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THE NORTHERN PARTY LANDS ON THE VICTORIA LAND PLATEAU

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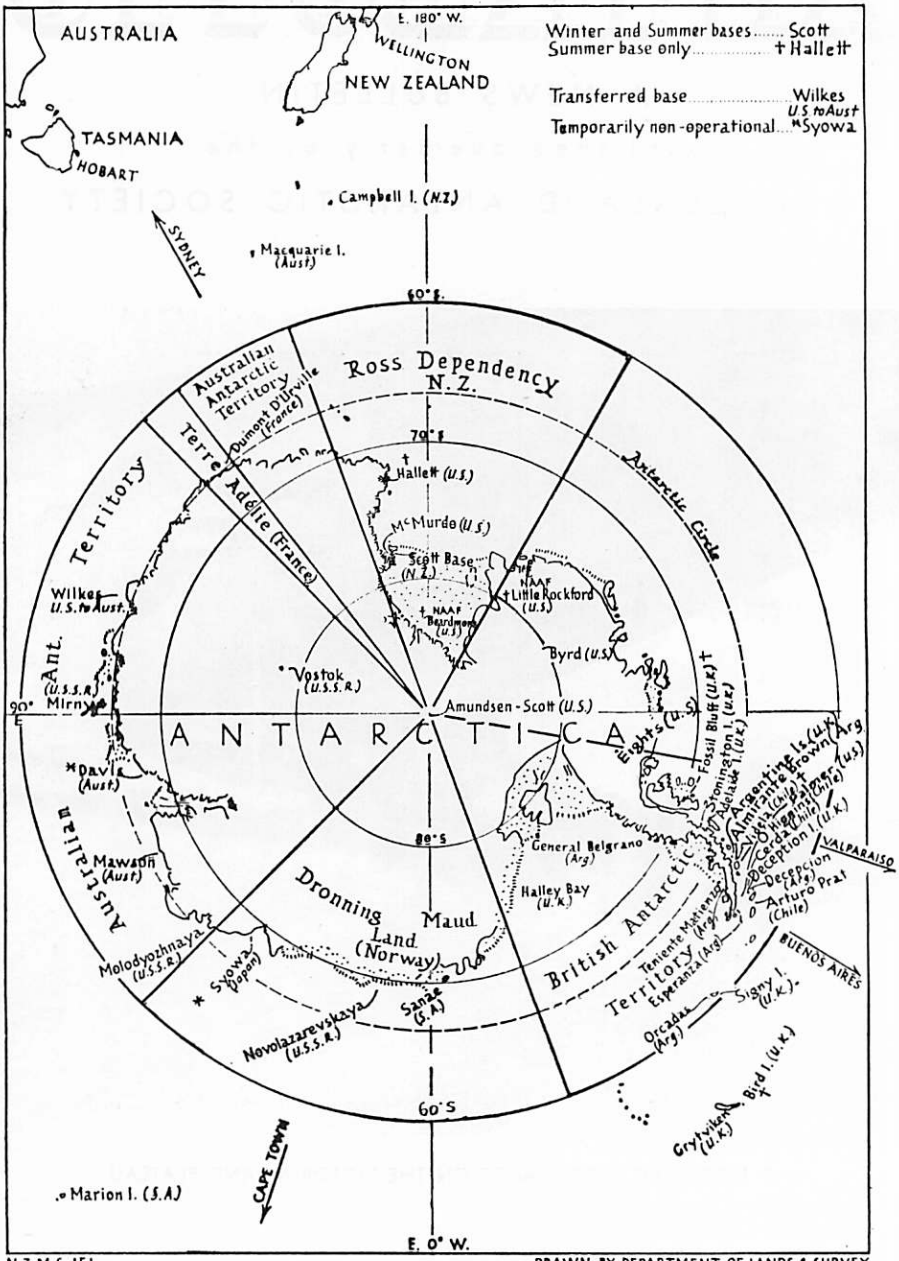

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CONTENTS

EXPEDITIONS

New Zealand — Page

Geological Exploration in the Campbell-Aviator Divide: Ross Chisholm and Simon Nathan 482

Mt. Erebus Climbed Again: W. R. Orchiston 485

U.S.A. 494

Woman in Deep Water: Helen E. Clark 492

France 498

U.S.S.R. 500

Australia 503

Belgium-Holland 506

Japan 508

Argentina 509

South Africa 510

United Kingdom 513

Chile 516

Sub-Antarctic Islands 517

The McCormick Skua in Southern McMurdo Sound, Antarctica: Ian F. Spellerberg 522

Antarctic Stations, 9: Novolazarevskaya 526

The Veterans 527

Antarctic Bookshelf 529

Will American Tourists Visit McMurdo Sound? 534

50 Years Ago 535

New Zealanders Abroad 536

GEOLOGICAL EXPLORATION IN THE CAMPBELL-AVIATOR DIVIDE

ROSS CHISHOLM
with geological and other notes by
SIMON NATHAN

New Zealand continued its geological survey and exploration of the Ross Dependency this year with two field parties, the southern, or Aviator Glacier survey party and the Mariner Glacier party working just to the north. The objective of the Aviator party was to survey the Aviator-Campbell divide including Mt. Melbourne and also the plateau area north of this so that no gaps remain in the geological maps of this region. The journey from the Polar Plateau to the coast at Cape Washington was completed in forty-eight days and was climaxed by the discovery of thermal activity near the summit of Mt. Melbourne, a prominent volcano on the coast of Victoria Land.

After being flown in by a Hercules transport aircraft to Evans Neve on the Plateau in the early hours of November 25, the two parties camped together until moving off in the afternoon to their respective geology areas. The members of the Aviator party were Simon Nathan, senior geologist, Frank Schulte, geologist, Iain Stewart, field assistant, and myself.

Our main area of exploration was south of Evans Nevé, but to coordinate the work of both parties, we started at the Pleiades east of the put-in point. A one day blizzard delayed us there but the Retreat Hills were reached on November 29. Two days there were sufficient to complete the geology of the main peaks and it was on one of these at about 10,500 feet that we were visited by a snow petrel which circled us for several minutes.

(Our tentative plan was to examine the rocks along the ridge between the Campbell and Aviator Glaciers, and to gradually make our way down to Mt. Melbourne and from there to the sea. Both glaciers bounding the ridge are large first-order glaciers, flowing from the plateau right down to the coast. In the past most travel has been either on glaciers or on the plateau, and our journey was partly an experiment to test the feasibility of travelling down a ridge. In the event it was highly successful, as the rocks could be examined in much greater detail than glacier travel allows, and there were few days when we did not spend some hours geologising. —S. Nathan.)

Our next task was to collect rock specimens from the crater ridge of Mt. Overlord, 20 miles to the southwest and this, together with an ascent to the summit at 11,145 ft. was accomplished on December 2.

(After two days examining schists and sediments at the Retreat Hills, we made a brief journey to Mt. Overlord — a large extinct volcano at the top of two thousand foot cliffs overlooking the Aviator Glacier. As we stood on the summit it was easy to visualise red hot lava pouring over the crater rim and down the cliffs on to the glacier. Before us the rest of our route was spread out in a magnificent panorama, with Navigator Nunatak below, the main hills and ridges of the Campbell-Aviator divide directly ahead, and cloud-shrouded Mt. Melbourne in the far distance.—S.N.)

After camping in the shadow of Overlord where the temperature dropped to —29°C., we sledged with our two Polaris motor toboggans and three sledges loaded with over 4,000 lbs. of gear, to the Intention Nunataks, a distance of 42 miles. This journey, which took us across the

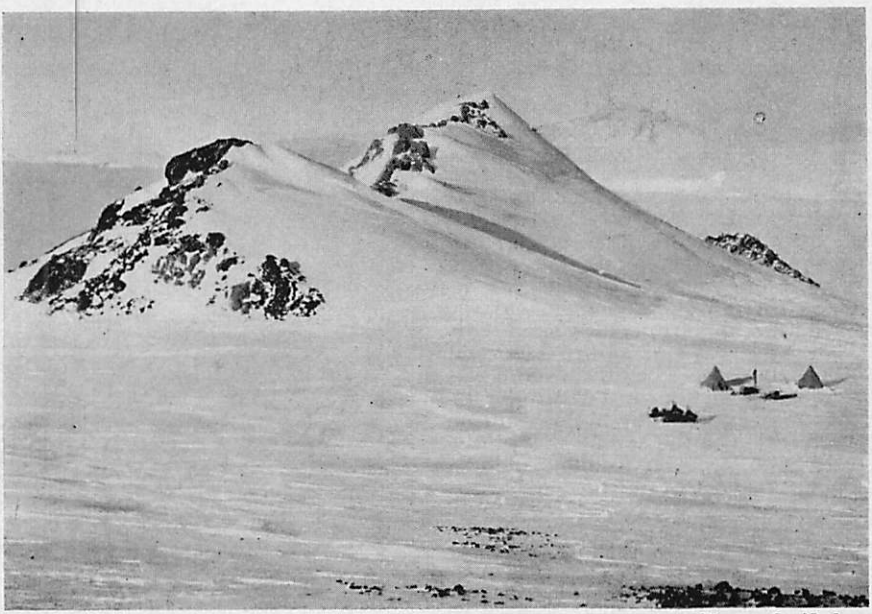

Photo: S. Nathan.

LOOKING NORTHWARDS OVER THE AVIATOR GLACIER.
MT. OVERLORD IN BACKGROUND.
Hills in foreground are of granite (grey) partly covered by black basalt.

nevé of the Astronaut Glacier, was the longest day's sledging of the trip and took 13 hours.

(Our load repacked, we set off on the long trek around Evans Nevé at the head of the Aviator Glacier. The 1962–3 northern party dog-sledged over part of this route and reported very soft snow conditions with much whooshing snow. However, we were blessed with continuing hard surfaces, and covered the ground very rapidly. In one long day's sledging we set our record for motor toboggan travel. Scattered hills and nunataks meant short geologising trips, but our next main stop was the Intention Nunataks.

This group of hills is composed of basalts and sandstones of Jurassic age, about 150 million years old, and we were fascinated to find leaf impressions and buried tree trunks in the sediments as well as large geodes and pockets of agate, chalcedony, and various zeolites in the basalts.—S.N.)

Solo Nunatak in the Rennick Glacier Nevé was visited and then on to Navigator Nunatak in the Aviator Glacier. Last year's Northern Party led by Dave Lowe had left ice-movement stakes in the glacier and we spent a day surveying and geologising here at the foot of the Co-pilot Glacier which drains the western slopes of Overlord.

(Is is significant that the centre stake was about two feet in front of the outer two, thus indicating movement at a rate much greater than expected.—S.N.)

December 10 found us on the ridge system forming the Aviator-Campbell Divide, and this area of many small glaciers and numerous outcrops of rock was to occupy us for the next 25 days. For the first three days we were confined to camp by a blizzard, but from then to Christmas Day we had near-perfect weather. We travelled generally southwards with side-trips

where necessary to visit distant ridges and outcrops bordering the Cosmonaut and Tinker Glaciers.

The most difficult part of this section was a steep saddle up which we had to climb from the Tinker Glacier. We managed to traverse with two toboggans hauling one lightly loaded sledge at a time, to about half-way, where we formed a dump. For the upper half, which rose at an angle of at least 25 degrees, we got the toboggans to the top after much pushing and connected them to one end of 1,000 feet of nylon rope. The lower end was fixed to a sledge and with the toboggans running slowly downhill on the far side of the saddle they developed enough power to haul a lightly-loaded sledge to the top.

The other obstacles encountered were three steep steps which had to be descended. The angle of these was over 30 degrees, but by completely covering the sledge runners with rope brakes, we were able to descend safely. The biggest step was a drop of 1,500 feet but the most difficult was the third one, at the top of which every item had to be carried over ten yards of rocks — except the toboggan, for which we shovelled sufficient snow over the rocks to enable them to be driven across.

(The rocks mapped were nearly all different varieties of granite, and it was interesting to correlate our work with that of last season's party who worked in an area immediately south of the Campbell Glacier. One feature of particular note was the evidence for very recent volcanic activity. At many outcrops we found small undissected basalt scoria cones or mounds, and in places basalt lapilli and pebbles were found on the ground surface — obviously thrown out by nearby eruptions and not yet destroyed by weathering processes.—S.N.)

Christmas we celebrated in the traditional manner with chicken,

FUMAROLE ON MT. MELBOURNE.

plum pudding and fruit cake, received the previous day, together with mail, in an air drop. This latter event was a great occasion and the party members were very appreciative of the work put into this by Colin Clarke, Dave Lowe, Bryan George and Norm White, the Base radio operator, as well as VX6 squadron U.S.N. A three day white-out delayed us from 27 to 30 December but by January 4 we had finished the geology of the coastal ridges and we headed out the long saddle to Mt. Melbourne. Camp was established at about 3,000 feet on the northern slopes, but cloud near the summit delayed the ascent till January 7. The 6th was spent in taking the spare sledge to the take-out point on Cape Washington Peninsula, a round trip of 61 miles.

On Saturday, January 7, we took the toboggans to about 7,500 ft. on Melbourne and set off for the summit on foot. Before long we came upon some strange sculptured ice formations and on closer examination found these to be hollow with the ground below warm and gently steaming. Boiling sounds could be heard by listening close to the floor

of the caverns. These fumarole ice formations were found over a considerable area of the upper northern slopes above 8,000 feet and in the craters of the 8,967 foot mountain. The temperature inside one of these caverns was +7°C. while outside there was a cool breeze at —18°C. This discovery of thermal activity on Mt. Melbourne makes it the second live volcano in Antarctica.

