exact numbers has in some cases arisen through the keeping of two sets of records.

BERNARD STONEHOUSE,
Reader in Zoology,
University of Canterbury,
Christchurch.

R. B. THOMSON,
Superintendent,
Antarctic Division,
D.S.I.R.,
Wellington

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guidance of Captain Edwin McDonald (U.S.N. ret.), whose polar assignments took him by air over both poles and on six Arctic and seven Antarctic expeditions (from 1956–57 to 1961–62). For his last six seasons of polar work he was Task-Force Commander and Deputy-Commander of Operation Deepfreeze. In 1962 he was awarded the Patron's Medal of the Royal Geographical Society for "outstanding services to Antarctic exploration," including the first coastal explorations in the south Bellingshausen Sea.

The co-ordinator of the scientific programme is Dr. Roy L. Sexton, M.D., of the Explorers' Club, New York, a medical practitioner for 40 years in Washington who has acted as medical director on previous Lindblad tours. Assisting him will be Dr. J. P. Wise, a marine biologist of Miami University, and Dr. R. T. Peterson, ornithologist. Also on the staff will be Mrs. Marie Darby, a marine zoologist of the Canterbury Museum, Christchurch.

ADVISORS

National Science Foundation's Advisory Panel for Antarctic Programs has received a new member. He is Dr. Ernst Stuhlinger, Director of the Research Projects Division at ANSA's George C. Marshall Space Flight Center, Huntsville, Alabama. Dr. Stuhlinger replaces Dr. Robert Cushman Murphy of the American Museum of Natural History.

Established in 1963, the Panel has had five meetings to consider broad aspects of the U.S. Antarctic Research Program. Other members are Dr. Laurence M. Gould, University of Arizona (Chairman); Ambassador Paul C. Daniels, Dr. Richard M. Goody, Harvard University, and Dr. Laurence Irving, University of Alaska.

Two troops of Boy Scouts in Christchurch, New Zealand, are now the proud possessors of Antarctic survival tents.

These tents were presented to boys in the Yaldhurst and Wigram troops by Lieutenant-Commander R. E. Berger of VX-6 after he had given the scouts a talk and showed them films on life in the Antarctic.

ANTARCTIC BOOKSHELF

MONDAY AT McMURDO, by David Burke. Reed, Wellington. 247 pp. $1.95.

An exciting plot, a realistic Antarctic setting and a practised writer with a distinguished record in Australian journalism and with three visits to the Antarctic behind him; here, surely, are the ingredients of a completely satisfying thriller. This, provided you have no objection to a number of incredible coincidences and a piling up of thrill on thrill as we approach a gory finale, is what Mr. Burke has given us in "Monday at McMurdo".

A reviewer who is not a thriller-fan must, however, confess to disappointment that Mr. Burke has not given us, as he could, something more; perhaps even the first great "Antarctic" novel. He knows the Antarctic, "our" part of the Antarctic, and his descriptions of pack and floe, mountain and glacier, white-out and scenic splendour, are realistic and with few exceptions convincing. He has flown into McMurdo on a long, hazardous pioneering flight from Australia via the Pole. He knows Antarctic weather and Antarctic men. And he can write well:

"They were at three thousand feet, the crater of Mt. Erebus fading on the horizon, the white face of the Great Ice Barrier passing slowly below. They droned across the humped shapes of Black and White Islands and the probing finger of Minna Bluff, the only feature disturbing the primeval frozen sea that filled the horizon to the east. To the west, headed by the broad dome of Mt. Discovery, the column of snow-covered peaks paralleling their flight jutted into the sky, gradually closing with them as Froce guided Lonely Jo towards the promontory of Cape Kerr and the mouth of Barne Inlet concealed behind it."

Froce is the McMurdo U.S. Base Commander, and he has a load of problems on his hands. Late in the season a group of V.I.P.s arrives, headed by Congressman Eric Hassen, who has with him his glamorous press secretary, Marcia Dupree. These two are on an Otter which makes a forced landing on the Tom Thumb Glacier inland from Barne Inlet, 300 miles south of McMurdo, while a blizzard ravages the base. Veteran British explorer Armsworth parachutes to their aid from a Beaver, and three days later Froce himself, at the controls of another Otter, a hurriedly-repaired one, sets off on a desperate do or die rescue mission. Add to all this a sudden ice break-up at the airfield, the clash of strong personalities, the desperate intrigues of a power-greedy politician, and the effect of exposure, hunger and danger on a group of men — and a woman — whose paths have crossed, tragically, before, and you have, in the hands of a craftsman as skilled as Mr. Burke, the makings of a first-rate thriller, if not of a first-class novel.