From Melbourne we moved to the take-out point, 340 sledging miles from our landing place, stopping on the way to geologise and visit an Adélie penguin rookery where we found 4,500 adult birds and approximately 2,700 chicks. This rookery was visited once before, by Borchgrevink in 1900, when he anchored in the small inlet just north of the rookery. From the take-out point, we travelled along the narrow peninsula ending in Cape Washington, where several skua gulls were found nesting. The 900 foot cliffs of Cape Washington were a well-known landmark to the early explorers of the Ross Sea. The next day, January 11, we were picked up by turbine helicopter and taken to the ice-breaker "Staten Island", a few miles away on the edge of the sea-ice. A comfortable leisurely trip back to McMurdo Sound on the ship was a pleasant way to finish a very interesting and successful expedition.

MT. EREBUS CLIMBED AGAIN

W. R. ORCHISTON

(We are indebted to Warwick Orchiston for this modest account of the eighth successful attempt to climb Antarctica's most famous mountain.—Ed.)

An attempt on January 4 to reach 6,000 feet with a husky team was foiled by heavy snow conditions, soft underfoot to a depth of 1½ feet on the main plateau. A stockpile of pemmican and food was made at 2,700 ft. prior to returning to Scott Base.

RECONNAISSANCE

On January 16, with very favourable conditions, a team of 13 dogs, Bruce Willis, Ian Stewart, and Warwick Orchiston set out to reconnoitre a route to the previously attempted area. First camp was at 1,800 ft., the next being 5,400 ft. From this point and with a lighter sledge we made excellent progress on firm snow to a height of 8,500 ft. in five hours, encountering only a small area of narrow crevasses at 7,900 ft. Before reaching 8,500 ft. we negotiated a siding which was fairly icy, otherwise the going was in easy stages along valleys and small plateaus. From where we planted our highest flag which was on the leading skyline ridge between Mt. Erebus and Mt. Terror, we found that by continuing further a dog team could well manage the next two gentle undulations opening out on to the major leading ridge, which forms a lower perimeter ring round the actual summit. During the return, flags were planted in prominent positions markking our proven safe trail; we arrived at Scott Base on the 18th.

ASSAULT

The main expedition after being delayed by bad weather eventually set off on January 26. The party comprised: Dave Lowe (Leader); Bruce Willis (Deputy-Leader); Bill Lucy; Warwick Orchiston; Bryan George and Peter Whiteford. The project's purposes were:

1. To climb Mt. Erebus.
2. To collect snow samples at every 1,000 ft. for tritium analysis.
3. To plant bamboo markers at every 1,000 ft. to begin measurements of accumulation.

4. To collect arthropods and investigate all possible habitats for insects and mites.
5. To test and assess the relative merits of the Polaris and Fox toboggans.
6. To collect geological specimens.
7. To do detailed black and white photography of the mountain.
8. To undertake any other scientific work that may arise.

Amongst the essential gear taken was: Three ten-day food ration boxes, three kitchen boxes, survival clothing, three Polar tents, six complete kits of sleeping bags, one 557 field radio and one Commando radio, one dog sledge and 13 dogs including pemmican and field span, one Fox toboggan and one Polaris toboggan.

All climbing equipment, including ropes, crampons, high altitude boots, crevasse ladders, skis and skins, ice axes, and first aid kit, was taken. The dogs, all pulling on a centre trace, were Johnny as leader, Chris and George, Franz and Steven, Leo and Draco, Virgo and Speedy, Toby and Kakiva, Rangi and Ratu. Handlers were Orchiston and George. Fox toboggan — Lowe and Willis; Polaris — Lucy and Whiteford. Each of the three sledges was packed as a complete unit, and all travelled fairly well together, at all times.

"HEAVY WEATHER"

We encountered extremely heavy snow conditions, loose and unconsolidated, at depths varying according to altitude. The first camp at 2,700 ft. in two feet of snow was situated on the upper reaches of the main plateau. Unfortunately, the weather turned bad, with whiteout and falls of snow accompanied by wind. In the next two days the sledges were buried under drift and all we could do was wait. On January 29, the Fox toboggan compacted a track in sections up a steep gully empty-handed, returning to pull, along with the Polaris, each of their sledges in turn. At all times the dogs aided by tracks already made in front of them, pulled their sledge with relative ease. The next camp was at 6,000 ft. in just over three feet of fresh snow. The toboggans, making heavy weather, frequently became bogged, especially the Polaris, and it would have been utterly impossible for the dogs to make any progress whatsoever if they had not been able to follow the toboggan tracks.

On the 30th the whole party resolved to pitch camp at 7,000 ft. and complete the climb on foot. While George and Whiteford took charge of this base, the remainder set out at 11.30 p.m., taking the toboggans only 500 ft. higher. A slow steady walking pace was maintained, each taking turn in the lead, and the snow began to get harder, with wind-drift sastrugi. Before commencing the actual steep climbing it was necessary to attach crampons as the going suddenly became icy. At this point Dave Lowe found it necessary to retire from the summit party and return to the base camp. At 8,500 ft. we roped up, as the mountainside was well honeycombed beneath; we several times arrested falls through the porous crust. Because of this it was decided to climb on a rocky promontory to 10,000 ft. where the going became less steep. The larger crater rim of a circular plateau unfolded, easing the climbing strain. From this point we observed many unusual-shaped boulders and peculiar mushroom-shaped snow mounds and pinnacles, caused presumably by outlet vents of steam from the interior. At 12 minutes to 7 (a.m.) on January 31, Bruce Willis, Bill Lucy and Warwick Orchiston reached the topmost point of the active crater. We had ice-matted beards and although warm, had locally cold noses and fingers.

THE CRATER

The crater, dropping very steeply inside to a depth estimated at 500 ft., gave forth a full-throated roar, and with all its gurgling belched great clouds of sulphurous smoke to be drifted in long layers in the atmosphere above. Only on odd sudden down-draughts of wind could we see any appreciable portion of the crater, but it was enough to observe

AT SCOTT BASE

Some extracts from "News from the South", the winter news-letter sent by Antarctic Division to the relatives and friends of the men wintering at Scott Base, will give some picture of autumn conditions at the base. Leader Colin Clark writes:

"We have seen some unforgettable sights as the sun has gradually got lower and lower, colouring the sky and tinting the snow in the most beautiful and delicate hues that we had previously only seen in Dr. Edward Wilson's paintings. If one forgets all else as the years pass, the sunsets and sunrises of the March and early April days will remain forever in the memory.

"The lowest temperature — in March — was —36°C. (68 degrees of frost), which is pretty bracing. During the particularly cold period over Easter weekend Bob Rae and Norm White did a 60-mile, two day trip toward Brown Peninsula with a motor toboggan. It gave them a stern realisation of what it must have been like for the early men down here. It was in late March, fifty-five years ago, that Scott, Wilson and Bowers perished on the Ross Ice Shelf.

"The changing scene in front of Scott Base since the annual sea ice broke out on February 18 has held our interest constantly these last few weeks. We had dark, open sea to look at for only 25 days, for on March 15 the sea began to freeze, and it is now probably strong enough to travel over again, though we are not yet taking any chances. The most spectacular sight came on March 6 when huge chunks of the Ross Ice Shelf, 60 feet thick, broke out to the east and south of Scott Base and were blown by the southerly gale right up against Pram Point, at our front door. The bergs, some of which would have weighed tens of thousands of tons, carried odd things. One had a road going across it (part of the "permanent" road to outer Williams Airfield); another carried proudly an abandoned Snocat. By morning they had gone, carried by currents to Cape Armitage and out to sea.

STATISTICS

"Five of us are married, three are engaged, and four, the ones who are not so good-looking are unattached. Our five married men have 15 children. Our ages range from 22 to 43: five are over 30, while seven are between 23 and 25. The average age is 29. . . . We have diverse ideas on everything from bicycles to philosophy. Yet we are a close group enjoying each other's company and enjoying tremendously the unique experience of spending twelve months in this forsaken and desolate region."

APRIL DAYS

On April 23 the flag was lowered and taken inside for the winter. As Leader Colin Clark put it: "The twelve men who stood at the flagpole probably wondered for a brief moment how it was going to be, this living in darkness for four months. But men do not meditate for long when standing in 57 degrees of frost with a brisk wind blowing drift snow in their faces. And back inside, the Base life is so warm and busy, interesting and convivial, that one does not get round to meditating very often." The flagpole will be

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the brightly-coloured hues in the rocks superimposed on the background of steaming cliff faces. Specimens of geological interest were collected and a start made on the snow samples which were packed away in plastic bags. Flags also were planted at every 1,000 ft. while descending and the trip down ended without incident. We made the base camp at 11.30 that morning, shrouded in the typical morning mist, having been tramping for nearly twelve hours.

All of the party's programme was completed with a great measure of satisfaction, reflected in the faces no doubt of each of us when we reached Scott Base the next day, February 1.

bare now until the sun returns late in August.

Already blown snow was beginning to cover the buildings, the sea had frozen over again, the seals and skua gulls had gone, temperatures were falling, the cook had brought his winter supply of meat up from the meat cave. Lines of stakes with reflectors had been laid out to the ice quarry and the dog-spans, and the guy wires on aerials and buildings had been checked and tightened against the coming blizzards.

WINTER — BUT

The dark months ahead are brightened by the knowledge that for the first time American airmen will be making *scheduled* flights to McMurdo Sound in the depth of winter, bringing mail and fresh foods.

BLIZZARD PROOF

A message from Scott Base dated May 26 says: "Fierce blizzards, with winds gusting up to 95 miles per hour, have been lashing Scott Base for more than a week. On May 18 the atmospheric pressure fell to the near record low of approximately 949 millibars (a barometer reading of 28.0), when the strongest winds were recorded. Since then blizzard has followed blizzard with only the briefest of lulls, piling the drift snow high against the buildings. The fine powdery snow drives through every minute crack around windows and doors into the covered passageways and some of the huts; it blocks the chimneys of the central heating units and finds its insidious way through the ventilating fans. The roar of the wind is incessant and dominating in the winter darkness. Outside jobs are bitter indeed in these conditions.

"Fortunately no serious damage of any sort has resulted. Two small huts mounted on sledges (wannigans) were tossed on to their sides by the violence of the gale three days ago, but all the main buildings of the base, secured to the ground with steel guys, have stood firm. Scott Base remains a credit to its Ministry of Works designers and builders. It can undoubtedly withstand the worst the Antarctic elements have to offer."

SCOTT BASE LEADER 1968

Leader of the New Zealand team next year will be

WILLIAM J. WEBB

who was Deputy Leader during the 1965–66 summer. Mr. Webb, who is 30 and married with one child, was born and educated in Invercargill, where he still resides. After leaving Southland Boys' High School in 1953 he joined the firm of consulting engineers by whom he is still employed. A keen musician and sportsman, he is particularly interested in tramping, mountaineering, swimming and squash, and has taken part in many search and rescue operations. He has represented Southland at swimming and water polo. He was Southland's first Queen's Scout. In his spare time "Bill" planned his own home and with his wife's assistance constructed all but the frame and part of the exterior.

WHY WEREN'T WE TOLD ABOUT THIS - - - - - ?

If this report from a Hobart newspaper is to be relied upon, the New Zealanders at Scott Base have been keeping very quiet about an unusually attractive visitor. (We have her photograph before us.)

"What business does a bonnie Scots lass have in the Antarctic? Quite a lot if she is 27-year-old Grace MacDonald, who is a director of Donald MacDonald (Antarctex) Ltd. A little tycoon in her own right, Miss MacDonald — who is really Mrs. W. P. Robertson, of Dumbartonshire, Scotland, and the mother of two children — travels the world promoting the sheepskin coats and rugs that the firm manufactures. In the Antarctic she modelled her latest coats and looked up some of her loneliest customers — the men in the bases of America, New Zealand, Great Britain, and the Argentine. Most of the men had not seen a woman for two years."

NEW ZEALAND'S ANTARCTIC PLANS FOR 1967-68 SUMMER

The state of the economy has cast its shadow over the planning which has been going on for New Zealand work in the Antarctic during the coming year.

The basic scientific work at Scott Base will of course necessarily be maintained at much the same level as in recent years. But field work, much of it intended to implement forward-looking projects of great interest and prospective value to the country, will be drastically curtailed. There will be only one D.S.I.R. team doing geological and survey work in outlying parts of the Ross Dependency, instead of the usual two or three.

RENNICK GLACIER

This sole field project will be a geological study of the Lower Rennick Glacier area, where a six-man party will spend ten to twelve weeks. This project complements work undertaken in surrounding areas during the past three years.

The Rennick Glacier, which is about 150 miles in length, flows northwards from the northern Victoria Land plateau at about 72° S. to enter the sea at Rennick Bay on the Oates Coast. It is one of the largest glaciers in Antarctica, if not in the world.

V.U.W.A.E.

The twelfth Victoria University of Wellington expedition will consist of seven men operating in three detached units.

(a) Two men will collect fossil material in the Wright Dry Valley, the Boomerang Range and Black Island. They will be in the field for about four weeks.

(b) Two men will study the glacial history of the Ross Dependency, ablation measurements and the ice budget of the Antarctic Ice Sheet. This involves a total of five to six weeks' study at Cape Royds, the Dry Valleys and U.S. inland stations.

(c) Two men will spend about seven weeks studying the heat flow through the bottom of McMurdo Sound, the bottom of Lake Bonney and Lake Vanda.

BIOLOGICAL STUDIES

UNIVERSITY OF CANTERBURY

Two 2-man parties will continue the Weddell seal research programme in McMurdo Sound, and between McMurdo Sound and Cape Hallett.

A 4–5-man party will continue the penguin and skua study at Cape Bird. Some marine biology in this area will also be undertaken during the summer season.

UNIVERSITY OF OTAGO

A 2-man party will be stationed at Cape Hallett for about three months to continue the work previously undertaken by the Dominion Museum. This includes studies of skuas and Adélie penguins in the area and the effects of man on their natural environment.

OTHER PROJECTS

GLACIOLOGY

The detailed study of the McMurdo Ice Shelf between Ross Island and the Mainland will be continued. Manpower requirements will be as for last season.

NUCLEAR SAMPLING

The gathering of air and snow samples will continue during the summer to provide basic data on isotopes occurring both naturally and as a result of nuclear explosions. The area of interest extends from New Zealand to the South Pole. Staff engaged on other projects will be used for such work.

OCEANOGRAPHIC SURVEYS

H.M.N.Z.S. "Endeavour's" resupply routes will be planned on preferred meridians to obtain bathymetric, temperature and proton magnetometer profiles which complement previous work.

An oceanographic cruise on H.M.N.Z.S. "Endeavour" will be made to study the eastern margin of the Campbell Plateau and Subantarctic Slope, and obtain geological and biological samples.

DRY VALLEY STATION POSTPONED

The major disappointment for all who are deeply interested in Antarctic work, and indeed for all who are keen to see New Zealand remain high in the esteem of the world's scientists, is the cancellation for the present of the Dry Valley project, because of the country's financial position.

This plan, for the establishment of a small year-round station in the Wright Valley near Lake Vanda, would have opened up a new and extremely interesting field of research calculated to be of immense practical value, particularly in the fields of meteorology, geology, glaciology, seismology and soil studies.

In addition, the placing of huts in the area (at a fantastically low cost by transferring existing huts to the site and also by transferring some man-power from Scott Base to the Dry Valley station) would have provided a much-needed staging post for field activities in the whole Dry Valley area.

A foreign exchange scientist was to have been one of the four men wintering over at the new base. There will be widespread regret far beyond New Zealand at the Government's decision not to implement this far-sighted plan this year.

FIRST N.Z. ANTARCTIC Ph.D.

Murray Smith has gained his Doctor of Philosophy at the Canterbury University for his work on the population, distribution and reproductive cycles of the Weddell seals.

In 1961–62 Dr. Smith was a member of the original Canterbury University Antarctic zoological party which consisted of Dr. Bernard Stonehouse (leader), Warren Featherston, Terry Jacobs and himself.

After completing his B.Sc. honours in 1962 he returned to Scott Base for the 1962–63 summer. He wintered over at Scott Base in 1963 and stayed over for the 1963–64 summer so that he could gather field material for his Ph.D. thesis.

In November 1964 he returned for a short period to make final check-ups.

Dr. Smith was one of the party which erected the N.Z. biological hut at Cape Royds in the spring of 1964 and also worked with Dr. Carlton Ray when Dr. Ray sent Weddell seals to the New York Zoological Gardens.

Dr. Smith is now at the University of North Wales, Bangor, working on a Wellcome Trust post-doctorate fellowship.

ALL ONE TO HIM

New Zealanders will be interested in this article from the Adelaide "News" of February 23. **Peter Hunt** is a Wellington-born surveyor who, after serving with the British Army in Cyprus, went to the Antarctic in 1959–60 and was a member of the New Zealand geological and survey party which worked in the coastal mountains between the Nimrod and Beardmore Glaciers. He wintered at Scott Base, and in 1960–61 dog-sledged to Cape Crozier and then led the southern dog-sledge team which surveyed the coastal area north of the Shackleton Inlet.

From the sub-zero cold of Spitzbergen in the Arctic or the Ross Dependency in the Antarctic to the 120° in the shade of Central Australia. . . .

. . . this is all in a day's march for Major Peter Hunt, a surveyor with the British Joint Services Expedition.

He's not unfamiliar with hot spots, having worked in southern Arabia.

The expedition will leave at dawn tomorrow for Alice Springs to spend three months in the western part of Central Australia.

Major Hunt, from the Royal Engineers, is one of four British Army men in the party with Royal Navy and R.A.F. men and two Australians.

Desert survival techniques and mapping will be two important parts of the expedition's work.

NEW ZEALAND MOUNTAINEERS SEEK ANTARCTIC FIELDS TO CONQUER

A NEW ZEALAND TEAM LED BY SIR EDMUND HILLARY AND INCLUDING EIGHT MEN WITH HIMALAYAN AND ANTARCTIC EXPERIENCE IS PLANNING MOUNTAINEERING AND SCIENTIFIC EXPEDITIONS IN THE CAPE HALLETT AREA FOR NEXT SUMMER.

The outstanding projects are:

(1) **To climb Mt. Herschel**, 11,800 ft., attempting both the east and the north ridges. Mount Herschel is possibly the most beautiful and challenging peak in the Antarctic.

(2) To manhaul up the Ironsides Glacier and carry out a **geological and mapping programme** under the direction of a leading geologist and an experienced cartographer, both men with extensive mountaineering experience.

(3) To carry out a detailed **study of cold acclimatisation.**

It is also proposed to send daily weather reports from the field parties to Hallett and to McMurdo, and to use and test new types of radio equipment and insulated tents.

To take advantage of the sea-ice at Hallett for aircraft landings, the expedition hopes to fly in to McMurdo Sound in early October and to return to New Zealand before the end of November. In general the plan is to fly from McMurdo to Hallett, where a master radio station would be established, and to carry out two airdrops (1) at the foot of the east spur of the north ridge of Mt. Herschel, (2) above the icefall on the Ironsides Glacier. After a base camp has been established at the foot of east spur and a camp on the spur itself, the team will split up and establish two assault camps, one on East Ridge and the other on North Ridge. This preparatory work should take just over a week.

During the following four days the team will attempt the ascent of Mt. Herschel via both ridges, including a traverse. All camps and equipment will then be carried back to the base camp.

The next four days will be taken up with hauling sledges up Ironsides Glacier icefall to the airdrop site and flagging a route through difficult crevasse areas. Ten days will then be spent in the upper Ironsides area with the party split up into groups for geology and surveying, followed by a further five days man-hauling down Ironsides Icefall back to base camp and sledging gear back to the Hallett airfield.

The individual members are prepared to supply the majority of their personal clothing and climbing equipment, and money will be raised by the sale of press and magazine articles in New Zealand, Australia, the United States and the United Kingdom.

GEOLOGICAL PROGRAMME

The programme drawn up by Prof. H. J. Harrington of the Geology Department, University of New England, New South Wales, whose party in 1957–58 produced most of the early geological knowledge of the Cape Hallett area, is as follows:

Completion of the geological and topographical regional reconnaissance commenced in 1957–58. Detailed study of the sedimentary structures of the Robertson Bay Group to determine the environment and mechanism of deposition and the direction of the source area of the sediments. Detailed study of the zig-zag cleavage folds or kink folds which are characteristic of the Robertson Bay Group and which are of considerable theoretical interest. A general study of the relations between Quaternary glaciations and their geomorphological effects.

WOMAN IN DEEP WATER

Helen E. Clark

[Miss Clark, from the Dominion Museum, Wellington, was one of two women scientists in the otherwise all-male ship's company of the U.S. research ship "Eltanin" during one cruise last summer.—Ed.]

The "Eltanin" appeared long and lean and grey with a strange assemblage of radar masts and screens. She was tied up at Queen's Wharf and someone went to get my suitcase from the car, returning with my brother's golf clubs as well, which caused considerable amusement and speculation from the various onlookers.

For the three weeks of Cruise 26 I lived on the "Eltanin" and enjoyed every moment of it. I quickly came to appreciate her and found to my surprise that I was quite a reasonable sailor after all. There is a surprising amount of space below decks and the laboratories are pleasant and reasonably roomy; I shared the foreward laboratory with the Southern California Scientific party, who seemed never to tire of teasing me, one of the two women on board. There were difficulties of course: the washer, and more especially the dryer, required careful handling. I lost much of my underwear, part of a shirt and a pair of socks in the dryer — and I only followed instructions!

Life on board between stations was never dull, and even if it had been, our cabin was so dark it was not easy to tell night from day, which provided an excellent excuse for the odd sleep-in. And of course there were the never-ending games of scrabble enriched by many variations and a good few arguments. We had a most amazing selection of movies on board too, from the wildest Westerns to the more moving and dramatic types, such as "El Cid"; they were screened in the evenings after dinner and the more enthusiastic often showed them again later at night. For others, there was the library with a strange assortment of books which provided plenty of amusement and settled the odd arguments which invariably occur.

In the daylight hours there were always trips to the bridge to be enjoyed and I never tired of watching the birds, especially the albatrosses as they glided with seemingly so little effort back and forth beside the ship. The sea itself was never in the same mood twice, and I loved to watch the spray the "Eltanin" threw back towards me as she dipped her nose into a wave. One morning I saw a whale. To my great delight it kept us company for quite a time before leaving on more important matters. And finally of course there was the P.D.R. — the three hours of which passed in a welter of clicking dials and changing figures, coffee cups, sleepy visitors, cigarette smoke, muttered conversations back and forth between the bridge and the P.D.R. shack and frantic calculations of wind force, direction and wave height.

I learnt a very great deal in these three weeks and never again will I criticise collections! When we were on station my trawl invariably came at the end and this necessitated long hours of weary waiting. Then would come the slow steady creep of the wire over the edge, the long wait, the clatter of the winch as it began to wind the thousand or more fathoms of wire in again and the sudden awful taughtening of the wire if the trawl became stuck on the bottom. Then would come the manoeuvring of the ship, swearing, shouting, excitement and then it would be free and beginning its slow ascent again from the depths. We did not lose a trawl but we did succeed in tearing the net and bending the frame and we brought up

some very large rocks too. The climax comes when the dredge, dripping and heavy, is clear of the water, and it is not until the trawl with its precious burden is gently lowered to the deck, that we can again relax. I remember watching with bated breath on one occasion for, as the trawl left the water, six or seven beautiful starfish clinging to the edge and the outside of the frame released their hold and spiralled back, down into the depths again. Alas, the long-handled net in these moments of crisis was never at hand!

Sorting the catch, generally by the light of the great arc-lights, was a cold but nevertheless interesting part of the work. One station near Cook Strait yielded immense quantities of a very fine, oozy, grey mud which took many hours of careful sorting and contained many animals including a fine array of spiny spider-crabs, sea urchins, strange fish, some large sea anemones and even a few starfish. As the same station we also brought up a trawl full of enormous pieces of rock which in a way was more trying to sort through than the mud for my hands became so cold that the rocks slipped out of my grasp. And after sorting, the day's work is not over, for the material must be taken below and carefully preserved and sorted and then stacked away with adequate labels and any relevant notes.

My main interest was the starfish, and although the hauls were not vast, there were some very interesting specimens among them. I expected that we might find some members of the family *Porcellanasteridae*, that strange deep-sea family, with relatively few finds from so far south, and I was not to be disappointed, as several specimens made their appearance. From the sandy areas I expected and obtained *Astropectens* and the ones which made their appearance were well worth the long cold hours of waiting. One of my main interests lay in the colour of these animals, and as it was not always easy to arrange for photographs, I had to rely on detailed colour notes. The colour fades very quickly and has almost gone even by the time the trawl lands on deck. In fact I suspect that the brilliant reds, oranges and yellows are fading as the trawl comes up through the water.

An interesting feature of the other programmes on board was the bottom photographs taken at each station. While these were interesting they were also frustrating as on many occasions animals appeared in the photos which we did not collect in the trawls and many of these seemed to me to be rare or unknown, although it is difficult to tell from a photograph. Photographs were however excellent guides to the kind of bottom sediments.

And so my trip on board the "Eltanin" came to an end and I was left only with happy memories and some new material to work up.

ICE

The importance of ice in the activities of Americans and New Zealanders in the Ross Dependency is illustrated by the fact that two of the eight articles in the February issue of the English *Journal of Glaciology* spring from research in the Ross Sea area: *Preliminary Studies on Sea Ice in McMurdo Sound during "Deep Freeze* 65" by Russell A. Paige and Claude W. Lee, and *Internal Structure of Sandy Glacier, Southern Victoria Land* by Wakefield Dort, Jr. All the authors are Americans.

The New Zealand Antarctic Society can take some pride in the fact that in Dr. Phillip Law's address to the Geographical Society of New South Wales on "Geography in the Antarctic" published in the "Australian Geographer" in March, in his list of references acknowledging his authority for 22 statements, he cites "Antarctica" (published by the N.Z. Antarctic Society) five times and this journal once.

LONG WINTER NIGHT CLAMPS DOWN ON FIVE AMERICAN STATIONS

At all the United States stations, scientific and support activities continued at a good pace during December and January, says the "Antarctic Journal of the United States", except for construction at Palmer Station and the survey of the coastal area of Byrd Land.

Here, inclement weather and the lingering effects of the loss of a helicopter in late November inpeded progress. In January so much work still remained to be done out of Byrd Land Camp No. 1 that preseason plans to establish two additional camps during the summer were abandoned. On January 26, personnel of Camp No. 1 returned to McMurdo, the season's work having been completed in that area.

Of considerable popular interest were the successful ascents by the American Antarctic Mountaineering Expedition of Vinson Massif and Mount Tyree, the two highest mountains in Antarctica, and four other peaks in the Ellsworth Mountains.

SUNSET

Night at McMurdo Station fell for the coming four months at 1.02 p.m. on April 25, under overcast skies, with driving snow and a temperature of —67°F. Sunrise will be on August 19.

The Stars and Stripes was struck minutes before the sun disappeared from sight, before nearly 200 Navymen and scientists, and presented to the oldest man at the ceremony, Commissaryman First Class Thomas Hicks of Hartsville, S.C., while God's care throughout the coming months of darkness was invoked by Navy Lieutenant and Catholic Chaplain, Father Dennis Casey.

At the Pole and Plateau Stations, where 21 men including a Soviet exchange scientist, and eight men respectively will winter over, the sun had already set two weeks before. Temperatures of —96° and —103° have been recorded. Williams Field runway at McMurdo will remain closed until June's planned midwinter flight.