Unfortunately for some readers, Mr. Burke has preferred excitement to involvement, and in its closing pages his book piles horror on Antarctic horror. If it could have ended on the high note of Armsworth's selfless dedication, a reviewer might have been able to cheer more heartily. As it is, most readers will enjoy the narrative skill and the realism of the background, with some reservations about dialogue interspersed with stilted, if necessary, explanations. The avid devourers of thrillers will go further and thoroughly enjoy this most unusual addition to their favourite reading fare.

It will not be surprising if we see "Monday at McMurdo" as a film. Several of the characters, Father O'Dell for one, will surely, if well depicted, hold audiences spell-bound.

L.B.Q.

NEW LIGHT ON THE HEROIC AGE

SOUTH TO THE POLE: the early history of the Ross Sea sector, Antarctica, by L. B. Quartermain. Oxford University Press, London. 481 pp., 44 illustrations, maps. N.Z. price $7.50.

Reviewed by R. B. THOMSON
(Superintendent, Antarctic Division)

The discovery and exploration of Antarctica provides accounts of daring, heroism, and hardship, unsurpassed by any other era in history. Many of these stories will no doubt survive the passage of time and be read enthusiastically as "the great adventure stories of old", by people of future generations.

But where does one find the true facts? Who first sighted Antarctica, and who was the first man to set foot on this southern continent? Numerous books have been written over the years, many contradicting earlier works but many more adding to the considerable wealth of material available, particularly in describing the events of the "heroic age".

Quartermain's book, "South to the Pole", is not the book for one just wishing to read an adventure story of the South Pole. This is truly a work of historic facts woven into an interesting and stimulating account of the numerous happenings in the Ross Sea sector of Antarctica. This book must appeal to all interested in Antarctica, and particularly those wishing to obtain an accurate knowledge of the great happenings of those earlier years without having to peruse numerous books and documents and perhaps still be left a little wondering.

"South to the Pole" takes the reader back to the dawn of the first century — to the days of the Greek philosophers who believed in the existence of a great Southern Continent to "balance" the known northern continents. Quartermain then briefly and ably describes the thoughts and voyages of many of the great sailors of the southern waters throughout the centuries until "the discovery" in the nineteenth century. Then follows the great exploration and the stirring accounts of the "heroic age". Here Quartermain is at his finest and fairest. Controversial issues are dealt with fairly and squarely — and easily perhaps by the author who quotes nearly one thousand references from a very extensive selected bibliography and amazingly enough still appears to retain a complete impartiality to favour. The author, aided by substantial new material including many previously unpublished notes and diaries, and information supplied by scores of personal contacts, provides a splendid coverage and gives a new insight to the lesser appreciated journeys — Shackleton's near attainment of the Pole in 1909, the outstanding trek of Mawson, David and Mackay to the South Magnetic Pole, Amundsen's triumph, the hardship endured by Scott's Northern Party, and the work of the Ross Sea component of Shackleton's Trans-Antarctic Expedition 1914–17. From all this, men attached to the present New Zealand expeditions will learn a considerable amount regarding the areas they work in today and the place names attached, for the names of the men in these earlier parties form a substantial portion of the Antarctic Gazetteer of today.

The last chapter, "End of an Era", is indeed appropriate: the "heroic age" has ended, the powers of the Governor of the Ross Dependency are vested with the Governor-General of New Zealand, and Antarctica awaits the onslaught of men and equipment of a new mechanical age.

The book is well bound, the cover attractive without being over-brilliant, but it should certainly grace a library or collection. The black and white photos provide quite an adequate illustrated coverage, and pleasingly, not too many "old faithfuls" are included. The substantial list of references and selected bibli-

ography provide the Antarctican reader with a very full list of books he should read — if he is fortunate enough to have considerable time available to do so.

"South to the Pole" could be one of the "great books" to come out of Antarctica. It lacks little except to provide a reader new to Antarctica with larger and more comprehensive maps of Antarctica, Ross Island or the Ross Dependency.

STUDIES IN ANTARCTIC METEOROLOGY, by Morton J. Rubin, Editor. Antarctic Research Series Vol. 9. 231 pp., illustrations, maps and diagrams. ...American ...Geophysical Union. $14.00.

This volume contains the first collection of meteorological studies for the Series, and consists of seven papers which are based upon data obtained by laborious and exacting field work, some of it by the authors themselves.

The subjects presented here comprise micrometeorological studies of wind, temperature, heat flux and the surface energy budget on the polar plateau in the vicinity of the South Pole, analyses of measurements made of snow drift density and particle size, study of snow drift gaugings and techniques used at Byrd Station, distribution af snow accumulation in western Antarctica and related synoptic meteorological factors, climatological characteristics of ice-free Wright and Victoria Valley systems and a regional climatic classification for the interior of Antarctica.

This collection of papers has set a fine standard. Clear presentation of text, tables and diagrams in each paper is worthy of note, while the liberal inclusion of field data, enabling the student and the specialist to appreciate the difficulty of the problems being studied and the extent to which solutions have been found, is most welcome.

E. G. EDIE.

Adrian Hayter, lone voyager, author of "Sheila in the Wind" and other popular books, and Leader at Scott Base 1965, has written a book on life and work at the Base. **"THE YEAR OF THE QUIET SUN"** is being published by Hodder and Stoughton, probably some time next year.

EXPEDITION ANTARCTIQUE BELGE 1957–58

Resultats Scientifiques
Vol. VII. Geologie et Annexe Glaciologique

This latest addition to the series of "Scientific Results" of the Belgian Antarctic expedition 1957–58 is surely a model of what such reports should be if they are to be of interest to a wider circle than that of the geologists themselves. This handsome, well-bound volume of 300 pages, well printed and set out, on first-rate paper, promises easy and enjoyable reading without in any way losing its value for the specialist. The historical and geographical introductions to each section are pertinent and valuable to anyone at all seriously interested in Antarctic research. The illustrations are numerous, good and well captioned, and include seven magnificent panoramas (19 to 24 by 4 inches). The whole effect is, surprisingly in a scientific publication, one of space and clarity.

Non-scientists will eagerly await the delayed appearance of volume 1, a general narrative of the expedition and description of Base Roi Baudouin.

THE ORIGIN OF CONTINENTS AND OCEANS, by Alfred Wegener.

A new translation by John Biram of the fully revised fourth (1929) edition of "Die Entstehung der Kontinente und Ozeane", 246 pp. Dover Publications, Inc., New York. $2.

Most readers of "Antarctic" have from time to time heard of Gondwanaland and/or the theory of the drift of continents. Frequently new discoveries in Antarctica are referred to as affording fresh evidence for or against the theory that in the remote past the continents were not separ-

ate as now but formed one super continent which later split apart.

Scientists — especially geologists, geophysicists, geodesists and paleontologists — are, of course, vitally interested and to a greater or less extent informed.

Both groups will be interested in a new English translation of the book which started the controversy which still rages. Alfred Wegener, born in 1880, was a German scientist and Arctic traveller who was wounded during the first World War and who died on the inland icecap of Greenland in 1930. His book was first published in 1915. The fourth edition, like earlier ones completely revised, has not before been published in an English translation.

Here, then, in full and in a particularly strong, attractive and easily handled paper-back edition, is one of the primary source books of the earth sciences. It is not only a book for every earth-scientist to study, but one which will help any intelligent person with a penchant for science to understand more readily and fully the significance of references by Antarctic research workers to Wegener's revolutionary theory of earth history.

LIBRARIANS !

The **Dictionary Catalog of the Stefansson Collection on the Polar Regions,** in the Dartmouth College Library, is now available from G. K. Hall and Co. of Boston. It contains 115,000 entries, published in eight volumes.

The Stefansson Collection, a monument to the collecting energies and acumen of the Arctic explorer Dr. Vilhjalmur Stefansson, existed as his private collection for a quarter of a century before its transfer in 1951 to Baker Library at Dartmouth.

Historical coverage is the main emphasis of the collection, with primary concern for the history of Polar explorations. Alaskan history, biography, description and travel also constitute an area of on-going specialisation. Resources on the Arctic and Antarctic are available within specified chronological and geographical limits, while documentation of the international-relations aspect of the Polar regions is included without regard to period.

This catalogue is available at the price of $470.00 in the United States; there is an additional charge of 10% elsewhere.

Descriptive material on this publication is available on request. Inquiries and orders may be addressed to the publisher, G. K. Hall and Co., 70 Lincoln Street, Boston, Massachusetts, U.S.A. 02111.

BYRD MEMORIAL IN DUNEDIN

A statue of Rear-Admiral Richard Byrd designed by Felix de Welden stands in Memorial Avenue leading to Arlington National Cemetery in Washington, D.C., and an exact replica of the head portion of the statue has been erected at McMurdo Sound.