FURTHER NORTH

Back in the haunts of man, three Starlifter aircraft had left Christchurch (N.Z.) airport in early March, and left the 46 men who will remain at the Navy base at the airport. The passenger lists, each numbering some 95 people, included 33 wives and eight children, seven of the wives being brides of sailors from the picket ship "Thomas J. Gary" which was based at Dunedin during the season. More than 300 scientists and servicemen had been flown home in January and February.

MORE WATER

The distillation plant at McMurdo was put into operation on December 29, and converted the energy derived from the nuclear reactor installed on January 16. Even now water at McMurdo is not abundant, but it certainly is more plentiful than ever before.

The Public Relations Officer of "Glacier" which reached Sydney homeward bound on March 13, said that because the Antarctic had had a warmer summer more icebergs than ever before had broken off the glaciers. "A warm summer," he said, "means less ice and more icebergs. We were able to get in closer to take soundings."

Among other Kiwis working with USARP last summer was **A. J. (Tony) Gow**, who was spending about his seventh season in the Antarctic, this time in the Koetlitz Glacier area.

SCIENCE IN THE FIELD

Apart from construction at Palmer Station, and the Byrd Land coastal survey, scientific, and support, work in the U.S. areas progressed apace during the December-January period. Bad weather and the helicopter mishap caused the only delays.

IN THE DRY VALLEYS

The Dry Valley areas were the most populated during this time, with no fewer than six teams working there on various disciplines. Dr. Roland Souchez, an exchange scientist from the University of Brussels, a team from the Australian University of New South Wales and another from the University of Massachusetts conducted geological research, while biologists from the Jet Propulsion Laboratory of the California Institute of Technology and from Virginia Polytechnic Institute studied micro-organisms in soils.

Some 75 samples of soil from above permafrost level were collected by J.P.L. investigators, and bacteria were found to increase in number with the depth of soil. Even so, far fewer bacteria were counted in these soils than have been counted in typical desert soils. Measurements of solar radiation and heat energy, net thermal exchange, humidity, evaporation rate and other measurements were made in McKelvey Valley and at Lake Vida. Another 120 soil samples were taken by V.P.I. biologists and some were analyzed at the McMurdo Laboratory, and bacteria were found to be present in almost all the dry-valley soils. When sunlight was continuous and meltwater present in soils, the microbial count was found to be as much as several million organisms per gram of soil, usually when the soil temperature was 10°C. higher than that of the air.

Yet another team working in the Dry Valleys was that from the University of South Dakota, which took water samples as well as soil.

OTHER AREAS

Elsewhere, biologists worked on penguins, skuas and seals, in teams from John Hopkins University, and Texas Technological College. Biochemists from the University of California and glaciologists from the Ohio State University also worked from McMurdo.

The Beardmore Glacier provided a research field for geological parties from the University of California (Los Angeles) and from Ohio State University. Other scientists worked to examine fossil flora in the Sentinel Range, at Palmer Station, Hallett (lichens), Byrd (physics, deep-drilling, telemetry and upper atmosphere physics), South Pole and Plateau.

BYRD LAND PROJECTS

The Byrd Land weather at no time really favoured research, but the geological team from Texas Technological College completed its survey of the Fosdick Mountains as well as studying parts of the Phillips and Alexandra Mountains. The U.S. Geological Survey's topographic mapping party was able to work on only seven days in December and three in January, in the field; but it managed before leaving the field to occupy 41 stations and complete 990 linear miles of the planned geodetic traverse. Geophysicists of the University of Wisconsin were able to fly for only 45 hours in December and parts of three days in January, but the group completed scheduled gravity measurements for the area west of Camp 1 in December and in January established 30 stations along a line from the Camp to the Flood Range. Members of the coastal survey collected lichens and mosses and took surface and sub-surface temperatures, while a geologic study was also made of the Ruppert Coast.

The National Science Foundation's Antarctic research trawler, whose keel was laid in early October last year, is now 15–20% completed. She is scheduled to be available in late January next year, when she will be able to accommodate a permanent scientific party of six, plus a temporary party of 10.

"ELTANIN"

New Zealander Peter Harper (see December issue, p. 389) gives some information about Cruise 27, the Ross Sea cruise of "Eltanin", January-February, 1967.

First landfall after leaving Wellington was the Antipcdes Islands, where Harper spent several hours studying the nesting Erect-crested and Rockhopper penguins found scattered along the coasts. Wandering Albatross, White-headed Petrels, the endemic Parrakeets and Skuas were among the birds observed and photographed.

During a brief stopover at Franklin Island (60 miles north of Cape Bird, Ross Island) on January 18, Harper photographed the entire Adélie rookery. The ship docked at McMurdo on January 22. A cruise along the Ross Ice Shelf followed, the shelf being approached to within a mile or so.

As Scott Island (315 miles N.E. of Cape Adare), Harper obtained a full list of the birds inhabiting this area, including many sub-antarctic species. Dove Prions were nesting in the crevices on the main island and on Haggitt's Pillar, making Scott Island the most southern known breeding place for this species of petrel.

Bad weather prevented a landing at Sabrina Island in the Balleny group, but photographs were taken and bird lists obtained.

A rather rough landing was made at Buckle's Bay near the Australian base on Macquarie Island before "Eltanin" headed for her 50th station, 80 miles south of Tasmania. She was due in Melbourne on March 1.

"Eltanin" called at Wellington on March 29 to have a winch adjusted and to load food and fuel before continuing on her 60-day voyage from Melbourne to Valparaiso, Chile. The slow speed is to facilitate the use of a gravity meter installed at Melbourne, which was calibrated during the Tasman crossing.

MEN IN THE NEWS

Chief Scientist, Office of Antarctic Programs, N.S.F., since 1960, Dr. A. P. Crary was appointed Deputy Division Director, Environmental Sciences on January 15. The Division of Environmental Sciences includes the Office of Antarctic Programs, in which office Dr. Crary will continue to serve as Chief Scientist for the time being. The Division of Environmental Sciences was established in November, 1965.

U.S.S.R. exchange scientist with the U.S. Antarctic Research Programme for 1967 has been named as P. G. Astakhov of the Arctic and Antarctic Scientific Research Institute in Leningrad. An upper atmosphere physicist, Mr. Astakhov will work at Pole Station for this, his second year in the Antarctic; he wintered over at Mirny Station in 1963 as a member of the Eighth Soviet Antarctic Expedition.

PENGUINS TOO

A journey of an estimated 3,000 miles has been made by three Adélie penguins over a period of some two years.

Forty Adélies were in November, 1964, captured on the coast of East Antarctica and transported 1,500 miles to a central location on the Ross Ice Shelf. During the 1966–67 breeding season three of these birds were recaptured at their home rookery near Mirny Station, after having made their return trip along the periphery of the Continent (presumably on the pack ice), a distance of some 3,000 miles. They were reported to be in good condition.

SUPPORT

The specially-created Construction Battalion Unit 201, designed last spring for operation in the Antarctic, worked in two widely separated areas in its continent this last season. The principal element of the unit, comprising two officers and 100 men, was based at McMurdo, from where it was despatched as needed to Byrd and Plateau. The other detachment, of one officer and 25 men, went to Palmer Station, where with-

in a month it had 76 percent. of the year's construction programme completed. At McMurdo and Plateau work was on schedule, at Byrd it was ahead, and only at Palmer, where the late arrival of construction material held the party up, was work behind schedule. Arrangements were therefore made for the Palmer detachment to remain at its post until the end of March.

Air operations, despite the temporary cessation of LC-130 flights due to fuel shortage, met all requests for support of scientific projects and the aerial mapping programme proceeded exceptionally well. By the end of January, 333,000 square miles of coverage had been obtained, mostly of Palmer Land, Ellsworth Land and the Ross Ice Shelf. As a result the communications blackout which on January 29 stopped all flights to, from or within Antarctica until the end of the month did not seriously restrict Deep Freeze activities.

DRY VALLEYS — AND MARS

Dr. Roy Cameron, of the Californian Institute of Technology's jet propulsion laboratory, is collecting data to help answer the age-old question whether there is life on Mars.

The dry valleys of Antarctica, which are snow-free even in winter, compare with the extreme kind of desert scientists expect to find on Mars.

Dr. Cameron has collected two tons of soil samples from these areas which will be used to test the extra-terrestrial life detectors which will examine a sample of Martian soil when the Voyager space probe is sent to that planet.

Dr. Cameron will use the soil samples to try to determine the environmental conditions under which the Antarctic soils were formed and what micro-organisms exist in them for comparison with information sent back from the spacecraft.

He and other biologists will measure such things as the moisture relationship, temperature fluctuations, humidity, evaporation rate and the number of life organisms there are in a given sample of soil.

This information may be invaluable to designers of the extra-terrestrial life detectors which will collect one gram of Martian soil.

American biologists want to know where organisms are found in Antarctic soil — whether on the surface or beneath it — so that the Martian life detectors can be adjusted accordingly.

VX-6 MUSEUM

An all-Antarctic museum, small but successful, operates at Quonset Point, Rhode Island, under the auspices of Air Development Squadron Six, whose home station is also at Quonset Point.

Established in 1960 to acquaint the local residents with the area to which VX-6 has now been supplying aerial logistic support for 11 years, the museum was totally remodelled during 1965 and 1966, its one-room gallery being fitted with new showcases, flooring, recessed lighting, wall panelling and a light box for displaying colour transparencies.

The Antarctic history of the squadron, the activities and progress of the U.S. Antarctic Research Programme are illustrated, the Antarctic aviation section exhibiting models of the LC-130F Hercules, the C-121J Super Constellation and the Ford Tri-Motor in which Admiral Byrd flew over the South Pole. Biology and geology are also featured and one of the highlights of the display is a collection of tinned foods from one of Captain Scott's caches.

It is planned to double the museum's size with a Jamesway Hut-style second room to house both more exhibits and audiences for lectures and slide shows.

LIVESTOCK

Life abounds in the oceans about the Antarctic continent. If ever man decides to, or is forced to make permanent settlement in this inhospitable place, the oceans will be his farms.

BAKUTIS SAYS . . .

For the future, the United States Navy's logistic effort in the Antarctic was expected to stay at about the same level for many years, the former commander of the United States Navy Antarctic Support Force (Rear-Admiral F. E. Bakutis) said in Christchurch on March 1.

The size and scope of the future support effort would, however, largely depend on the requirements of the scientists. There could be reductions as more experience was gained in the support task, he said.

It was doubtful if any more nuclear power plants would be installed in the Antarctic. He did not envisage plants similar to the one at McMurdo Station being put in at Byrd or the South Pole stations, as had originally been planned.

The bigger the plant the more economical it was. "Unless there is some miraculous break-through with a plant which needs hardly anyone to maintain it I think McMurdo will be our only station to have its power supplied by a nuclear reactor," said Admiral Bakutis.

The undersnow design at Byrd Station was unlikely to be repeated elsewhere on the continent. "I personally believe we overbuilt there," said the Admiral.

"We feel that not enough study has been made of having stations above the surface, and I think we may find this the most desirable type of building for any future bases we may have in mind."

Any future improvements in the Antarctic would probably be at McMurdo Station, the main base. With that in mind better and more permanent facilities would be provided almost annually.

For scientific research Admiral Bakutis considers that portable camps such as that established at Plateau Station will be the pattern for the future.

The runway on glacial ice at McMcMurdo, about 12½ miles from the main camp, was expected to last at least 10 years, he said. An unusual feature of this runway was that it was in better condition with each successive year.

TERRE ADELIE

In spite of bad weather, the programme in Terre Adélie for the 1966–67 season has been carried out in its entirety.

The sea-water-distillation plant for the provision of drinking water became operational at the end of February. The production has risen to 2.8 tons of fresh water per day.

The building used as living quarters by the summer party was completed and the new lodgers moved in when the ship left.

The kitchen of the new living quarters (previously referred to as the community hall) came into full service after several weeks and the running in of new equipment, only a fortnight behind schedule.

The Decca meteorological radar and its dome were set up without any major difficulty, and it has been functioning since March 16.

The monorail refuse-disposal unit became operative after the completion of the porches and of the definitive electric wiring.

Several topographic projects were carried out; the photographic coverage of Astrolabe Glacier was accomplished with helicopter assistance.

The rocket-firing programme was described in our last issue. The three firings (on January 26, 28 and two on January 29) were carried out thanks to a calm period (after particularly violent winds during the month) in happy conjunction with exceptional ionospheric and magnetic phenomena. The result was the complete success of the rocket-firing programme, and credit is due to the organisations responsible, le Centre National d'Etudes Spatiales, le Groupement de Recherches Ionosphériques, Matra, Sud-Aviation and Expéditions Polaires Françaises.

RE-ARRANGEMENT

The changes in the French relief programme necessitated by the holding-up of "Thala Dan" during its Australian charter period are summarised in the Bulletin of Expéditions Polaires Francaises.

Difficulties caused by bad weather and ice conditions compelled the authorities to cancel the third voyage of "Thala Dan", planned for the beginning of February (see "'Antarctic", March, p. 458) between Australia and Terre Adélie. "Thala Dan", under charter to A.N.A.R.E. till January in order to permit the relief of the Australia Wilkes Base, was trapped, 80 kilometres from that station, by very dense pack. She finally reached Wilkes on February 6, thanks to the assistance of the American ice-breaker "East Wind" which broke-out a channel for "Thala Dan" after a fortnight's hold-up.

The French therefore had to recast their operational programme. "Thala Dan", after leaving Wilkes on February 10, returned direct to Dumont d'Urville without going to Melbourne, in order to embark 19 men and gear of the National Centre of Space Studies. A final voyage between Melbourne and Terre Adélie was planned for the beginning of March to permit the transport of the 11 last wintering-personnel of TA17 and the repatriation of the wintering party of TA16 as well as those participating in the summer operations who still remained at Dumont d'Urville.