A second copy of this bust is in the foyer of the National Geographic Society building in Washington and a third has been presented by the Society to the City of Dunedin, where it is to be erected at Unity Park, which overlooks the City and the Pacific Ocean.

This bust was presented to Dunedin because Rear-Admiral Byrd's Expeditions used the city as their base.

The bust will be unveiled by His Excellency Mr. J. F. Henning, United States Ambassador to New Zealand, in October. It stands on a polished granite shaft which was sent from America and is approximately six feet in height. The City Council proposes to have the bust floodlit.

ANTARCTIC BILL

The Antarctic Treaty Bill, which protects the flora and fauna of Antarctica, was passed in the House of Lords on July 25.

Moving the third reading, the Bishop of Norwich, Dr. Fleming, said he welcomed the Netherlands Government's assent to the treaty.

Previous signatories included Britain, Australia, New Zealand, Russia and the United States.

N.Z. ANTARCTIC SOCIETY OFFICERS 1967

Patron: The Rt. Hon. Sir Walter Nash.

President: Mr. E. R. Gibbs.

Committee: Dr. T. Hatherton, Mrs. D. Braxton, Messrs. V. E. Donnelly, H. F. Griffiths, R. Heke, A. H. Newton.

RECENT MEETINGS

Mr. Frank Shulte, from the University of North Dakota who is studying for his master's degree in geology at the University of Canterbury under a Fulbright scholarship, addressed 40 members of the **Canterbury** branch in July. He took for his subject the discovery of an area of thermal and volcanic activity on the Antarctic mainland.

Wellington Branch meetings have included the Annual Meeting, with an attendance of 80, in conjunction with the screening of the Mike Minehan TV documentary on life at Scott Base; and a talk by Mr. R. B. Thomson, Superintendent of the Antarctic Division, on the coming Antarctic season (with slides of the Dry Valley area) and the thorny question of Tourism in the Antarctic.

Bill Hopper is again Chairman, and Mick Donnelly is combining the Secretaryship of Society and Branch.

YOUR CHANCE !

Single copies of the following issues of "ANTARCTIC", which have been **unprocurable** for some time, have come to hand, and are available to the first comer at 50c per copy.

Vol. 1, nos. 1, 2.

Vol. 2, no. 9.

Vol. 3, nos. 5, 7.

FOUR "DAN" SHIPS ON ANTARCTIC SERVICE

Four of the Lauritzen Company's polar expedition vessels took part in the supply service to Antarctic scientific stations in the 1966–67 season.

Besides the veterans, the "Nella Dan", "Thala Dan" and "Magga Dan", the "Perla Dan" for the first time made the long and demanding voyage.

The "Nella Dan" supplied Macquarie Island and Mawson for Australia's ANARE.

The "Thala Dan", under charter to Expéditions Polaires Francaises, made four calls at Dumont d'Urville and furthermore supplied the Australian Wilkes station.

The ice conditions off Wilkes and Repstat on the Budd Coast were extremely difficult. Heavy pack ice, concentration 9/10 to 10/10, and often under pressure due to wind and current, blocked the entrance. The "Nella Dan" and "Thala Dan" fought for many days in this ice, but progress was so slow that eventually the Americans sent their icebreaker "Eastwind" to their assistance, and she helped the "Thala Dan" through to Wilkes. The going was so heavy and slow that it was considered too tedious a job to get the "Nella Dan" through in the same manner, and the most urgently required cargo and one passenger were therefore transferred to the "Eastwind", and the "Nella Dan" proceeded to Mawson.

Under charter to Expéditions Antarctiques Belgo-Neerlandaises, the "Magga Dan" called at Roi Baudouin.

The British Antarctic Survey used the "Perla Dan" to service Port Stanley in the Falkland Islands, Deception Island, Signy Island, South Georgia and the Halley Bay station in the Weddell Sea. Ice conditions in the Weddell Sea were unusually easy this season except for some difficulties created by the breaking off of large sectors of the shelf ice, which deprived the vessel of its usual unloading "pier" and made the cargo operations more tricky.

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The New Zealand Antarctic Society

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 currently two branches of the Society and functions are arranged throughout the year.

You are invited to become a member. **South Island** residents should contact the Canterbury secretary, **North Islanders** should contact the Wellington secretary, and **overseas** residents the secretary of the New Zealand Society. For addresses see below. The membership fee includes subscription to "Antarctic".

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