FRESH WATER

The desalination unit recently installed at Dumont d'Urville and described in our March issue as a multi-stage flash evaporation design, produces three times as much fresh water for a given consumption of energy as units currently used on ships — three tons of fresh water per day for an energy consumption of 50 kilowatts. The unit designed in Grenoble underwent three months of sucessful testing at Monaco before being shipped from there to the Antarctic.

1967 PROGRAMME

The scientific programme for 1967 directs special attention to *Animal Biology* (bird life of the Pointe Geologie archipelago, including a "follow-up" of the 3,500 birds ringed during the previous two seasons), *Night Sky* and *Aurora, Geomagnetism, Ionosphere* (making full use of the unique characteristic of Dumont d'Urville Base — the fact that the local magnetic field is almost vertical), *Medical Science* (physiological, psychological and applied medical research into the prevention of accidents and problems of hygiene and living in an Antarctic station), *Meteorology, Radio activity* and *Nuclear Geophysics, Cosmic Radiation* and *Seismology*.

EMPEROR VISITS NEW ZEALAND

A penguin believed to be of the Antarctic Emperor species, was captured near Oreti Beach, Invercargil, on April 7.

It is the first time that a bird of this species has been recorded on the New Zealand coast.

Southland ornithologists thought at first that the bird was a King penguin. Closer examination, however, convinced them that it was an Emperor and they consulted by telephone with Dr. Bernard Stonehouse, reader in zoology at Canterbury University and a world authority on the bird. Dr. Stonehouse assures "Antarctic" that the bird was certainly an Emperor.

Its appearance in New Zealand waters is remarkable because, at that time of year, Emperor penguins are moving south to their breeding grounds on the Antarctic continent.

Previously, the Emperor penguin has been recorded at the Falkland Islands and one or two cold-temperate islands, but as far as Dr. Stonehouse knows, never as far north as New Zealand.

The penguin, which was in excellent condition, was taken south from Bluff and released at sea.

BIG RUSSIAN SUMMER PROGRAMME

COASTAL GEOLOGY AND 2,000 MILE TREK

Field work in the 1966–67 summer concentrated on a series of geological surveys in the coastal mountains and a long tractor journey comparable with that carried out in early 1964.

GEOLOGICAL WORK

The geological work of the summer was transferred from Molodezhnaya base to the Japanese base Showa, in order to facilitate a study of the Yamoto Mountains. Research was also carried out in the Sor Rondane Mountains, 150–200 km. from the Belgian Roi Baudouin Base, where the Russian geologists were the guests of the Belgian scientists.

Research based on Novolazarevskaya was in the Wohlthat Mountain mass.

All this mountain research work necessitated hundreds of flights by AN-6 aircraft. The purpose was to study the geological structure of the mountains and the possibility of finding mineral deposits in exploitable quantities. Big deposits of mica, rock-crystal and graphite are suspected. Beryl has been found in Queen Maud Land and at the Bunger Oasis, and iron ore in the region of the Westfall Oasis. There are coal deposits in the Transantarctic Mountains, copper-nickel ores in the Dufek Massif, and in the Antarctic Peninsula prospects for molybdenum, lead, zinc and copper ore.

An interviewer for "Trud" who asked M. G. Ravich, director of the geological research on the 12th Soviet Expedition (1966–67), what mineral deposits in exploitable quantities had been discovered in the Antarctic, was told that Soviet geologists had already found iron ore and signs of big deposits of mica, rock crystal and graphite; and that American geologists had found cupro-nickel ore and lead. The Antarctic is thought to hold not less than five percent of the world stock of coal.

MARINE RESEARCH

During the voyages of the "'Ob" during the 1966–7 summer, a marine research team under oceanographer Liev Eskin carried out meteorological, radiometric, aerological, actinometric and oceanographical observations. During the crossings between the Antarctic bases a series of oceanographic and glaciological studies was undertaken in the continental shelf waters of the Davis, Cooperation, Cosmonauts, Rieser Laren and Lazerev Seas. A series of successful studies was also undertaken over two sections of ocean, from Pravda Coast to the southwest coast of Australia and between Africa and the Antarctic continent along the line of 20° W.

THE ICE-CAP

Dr. A. Kapitsa, who was on the Soviet tractor journey to the South Pole in 1959–60 and led the Vostok-Molodezhnaya trek in 1961, discusses the nature of the Antarctic ice-cap and the sub-glacial topography in an article in "Smena".

A few of his figures will interest the layman. The greatest thickness of ice is found at two places, on the Byrd Plateau in western Antarctica, where the ice-thickness is 4,335 metres (14,200 ft.), and on Schmidt Plateau in eastern Antarctica, 4,300 metres. The thickness of the ice in the central area of eastern Antarctica is as small as 640 metres (2,100 ft.).

The total volume of Antarctic ice is calculated as 24 million cubic kilometres, enough to raise the level of the world's seas 56 metres (183 ft.).

SOVIET TRACTOR TEAM'S LONG TREK ENDS

News was received in Moscow at the end of March that the big journey by tractor train from Molodezhnaya to the Pole of Inaccessibility and back to the coast at Novolazarevskaya had been successfully carried through.

This journey was a notable extension of the 3,000 km. trek three years ago, when Dr. Andrei Kapitza led a train comprising two powerful overland vehicles (Kharkovchankas) and a tractor from Vostok to the Pole of Inaccessibility, on to the "white spot" on the map at 78° S., 25° E., and to journey's end at Molodezhnaya. The whole journey took 76 days, from January 4 to March 21, 1964.

The new trek retraced Kapitza's Molodezhnaya-Pole of Inaccessibility section, but then the tractors, again three vehicles, headed not east towards Vostok but west towards the Princess Astrid coast at Novolazarevskaya, over an almost completelv unknown area. The team comprised 17 men and was led by Ivan Petrov, an experienced Antarctic scientist.

The tractor train left Molodezhnaya on December 29 and on February 22 reached the Pole of Inaccessibility. From now on, travelling over almost unknown terrain, sometimes at altitudes as great as 4,000 m. (13,000 ft.) above sea level, the train struck very heavy going — thick snow-cover, clouds, wind, poor visibility and of course cold, worse conditions than those experienced on any previous journey. Some of the equipment, including one tractor, became unusable because of the intense cold, and there were delays while aircraft bringing essential spare parts had difficulty in finding the train.

Some hundreds of miles before reaching the coast the Soviet party were warmly welcomed and hospitably entertained at the American Plateau Station (79° 14′ S., 40° 30′ E., alt. 3,624 m.), established in February last year.

The U.S. scientists showed their Russian friends the aerometeorological, glaciological and other work conducted at the station. They also generously provided the Soviet party with seven tons of fuel.

The team now made towards the Princess Astrid Coast, but at 78°38′S., 27°E., had to stop for repairs to the Kharkovchankas. More than 100 hours were lost here in difficult conditions due to lack of oxygen and a temperature of —56°C.

After traversing 170 km in three days the party reached 78°03′S., 19°59′E. At this point an IL-14 aircraft from Molodezhnaya parachuted spare parts and fresh vegetables.

The last stage of the traverse crossed a steep glacier slope in a zone of dangerous crevasses. This 250 km section had been previously surveyed by men from Novolazarevskaya who set up an intermediate depot. But as the team was still 90 km from Molodezhnaya and short of fuel, this was brought in by an AN-6 plane from Novolazarevskaya.

The party now traversed along Scherbakov Ridge by previously set stakes and entered the Schirmacher Oasis.

The tractor train reached Molodezhnaya on March 26 after a journey of 3,500 km. (2,100 miles) in 88 days. Scientific observations were taken throughout, chiefly aimed at the determination of ice thickness and the relief of areas under the ice by experimental radar sounding, and geological and geophysical research.

An American geologist is wintering at Molodezhnaya and a Soviet scientist will undertake scientific studies at one of the United States bases. This will be the 10th time such an exchange between the Soviet and American expeditions has taken place.

THE 1967 PROGRAMME

As usual, observations will be made at the four stations Mirny, Molodezhnaya, Vostok and Novolazarevskaya in the fields of meteorology, aerology, actinometry, glaciology, geomagnetism, ionospheric physics, aurora, cosmic rays and gravimetry. Special interest is being taken in the medical research programme on man's acclimatisation to the severe conditions in the Antarctic.

DUG IN AT VOSTOK

The 16-man party to winter at the inland station of Vostok is led by an experienced polar scientist, engineer Boris Belyaev. It is planned to carry out extensive research in the region of the South Geomagnetic Pole, which is also "the Pole of Greatest Cold". Vostok is the most remote station from the coast and the highest in altitude among the active Antarctic bases. All that is needed in the way of fuel, foodstuffs and equipment had to be supplied from Mirny by tractor-drawn sledge-trains or by aircraft.

AT MOLODEZHNAYA

The glaciological and hydrographic work carried out on the shores of Alasheev Bay and on the adjacent waters of the Sea of Cosmonauts was under the direction of Vladimir Maltsev, who was making his seventh visit to the Antarctic.

For the first time in the history of Soviet Antarctic Expeditions, regular radar observations of the trajectories of meteorites are to be made at Molodezhnaya. From the measurements obtained, much should be learned about the wind conditions at heights of over 100 km.

A group of carpenters is included in the Molodezhnaya team. They are continuing the construction of living and working quarters, an electric power station, and a radio centre. "In the not too distant future" Molodezhnaya is to become the main scientific and technical headquarters of the Soviet Antarctic expeditions.

For the first time a building will be constructed of experimental aluminium and foam plastic panelling. It will be 25 m. long and nine metres wide, and raised on high (1.5 m.) piles. In the opinion of experts, aluminium will offer good resistance to the severe cold, because of the heat-retaining properties of the distinctive "stuffing" of the building's panels, a layer of heat and sound insulating synthetic material, phenopolystyrol (or polystyral foam). Aluminium buildings are also easy to assemble.

MUCH STILL NEEDS TO BE DONE

"Antarctic research," says Dr. Kapitsa, "has really only just begun. Many secrets are still hidden in its icy midst. Each new discovery in the Antarctic is not only improving the knowledge of our planet but is also a step along the path of the battle with the elements. We must not only become acquainted with the laws governing the development of our natural environment, but learn how to forecast those processes."

NEW POLAR SHIP

Plans have been drawn up for a powerful scientific research vessel suited to navigation in severe polar conditions. The vessel will be capable of carrying sufficient stocks of fuel, fresh water and foodstuffs to enable it to carry out long voyages in the Southern Ocean, as well as delivering cargoes for the wintering parties. Its strongly built hull and powerful engines will enable the vessel to break through solid ice up to a thickness of 60 centimetres.

The designers have drawn heavily on the experience of eleven years of operations of the diesel-electric ship "Ob".

The 10,250-ton Soviet supply ship "Tselinograd" called at Wellington on March 25 to load more than 2,000 tons of supplies for two Russian Antarctic whaling fleets, comprising two factory ships and 40 chasers. The purchase included 13,440 cabbages, supplied by three Levin growers.

AUSTRALIANS' AUTUMN JOURNEYS HAVE PERILOUS MOMENTS

The new team installed at Mawson in February set out on a tractor and dog-team autumn journey which taught them some grim lessons before they returned to base eight weeks later.

MAWSON STATION

The 1967 Mawson Expedition took over the station on February 20 after a long journey in time from Australia.

The party spent 26 days in the pack ice off Wilkes where the ship was so firmly held by the ice that Manning was able to teach his navigation class with a theodolite set up on the deck. Illingworth drilled holes in the sea ice around the ship and found it to be 12 feet thick, so all got out and went skiing.

Kerr had ropes dangling from the masts, up and down which he drove complaining expeditioners, teaching them how to get out of crevasses unaided. Dent was able to take his geophysical apparatus far out over the sea ice to get readings of the earth's magnetic field. Many, like doves from the ark, were able to go out in the helicopters looking for open water.

They were warned that if the ice did break up it would happen suddenly, and miraculously on February 2 many leads opened and the ship moved out into the open sea.

All are well settled in at Mawson, with the various sections running as if they had been doing this all their lives, which speaks well for the indoctrination by ANARE.

AUTUMN JOURNEY

The autumn trip men, Manning (surveyor), Jaques (meteorologist), Lawson (mechanic) and Moonie (radio operator), were busy mending tents, packing stores on sledges and fixing up Snotracs. They got away on March 11 and hoped to complete the tellurometer survey to Church Mountain and back by about April 21, winter storms and the onset of darkness permitting. They were supported by a party consisting of Erskine, Gillies and Cheney, with two teams of dogs. This latter party hoped to get away by March 17. The objective was to carry out a survey and mapping programme, and to collect geological and lichen specimens in the Church Mountain and Mount Rivett area.

Wood and Jaques went up on to the Plateau to erect a survey beacon on Painted Peak and learned that Antarctica really is cold.

MOUNT RIVETT CLIMBED

By the end of March the Church Mountain men had been away in the difficult white waste east of Fischer Nunatak for three weeks. They had made quite a fast trip so far, and except for occasional blizzards the weather had been reasonable.

Two of the party, Manning and Lawson, climbed Mount Rivett (100 miles east of Mawson), the first humans to set foot on it. They reached the summit on March 17 at sunset in a temperature of 44° below freezing (Fahrenheit). The party began working its way back towards Mawson with Manning and Jaques taking tellurometer distance and theodolite angles every few miles. Bearings were taken on the Scullin Monolith where Mawson made a landing on February 13, 1931. They reported that the country around Mount Rivett was heavily crevassed.

IN TROUBLE

The support party used two D-4s with sledges to carry the Church Mountain 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.

By the beginning of April the sea began freezing over and the winds blew colder.

The next news of the party was a press message issued by Canberra on May 19:

"Four Australian members of an Antarctic survey mission have been rescued after battling against blinding blizzards for four days.

"A radio message to Canberra from the Australian Antarctic base camp at Mawson yesterday said a tractor train picked them up 20 miles from the camp.

"They had dragged their equipment and food in sledges for 32 miles and were almost frozen to death."

RETURN TO BASE

They had been absent more than eight weeks from their station,

Temperatures as low as 70°F. below freezing and blizzards up to 70 m.p.h. made the return journey extremely difficult for the field party. Sixty miles from the station, the intense cold and blinding snow drift forced the men to halt with their motorised vehicles. It was decided that the party should complete the remainder of the return journey on foot, manhandling their food and essential equipment. Roping themselves to sledges, they trudged for four days 32 miles until they were met at night by the tractor train and dog-sledge party sent out from Mawson Station. The combined groups drove back to the station by headlights.

Despite all the difficulties of their mission, the field party accomplished valuable work, including a survey and mapping programme and the collection of specimens of rocks and lichens.

Before the helicopters left, Thomas and Simpson flew to Orley Hall to check the auroral parallactic cameras, and a party also flew to the Taylor Glacier over magnificent scenery to count Emperor penguins.

BASE VISITOR

Bishop found a Fairy penguin down by the sea shore, some thousands of miles from its usual home near Australia's southern coast. Official identification photographs were taken of this visitor before he was banded and shooed on his way.

WILKES

Once arrived at Wilkes, the new party established what must be a record unloading of the many tons of stores and equipment in a little over 3½ days. The efforts of many of the old party helped to achieve this.

Sledging parties went out almist immediately and after only two and a half weeks reports put them some 20 miles from Site 2, which is 50 miles from Wilkes.

The weather men achieved remarkable results with their daily radiosonde balloon flights. After a frustrating start their generator was now producing hydrogen satisfactorily, and flights to 100,000 feet plus were commonplace. The flight of February 28 they reported as reaching 152,000 feet — no mean effort.

In the camp, March was a month of cleaning and tidying up before the inevitable snow and subsequent drift covered everything. A platform was built on the rock near the food store on which to stack cases of food not required immediately. This platform is two to three feet above the rock and will remain drift free throughout the year.

High winds during the month removed some of the malthoid from the roof of one of the corridors for

a distance of about forty feet by nine feet wide, exposing the bare timber. Snow which fell later melted very quickly and water came in all over the place. Four men spent some time at Repstat, the new station being built about two miles away from Wilkes across the bay. It is some five miles away by land over difficult terrain, involving crossing blue ice and frozen melt streams, with many hills and valleys.

FIELD TRIPS

On March 3, the sledgers Baggott, Hopley, Whitehead and Liddell returned to camp fit and well after covering about 130 miles. They were blizzed in for two separate days during the trip, but successfully achieved all they set out to do and gained a lot of experience. The dogs behaved themselves reasonably well.

Station Leader Canham, together with Carter, Tansen and Langtip, departed on March 7 in a Nodwell tracked carrier and a Snotrac to take gravity meter readings at every accumulation stake around a marked triangular route, including the top of the local ice dome known as Law Dome, after Philip Law who was Director of the Antarctic Division for 16 years up to 1966. They returned after 18 days.

A repeat exercise was planned to set off again on April 12 for a trip on the same triangle, but this time doing optical levelling on one of the 60-mile legs in both directions, by means of accurate observation with theodolite and staffs — a long and tedious process but all in the interests of scientific research. The party expected to be away this time for five or six weeks. They finally left Wilkes on April 6.

The party experienced some bad weather and temperatures down to −40°F. They were only about 30 miles from Wilkes when their prime mover developed some mechanical problems, and Hansen and Currie went to their assistance in the Nodwell, the largest of their heavy duty snow vehicles.

A blizzard covered up the corridors at Wilkes and the camp is now virtually submerged under a blanket of snow. Olrog found out how easily one can get lost in a blizzard — luckily there was an outside light which gave him a bearing.

"NELLA DAN" RETURNS

The day after "Nella Dan" berthed in Hobart on March 8 to off-load a 22-man expedition which had spent the past 12 months at Mawson and flew from Hobart to the mainland, "Nella Dan" sailed for Macquarie Island with supplies and 20 mainland scientists. The scientists had a three-day look at the island before returning to Hobart when "Nella Dan" had off-loaded supplies.

ANTARCTIC POSTAGE STAMPS

Supplies of postmarked Australian Antarctic Territory postage stamps have been obtained from the Australian base post offices in Antarctica. The Director-General of Posts and Telegraphs, Mr. T. A. Housley, said the stamps would be sold in Australia as an added philatelic service provided by the Postmaster-General's Department. The stamps bearing Macquarie Island, Mawson and Wilkes postmarks, would be sold at face value at philatelic sales sections from June 1, Mr. Housley said. Subject to continuity of supplies, the stamps would be available singly or in blocks and sheets in accordance with the department's current terms of sale. In addition to normal counter purchase, collectors in Australia may address mail orders to the philatelic sales section in the capital city of their State of residence.

HONOUR DUE

New Zealand Antarctic enthusiasts will welcome the naming of **Cumpston Massif**, "a flat-topped rock outcrop about 2,070 m. high, nine miles long and six to seven miles wide", in MacRobertson Land, 73° 33′ S., 66° 53′ E., Australian Antarctic Territory.

Dr. Cumpston was a very active member of the Antarctic Society when on the staff of the Australian Embassy in Wellington, and has continued to give valuable support to this journal since leaving for New Caledonia and Canberra.

BELGIAN-DUTCH TEAM EVACUATES ROI BAUDOUIN BASE

On New Year's Day the principal scientific programmes at the Belgian base, Roi Boudouin, were terminated because of the imminent evacuation of the base.

However, certain programmes were maintained provisionally: surface meteorology, atmospheric electricity, riometry, geomagnetism and radioactivity.

"RAIDERS" COME HOME

January 5 saw the return to base of the team which set out on September 25, 1966, to explore the Sor Rondane Mountains. They had completed their glaciological programme, comprising speed of flow and measurement of ice thickness.

RUSSIAN VISITORS

At the beginning of January the Base entertained for ten days a Soviet geological expedition of 18 men who were mapping the coastal mountains of Dronning (Queen) Maud Land. The Russians worked with two Antonov 6 aircraft and were re-provisioned by two-engined planes from their base, Molodezhnaya. Co-operation between the two expeditions was excellent. The Belgian leader, T. Van Autenboer, acted as guide to Professor Ravich during one day spent in the central part of the range.

AND SOUTH AFRICANS

From January 10 to 14 the South African ship "RSA" called in response to a Belgian offer to supply them with dogs. Blocked about 20 km. from the coast, the Captain and members of the South African expedition visited the Base in a light vehicle.

EVACUATION

From January 7, stores and equipment were transported in stages to a depot on Roi Leopold III Bay. The access camps at both bays are in very poor condition, being narrow and having a very steep slope. It was finally agreed to use Roi Leopold III Bay, where conditions seemed much better.

The electric generators were transported from the Base along an inclined plane. An outside set continued to supply the base with electricity.

SUMMER PROGRAMME

"Magga Dan" was near enough to Roi Leopold III Base on January 16 for Van Autenboer to fly to the ship by helicopter and to take over the command of the summer operation, which began on the 18th. Cartographers Derwael and Lallemand began the re-measurement of the triangulation on the shelf, begun in 1965. The two aircraft (Otter and Cessna) were lowered to the sea ice and flown to the base. The distance and the numerous crevasses in the sea ice prevented the vehicles from reaching the ship to aid in the disembarkation, and an aerial tramway was used to transport the summer party's gear to Roi Baudouin Base.

The Anenometers were set up between Base Roi Baudouin and Romnaes, 120 km. to the south, for Rietman's Katabatic wind study. The programmes in biology and oceanography will continue uninterrupted on the "Magga Dan".

The two-man photogrametry team was set down in the eastern part of the coast and established astronomical fixes. After the establishment of vertical photographic coverage, Lambert and Deruyck moved to the western area to continue their programme. Some parts of the Sor Rondane Mountains were photographed for photo-geological studies.

PACK UP

The "Magga Dan" finally succeeded in reaching the base on Roi Leopold III Bay on January 25, and

the loading of goods from the base then began. Loading was completed by January 30, except for what was required for the Summer operations, such as the radio station, electric generator and vehicles which remained at the base, where a small summer party was still quartered.

MONTS BELGICA

On February 1 a team comprising Fagnoul (pilot), Pierre (mechanic), De Winde (topographer) and Van Auntenboer (expedition leader and geologist) visited the Monts Belgica by Otter plane and dog-team for a preliminary geological reconnaissance survey. They returned on February 6 after two forced landings due to bad weather. This concluded the summer programme, and the last goods from the Base and of the summer programme were put aboard on February 7.

The main doors (of the base and of the emergency shelter) were clearly marked, and the principal things likely to cause snow accumulation, such as chimneys and antennae, were taken down.

The official closing of the base took place on the 9th in the presence of a small group. Doneux, second in command, lowered the national flags and Van Autenboer that of the expedition. A glass of champagne was drunk to the health of old and future inhabitants of Base Roi Badouin. Then the team went back to the ship by helicopter.

HOMEWARD BOUND

"Magga Dan" weighed anchor that evening. The helicopter made its final reconnaissance flights over the ice and was then dismantled and packed. "Magga Dan" reached Cape Town on February 20. Expedition members boarded a DC6 plane of the Belgian Air Force and arrived in Brussels on February 25.

It has been calculated that about **two million tons** of snow blow away per year **across one mile** of Antarctic coast. Authority: Phillip Law.

MOUNTAINS OF BLUBBER

John Béchervaise recalls one of his days on Heard Island in an article in the "Victorian Naturalist".

"Bull elephant seals are almost incredible. . . . Their enormous distended noses drop down a foot or more from their red, lecherous eyes. Immense shapeless bags of flesh, they mostly lie as though exhausted: but every now and then they will rear up ponderously, inflating their probosces and bellowing challenges to the wind and spray. A bull that has engaged a harem, however, will defend it vigorously against all comers, using his sheer mass as his principal weapon. . . .

"Occasionally the rivals confront each other, rearing so high that one wonders how they are supported. Then, rhythmically and stubbornly, they thud away, using their massive bodies as clubs, and trying, generally ineffectually, to rip each other with their tusky teeth . . . until the vanquished retires.

"In tranquillity, these mountainous animals have a curious and comical habit of scratching themselves with one of their flippers. This dexterity seems extraordinarily out of keeping with their flaccid bodies. The flipper is raised, arched, extended, an amazingly articulated organ, moving with the graceful gestures of a ballet dancer ludicrously like a human hand. Often it is the only sign of life appearing unexpectedly, hopelessly inadequate, one would think, for attending so huge an area of blubber."

JET STOPOVER?

Sir Vivian Fuchs said recently that if commercial airlines decided to use the Antarctic as a refuelling stop, an airfield could be built in three years. It was better, he said, to develop territory in this fashion than to attempt to exploit its mineral contents. Although Antarctica probably has the world's largest coal-field, it would not pay to get it out.

CHANGE-OVER AT SYOWA

The handing over of control from the 7th to the 8th Japanese expeditions was carried out at Syowa Station on February 10.

The 8th Japanese Antarctic Research Expedition left Fremantle, W.A., on December 22 on board the icebreaker "Fuji". An iceberg was seen first on the 29th at 55° S. and 99° E. On January 4, 1967, the "Fuji" reached the ice edge at about 65.5° S., 49.5° E. at the offing of Enderby Land. From that position the ship had to do continuous ice-breaking to the south-west, navigating along the boundary between fast ice and drift ice.

The first helicopter (Sikorsky S61) flight was made from the mooring site at 68° 18′ S., 40° 22′ E. at 1608 hours on the 7th to Syowa Station. Four flights were accomplished on the same day, delivering cargoes and personnel for summer construction work.

Between the 7th and 13th of January, air-lift operations were continued without cessation whenever the weather was favourable. At the same time the ship continued the southward penetration into the fast ice to the north of Syowa Station and finally reached the station at 1345 hours on the 14th; the ship moored at the fast ice within a distance of about one kilometre from the station.

An air traffic control hut was built before the arrival of the ship at the station. Most of the cargoes were air-lifted, taking only a few minutes' flight between the ship and the unloading site. The air-lift was finished on the 26th. A total of about 460 tons of cargo was delivered to the base, some heavy vehicles being transported over the sea-ice and land. Buildings were erected before the departure of the ship on February 6, leaving such additional work as making corridors and vestibules to be done by the dozen people who were left for construction work and the installation of research equipment at the station between the 6th and the 10th. The final evacuation of personnel was carried out on the 10th after the official replacement ceremony of personnel between the 7th Expedition and the 8th. Captain M. Matsuura, Dr. A. Muto, the leader of the 7th party, and Dr. K. Kusunoki, leader of the summer party, flew in to the base to attend the ceremony on the 10th. At that time the ship was located at 68° 25′ S., and 38° 46′ E., just near the edge of the fast ice.

It took four days before the ship could escape from the pack ice on the 14th. Then she made a westward cruise with the intention of calling at SANAE station and making oceanographic surveys. Due to adverse weather and ice conditions it was not possible to visit the South African Station and finally the "Fuji" set sail to the north on February 20 from the offing of SANAE station. The return voyage to Tokyo was as intended, making shipboard observations of night-airglow, cosmic rays, ionospheric physics, radio waves, atmospherics, oceanography, biology, seismic profiling, gravity, and geomagnetism.

PLANS FOR 1967–68

The National Antarctic Committee nominated as leader of the next expedition, the 10th JARE, Mr. Masayoshi Murayama (leader of the 7th Expedition) and as acting-leader Mr. Zenbei Seino. Formal appointment will be at a later date with the approval of the Antarctic Headquarters. Mr. Murayama heads the Second Section of the Department, and Mr. Seino was chief meteorologist in the 7th (wintering) Expedition. He has wintered three times. Mr. Murayama will lead the wintering team of 28 men and Mr. Seino will lead the summer party of 12 men. The commander of "Fuji" will

be Captain Toshiharu Honda who was the skipper during 1965–66.

The itinerary of "Fuji" is not yet decided, but she will leave Tokyo at the end of November and will call at the same ports as on the previous year's schedule, Fremantle, Cape Town, and Colombo.

AT SYOWA

The news from Syowa Station is that the weather was fairly good till the end of March. The maximum air temperature in March was +2.6°C. and the minimum —20.8°C. Fairly strong blizzard was experienced in the latter part of that month. Scientific activities were continued according to routine. There was minor trouble in the electric generator on the 22nd. Several trips in the neighbourhood were carried out; however, the sea ice between the station and the continent was not thick enough yet to support large vehicles.

MEETINGS

The Department recently published the "Proceedings of the Pacific-Antarctic Symposium" held at the 11th Pacific Science Congress in Tokyo last year. It contains a score of papers covering many topics of Antarctic research. In 1968 the Japanese government is expected to have a meeting of logistics specialists under the Antarctic Treaty and the 10th SCAR meeting in Tokyo.

ERRATA

The address of the Department of Polar Research in "Antarctic", Vol. 4, No. 8, page 399 was erroneous. The correct address is: Department of Polar Research, National Science Museum, Ueno Park, Tokyo.

We regret that a misprint in the title of an article on page 438 in our last issue was not corrected. "Aviation" should read AVIATOR.

The biological work at Cape Hallett last summer, carried out by T. S. Choate and B. Willis, was sponsored by the **University of Otago.**

ARGENTINE PLANS

On February 22 a new station named *"Estacion Aeronaval Petrel"* was officially commissioned. The station is manned by the Navy and is built on Dundee Island, its coordinates being 63° 27.8′ S. and 56° 17.5′ W. It is composed of quarters for the personnel, a hangar for aircraft and a depot.

At present "Estacion Aeronaval Petrtel" is the 8th active Argentine base.

It is anticipated that four men will be added to the Navy personnel at the station for work throughout 1967. They will carry out tests to determine the suitability of the site for the construction of an air base with a solid earth runway. These tests will comprise measurements of snow accumulation and the cause of this, comparison of summer and winter snow coverage likely to interfere with roads, tracks, and aircraft and vehicle traffic zones, and a fortnightly reconnaissance of the near-by glacier with a view to its utilisation as a landing strip, as well as consideration of access routes to it for men and vehicles.

On March 21 the 40th anniversary of the first wireless transmission from the Argentine base at the South Orkneys was commemorated. The service has been in operation at the base since 1927, mainly for the sending of meteorological and other data and for logistic purposes.

—67°C. was registered this month at "Sobral" station. This is the lowest temperature registered in Argentine stations in the Antarctic since 1904.

REFUGES

In its annual report to S.C.A.R. the Argentine Government lists no fewer than 36 unoccupied "refugios" or shelters maintained by Argentina in the Antarctic. They range over 20 degrees of latitude, from 59° 27′ S. (Teniente Esquivel on Thule Island in the South Sandwich group) to 79° 58′ S. (Santa Barbara, 270 km. south of General Belgrano Base). Others bear such interesting names

ALL-ROUND AUTUMN ACTIVITY AT SOUTH AFRICAN BASE

February was a busy month for the meteorologists at SANAE. The old stock of 350-gram radiosonde balloons was used up and the new stock were inclined to burst at low altitudes. The weather was rather stormy: mean wind speed of 23 knots, 5 days with gale-force winds and a highest gust of 87 knots. So only 17 upper air ascents could be made. The average temperature of —7.7°C. was slightly above normal.

During March the weather was calmer although the average wind speed was still a fresh 17 knots and gale-force winds were recorded on 9 days. Upper air ascents were more successful with 27 ascents, reaching an average of 29 mb. The balloon hut and the Stevenson screen were elevated during the month. The radio-theodolite cables were dug up and it is hoped that it will last through the winter. The average temperature showed a gradual fall to – 12.4°C.

Although April was characterised by cloudless days, the mean temperature of – 24.3°C. showed a sharp fall as compared with March, and working conditions in the open were extremely difficult and unpleasant. There were again 27 successful radiosonde ascents. A new anemometer was installed this year and is functioning well.

Although there were 115 hours of sunshine, the elevation of the sun was below six degrees and its complete disappearance is only a matter of time.

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as "Virgen de las Nieves", "17 de Agosto" and "'Paso de los Andes".

PERSONNEL

For the summer operations 1966–7, the principal officers were Comodoro D. Carlos A. Lopez (Chief of Air Task Force), Vicecomodoro D. Herbert O. Horsch (Chief of Combined Task Force), Capitan de Navio D. Julio A. O. Vazquez (Commandent Naval Group).

GEOLOGY

The geological programme comprised the mapping of the sedimentary and igneous terrain between 72° 30′ and 73° S. to the west of the Greenwich Meridian, as well as the continuation of related research projects in glaciology, seismology and oversnow gravity and magnetic traverses. Prior to arrival at SANAE Base, "R.S.A." conducted a reconnaissance bottom sampling and sounding traverse along the edge of the Fimbul Ice Shelf, between 2° and 3° W.

FIELD WORK

Pre-winter fieldwork was confined to geophysical-glaciological investigation of the grounded areas constituting the western limit of the Fimbul Shelf. Glaciological budgetry studies at SANAE included the maintenance of the accumulation and strain networks and stratigraphic investigations.

The spring objective was the Borgmassivet area some 350 km. south of SANAE. Two parties were in the field from the beginning of October till the first week in January and operated virtually independent of each other. In addition, a three-man party operated for a few weeks during December resupplying depots.

Geophysical field work completed during this second season included magnetometric and gravimetric profiling along the route and absolute geomagnetic observations at selected points as part of the Geomagnetic Programme.

A surface and borehole sampling traverse extending from the pack ice to the north of the Trolltunga up to the Borgmassivet was also completed.

Geological mapping commenced in the Ahlmannryggen (Jekselen Nunatak, 72° S., 2° 40′ W.) and was continued into the Borgmassivet, where an area of approximately 1,500 km.^{2} was completed on a scale of 1:100,000

with additional detail mapping of selected nunataks. Small amounts of visible gold of possible sedimentary origin were found in an altered grit. In addition to this, samples of lichen and moss were taken on a systematic basis throughout the area traversed.

TRANSPORT

Transport consisted of a muskeg with caboose, two sleds and a motor toboggan used by a three-man party, and a dog team used by a two-man group. Mechanical problems, along with bad travelling conditions and heavy loads, hampered progress especially during the early stages of the field season, and only some mechanical wizardry kept the vehicles going. The Polaris, however, succumbed to the heavy going and had to be left behind after covering some 300 km. It was later salvaged by the depot-laying party.

The dog team, consisting of 11 dogs (average weight 80 lb.), performed very well. Sled loads during the three-month season varied from 800 to 900 lb., with a maximum on some trips of up to 1,500 lb. Dog rations consisted of 1 lb. of Nutrician per day, with an occasional second helping after a hard day's work. On this diet the dogs kept their condition well and finished off the field season by doing the return trip (300 km.) in five days. Maximum distance travelled in any one day was 74 km., hauling 800 lb. on a good surface.

UPPER ATMOSPHERIC RESEARCH

At SANAE, ionospheric conditions have been probed by the Rhodes University since 1962 while cosmic rays, absorption of cosmic noise and air glow have been recorded by scientists from the Universities of Potchefstroom and Stellenbosch since 1964. Several balloons with cosmic ray detectors have also been sent aloft to measure the soft corpuscular radiation at stratospheric heights.

The ionosphere at SANAE appears much more often disturbed than elsewhere. The results indicate a heating up of the F layer of the ionosphere by enhanced particle radiation, and ionospheric blackout due to D layer ionization. These disturbances are not shown to that extent by the absorption of 30 mc/s. cosmic noise as measured by the riometer, and are not necessarily coincident, with magnetic disturbances or aurora. Presumably the ionospheric disturbances are caused mostly by fairly soft particle radiation precipitated into the atmosphere from the Van Allen radiation belts due to a lower mirror points at SANAE than at the northern hemisphere conjugate point, due to the Cape Town Magnetic Anomaly.

The cosmic ray programme is of interest because of the effects of the Magnetic Anomaly on the spectrum of cosmic rays incidented at SANAE in the vertical and in directions inclined to the vertical both during quiet and magnetically disturbed periods. Both Japanese and South African measurements by a shipborne neutron monitor show a strong dependence of the incident cosmic ray spectrum on solar activity from south of Cape Town towards the Antarctic. These measurements are still being investigated towards the solar activity maximum expected in 1968.

QUITE NEAR ENOUGH

The Chief Officer of the South African 1573-ton supply-ship "R.S.A.", on the ship's return to South Africa, described how the vessel had its narrowest escape yet in her six years of Antarctic work. She was leaving one "bukta" (bay) in the ice front to land the team at another bukta. The ship was just moving out from the first bay when the Chief Officer noticed large bubbles at the edge of the ice cliff. Then "a huge chunk of ice which must have risen from the bottom of the cliff popped up suddenly. Then another piece broke off about 250 feet away. Then the middle section broke off and slid into the water, turning over."

The vast block of ice was estimated at nearly 40 times the size of the vessel. If the ice which first

rose up had done so under the "R.S.A." the ship must have capsized. And if the men had been put ashore at this bukta, they would have been engulfed in tons of plunging ice.

PLACE NAMES TRUNCATED

The U.S. Board of Geographic Names has been doing some ruthless pruning. The names of a number of geographic features in Antarctica have been shortened by the omission of the Christian name, and by no means everybody will think it an improvement that, for example, Marie Byrd Land has (officially) become Byrd Land, Edith Ronne Land — Ronne Ice Shelf, Hal Flood Range — Flood Range, and the Lowell Thomas Mountains are now simply the Thomas Mountains. Many will feel that something quite significant has been lost.

BIG PRICE FOR ANTARCTIC LOGS

A petty officer's three Antarctic log books, in one of which is an account of the finding of the bodies of Captain Scott, Dr. Wilson and Lieutenant Bowers in November 1912, were sold at auction in London in March for £2,600.

Petty Officer Williamson served under Scott in both the "Discovery" and the "Terra Nova". He ran away to sea at the age of 13, and was a labourer on the Portsmouth docks at the time of his death in 1940. His widow died recently and her son decided to sell the diaries.

The purchaser apparently bought them as a speculation.

The Scott Polar Research Institute had been interested in obtaining Williamson's logs for its archives, but was too short of money to obtain them.

As we go to press we are informed that the Institute has, thanks to a number of donations, been able to purchase the Diaries for its library. Congratulations to the SPRI.

KISTA DAN SOLD

(From "J.L. News", the journal of J. Lauritzen Lines, owners of the "Dan" ships)

The forerunner of all the "Dan" polar ships, the "Kista Dan", which was built as an experiment in 1952, has been sold to Norway.

An eventful, colourful and at times thrilling chapter in JL history has thus come to an end.

The building of the "Kista Dan" was a challenge to the past, to the hard-earned experience of many generations which said that for navigation in heavy pack ice you need a wooden ship, and a challenge for the future, as there did not seem to be sufficient need for such a ship to justify her existence.

A lot of research went into the design and construction of this prototype polar ship, and it was a proud day when, at the naming ceremony, the first little piece of the Greenland icecap struck her bow and sent her down the slipway.

The "Kista Dan" was a success. She was a good ship and a lucky ship. Tremendously strong, she behaved beautifully under the severest ice conditions. She found a market, and for many years made herself indispensable in the East Greenland trade and in the Antarctic, carrying scientific expeditions and their supplies to Australian (1953–57) and British (1959–64) stations on the Antarctic Continent.

She was pictured on one of the Antarctic stamps issued for the British Antarctic Territories in 1963.

Her life has been like that of a migratory bird, each year making the long trip from the North Polar Regions to the South Polar Regions and back.

From the small experimental ship "Kista Dan" a large fleet of "Dan" polar ships now counting 18 units has grown.

The "Kista Dan" is still full of vitality and we hope she has many years in front of her. Her life will now be that of a Norwegian sealer, and she will thus still be found in the icefields, for which she was designed and built.

ALL MOD. CONS. NOW AT HALLEY BAY

One advantage of the new Telex link between the B.A.S. London office and the Falkland Islands is that it is now possible to transmit general news instead of being confined, as hitherto, to cryptic telegraphese on essential matters — as the following bulletin from the commander at the new Halley Bay base shows:

"In contrast with the old base New Halley Bay affords luxury hitherto unknown by B.A.S. wintering parties. It strikes me as strange to walk into the new dining room and see men sitting about in shirt-sleeves instead of sweaters, and slippers instead of Mukluks.

"In the washrooms hot and cold running water is obtained from stylish taps mounted over sinks instead of direct from melt tanks. In place of the traditional five-gallon drum with tape and hose, modern primrose-coloured shower cubicles are installed, two in each dormitory. The only snag with the new showers is that they tend to promote the desire for prolonged soaking, an indulgence for which you pay on the morning after when cutting snow blocks to replace the water used.

"Two men share a bunk room and once essential furniture is fitted the occupants have a free hand to decorate as they wish. Those completed to date have shown originality of ideas and include such features as concealed panels covering cupboards, ornamental bedheads and concealed lighting. Colour schemes are varied, ranging from the pastel shades of the romantically minded to the whites, greys and varnished wood of the more practical man. In one bunkroom a mountaineering enthusiast has mounted crossed ice axes on the wall whilst his companion, not to be outdone, responded with crossed carpenter's saws, the tools of his trade. Photographs of home adorn the shelves alongside books and souvenirs of Montevideo. An unusual table lamp made from an old engine piston takes pride of place in one of the electricians' bunk room.

"Prior to moving in some have held bunkwarmings, similar to housewarmings at home. Saturday evening get-togethers are still held in the old lounge at present and men living at "T'he Village" (the new base) look forward to dressing up for the weekly night out. They go down to the old base in Muskegs for the weekly film, pints of ale or a tot and witter with people they have not seen for a week.

"'When the Theron's* parties returned they were quite surprised by the style and luxury of things, especially in the dormitories. The first comment of one was "Look at all those right angles!' which shows just how he had become used to the distorted walls and ceilings of the old base. There is still much to be done and it is a race against time and weather to complete all outside tasks before the onset of winter. Through the excellent co-operation of everyone, New Halley Bay will soon be born and provide a real home for the wintering parties of the future."

* Field parties who had been working in the Theron Mts.

The recently opened Telex link has greatly improved communications and it is hoped that it will eventually be extended to the bases. Four tall radio masts have already been erected at Halley Bay in preparation for a new transmitter and teleprinter, which are scheduled to be installed later in the year.

Work proceeds apace at the new base. A covered way between the buildings and separate access shafts to each building have now been

completed. Meanwhile, scientific work has been continued at the old base, and most of the scientific equipment will not be transferred until 1967–68. Those left behind are looking forward to the time when they can move, and some are already "commuting", to decorate their bunkrooms in their spare time.

AT ADELAIDE ISLAND

A new living hut was also built at the Adelaide Island base — after most of the summer field work had been completed. The Pilatus Porter and Otter aircraft were flown north to their winter-quarters at Deception Island at the beginning of March (the Otter has now been grounded because of metal fatigue in the fuselage), and a fuel dump has been laid up on the Adelaide ice piedmont in preparation for next summer's flying operations.

AND OTHER BASES

At Deception Island the aircraft were serviced and prepared for the winter. At the Argentine Islands geophysical observatory, scientific work continued as usual. Biological work continues at Signy Island, South Orkneys, and a number of very interesting projects are under way. These include the study of bloodless fish which are able to resist freezing and obtain and use oxygen from their surroundings, and measurements, using isotropic tracers, of the rate at which algae and other microscopic plants fix free nitrogen from the atmosphere. This latter is part of the International Biological Programme, which is to make a worldwide survey of biological productivity and foodproducing potentialities.

SEAL TROUBLES

Edward Smith, a specialist on seals who took up his appointment as the Survey's Chief Biologist last November, visited the bases this summer and was able to solve a number of problems at Signy (and tune the base piano). In the course of his travels, he made a hair-raising (as always) landing on Bird Island off the north-western tip of South Georgia, with Lt. Cdr. Cheshire from H.M.S. "'Protector". The intention was to weatherproof a research hut there, which was evacuated two years ago. The urgent problem, however, was to make it seal-proof; seals had moved in and made themselves comfortable is the sleeping-quarters and food cupboard.

INTO THE FIELD

Only one main field journey was undertaken at the end of the summer, and that was by a party of geologists and surveyors from Stonington Island, who worked up on the Graham Land plateau for five weeks.

THE SHIPS

As mentioned in the last issue, "Shackleton" again continued the magnetometer and seismic survey of the Scotia Sea — for the eighth season in succession. A proton magnetometer was towed over thousands of miles and seismic studies made of the ocean floor. This latter was carried out with sonobuoys which automatically transmit from a distance explosion shock-waves reflected by various layers of the underlying rock.

The principal magnetometer survey was that in the Bransfield Strait between Deception Island and Elephant and Clarence Islands. The total mileage covered was 1,750 n-miles at a track spacing of 3–4 miles. The survey covered the interesting 1,000-fathom trough running parallel to the South Shetland Islands, and the magnetic anomaly associated with the southern edge of the material underlying the main South Shetland island group.

In March, the "Biscoe" carried out hydrographic survey in the vicinity of the Argentine Islands using Decca "Hi-fix" position-fixing equipment.

The "Perla Dan" arrived back in the U.K. on March 26, "Shackleton" on May 8, and "John Biscoe" on May 18, having left a total wintering party of 91 men at the bases.

SURGERY ON ICE

A 28-year-old doctor during a year's duty in the Antarctic performed his first two operations.

Photo: R. Randall.

VETERANS OF 1902-04 ON DISCOVERY

Sir Vivian Fuchs talks with FRANK PLUMLEY, 91 (centre) and JAMES DELL, 86 (right) at the gathering on their old ship to celebrate the publication of Wilson's Diary.

One was on a seaman and the other on a scientist. Both were for appendicitis.

The one on a Scottish member of the Antarctic survey team, George McLeod, was performed in an underground hut at Halley Bay.

Dr. Ronald Lloyd, of Cheshire, sterilised his instruments in cooking utensils.

Both patients made good recoveries.

NEW ZEALANDER WITH B.A.S.

Christopher Sykes, a mechanical engineer with the British Antarctic Survey team at its Halley Bay base, is a New Zealander. He is the son of Dr. and Mrs. P. H. Sykes, now living in Surrey, and a grandson of the late Mr. G. R. Sykes, M.P. for Masterton from 1911 to 1935 and of the late Dr. W. J. Anderson, M.A., LL.D., New Zealand's Director of Education from 1915 to 1921.

S.P.R.I.

Work on the site for the new *Scott Polar Research Institute* building in Cambridge, England, began in July last. The new block is due to be completed on November 30 this year and the connecting link on February 29, 1968. Conditions in the present building have been extremely crowded.

Owing to financial difficulties work on the compilation of a projected *Antarctic Atlas* has temporarily ceased.

WORSLEY DIARY

Thanks to the generosity of Messrs. Cassell, the publishers, Mrs. Jean Worsley and the friends of the Institute, the library was able to purchase two volumes of F. A. Worsley's diary kept during Shackleton's Trans-Antarctic Expedition, 1914–17. These diaries are complementary to a third volume presented to the Institute by Mrs. Worsley in 1913 and complete the set. Worsley, Shackleton's navigator on the great boat journey from Elephant Island to South Georgia, was a New Zealander, born in Akaroa.

CHILEAN AIRCRAFT CROSS THE 70th PARALLEL

After 24 days in Antarctic territory, three Grumman planes of the Chilean Air Force which had left from Wing No. 2 on February 7, landed on their return to Quintero Air Base on March 3. The aircraft had carried out reconnaissance flights beyond latitude 70°S., under the command of Group Commandant don Edgardo Vera Maldonado.

The object of the long flights south was to investigate the possibility of installing new landing strips in order to facilitate the exploration of the Antarctic up to a much more southern latitude than that of the present Chilean bases.

The flight from Punta Arenas in February crossed the Strait of Magellan, followed the route Tierra del Fuego, Cape Horn, Drake Passage, and after five hours' flight above thick clouds turned east and a few minutes later touched down at Deception Island on a sea whipped up by strong gusts of wind.

The aircraft now made for Pendulum Cove and the Pedro Aguirre Air Force base. During the next two days they were held up by heavy snow-falls and winds, but on the 16th the forecast was good. Grummans 569 and 576 were assigned to the southern flight while 568 remained for search and rescue duties at Pendulum Cove. But the weather unfortunately changed suddenly and the planes had to return with their mission unaccomplished.

On the 17th to the pilot's joy, at dawn the sea was calm and the sun shone brilliantly. Awakening very early, the activities at P.A.C. began at once. After a conference with the aircraft crews Commandant Vera gave the order for the southern flight to take place from Deception Island to 70 degrees south, and at 12.45 the planes took off with their noses pointing towards the western part of the Antarctic Peninsula.

At 16 hours the three planes crossed the Antarctic Circle and 70°S. for the first time in the history of the Chilean Air Force.

RELIEF

On March 9 the "Piloto Pardo" and the "Lientur" of the 21st Chilean Antarctic Expedition reached Punta Arenas. After on-loading oil in the harbour from the "Admiral Montt" which had moored at the Arturo Prat Wharf the day before, the two ships brought back personnel of the Task Force from the various Chilean Antarctic bases, and the scientists who had wintered over in the Antarctic. This voyage concluded the year's Antarctic operations.

INFILTRATION?

One result of the occasional Kiwi incursions into Wallaby country (from the northern Victoria Land area into the eastern portion of Australian Antarctic Territory) is the appearance of more New Zealand names on the maps of A.A.T.

The September 1966 list of new A.A.T. place-names includes Ahern Glacier, Allan Hills (Prof. R. S. Allan), Ballance Peak, Chappell Nunatak, Gray Glacier, Mount Gregory, Mount Hayter, Laird Plateau, Lowe Glacier, Lucy Glacier, McDonald Spur, Mansergh Snowfield, Mount Manson, Mount Simmonds (N.Z. cartographer), Townrow Peak (Tasmanian with NZARP), Warren Peak, Mount Watters.

One of the aims of current research into Adélie "sociology" is to decipher the means and the "language" by which parent and chick identify and communicate in rookeries of sometimes as many as a million birds.

Who knows? Perhaps humans may learn something from these strange little birds for their own chaotic society.

NEWS FROM THE SUB-ANTARCTIC

CAMPBELL ISLAND
(New Zealand)

Again this year one hundred nests were pegged in the Lyall Saddle and St. Col areas and the progress of the nesting Royal Albatrosses noted carefully during regular and indeed daily visits to each nest, until the chicks hatched out or the egg proved to be infertile over a period of two weeks. The number of failures including infertile eggs was 32 and 13 chicks died after hatching as at 1.5.67 compared with the 1966 figures of 19 and 6 respectively.

Banding of Royal Albatrosses is continuing at a good rate but perhaps more noteworthy is the banding of nearly 100 sooty albatrosses, including a large percentage of chicks banded two or three months before they fly. The nests of these birds are built in almost inaccessible places, usually in ledges of sheer cliffs where the bander has to have one hand for the bird and one for himself. However, a large number of nests can be reached on a fine day in Perseverance Harbour from the station launch "Aurora" by dropping a team of two on rocks in between sea swells. When as many nests as possible have been visited from one vantage point the banders signal to the launch and balance themselves on the rocks ready to leap aboard as the "Aurora" sweeps past on the top of the swell. In easier cases it is not unusual to come across a brace of nests in some most unlikely place such as under a peaty bluff high on the tussock covered slopes.

During April, four rewarding days under canvas were spent by Foubister and Hodgson at the northern end of the island. Under 60 lb. packs they reached Bull Rock in three and a half hours. The main object was to take specimens of Blackbrowed and Greyheaded Mollyhawk chicks for the Dominion Museum and to band as many chicks as possible before they flew. After two nights at Bull Rock, camp was shifted to the neck of the Courrejolles Peninsula via an easily followed sheep track around the coast. The tramp back to the station took two and a half hours. Almost 2,000 Mollyhawk chicks were banded, an excellent basis for further study.

On April 24, to see the Rock Hopper penguin colonies at the base of Mt. Parrish described so well by J. H. Sorenson, Paull made the trip over the knife edge ridge to the peninsula that commands an excellent view of the extensive colonies stretching from the peninsula neck to the westernmost point of the island. Although at this time of year there were not 2½ million penguins in residence, there was ample evidence on the rocks and scree slopes that there would, at other times of the breeding season, be more than we saw during this visit.

The walking tracks on some of the more frequented routes have been improved, especially a track going over the station around Beman Hill which since its formation a few years ago had deteriorated to a series of knee-deep bogs connected by slippery bluffs. Work is progressing with the making of a track over the Azimuth/Fizeau saddle to link up with a track recently formed to "The Pimple".

Campbell Island now boasts a cool store where locally killed wild mutton can be stored during the warm summer months. A recently completed room built in the hostel annex means that there are now twelve private rooms for the staff.

On March 28 we were surprised by the unexpected appearance of an R.N.Z.A.F. "Orion" which made several runs over the station. During its sweeps up Perseverance Harbour we hoped that they would drop something (not depth charges) like a bundle of newspapers but these hopes were not fulfilled.

Anzac Day was solemnly observed with a short service on the station launch while the wreath was cast to the sea. Just as the wreath was sinking below the still grey waters of Perseverance Harbour a Royal Albatross glided, as if in a fly past, over the spot.

KERGUELEN
(France)

The wintering party this year was expected to number 81. Again, the "Gallieni" was used to effect the annual relief. The summer programme included the construction of two new buildings with a total floor space of 800 sq. m. to house the new generator and the new radio transmitter. Rocket-firing plans also involved the building of a shelter and a concrete firing platform as well as the construction of 120 m. of metalled roadway linking the two.

Among the scientific projects undertaken were (1) an investigation of the bacterial variations in the penguin digestive tract and the influence of geophysical factors thereon; (2) a systematic study and collection of freshwater algae of all sizes, both animal and vegetable, in lakes and rivers; (3) night sky and aurora photography with 16 mm. wide-field camera, fixed detector and 10 colour photometer early in the winter. Later, the fixed detector will be replaced by the new photometer installed during the summer and the 16 mm. camera will be replaced by a 32 mm. camera during the following season. The meteorologists plan 150 soundings for wind and temperature this year, using improved balloons and sondes, during world days, geophysical intervals and "strat-warn" alert periods.

The weather has remained mediocre, with a mean temperature of 6°C. and wind 35 km/h., the whole punctuated by the habitual storms, notably during March. Work was hindered but not held up thereby. The arrival of new apparatus demanded the adjustment of priorities in the magnetic laboratory. The creation of the two main storage areas — for the rocket-firing programme and for the electrical power-house — meant much preparatory work, earthworks and the stockpiling of materials, which went on up till March.

Both for the launching area and for the power-house site the mould had to be removed and replaced to a depth of 70 cm. by shingle, gravel and sand. The "rocket firing" track from the base to the launching area was completed with the help of all hands. The track leading from the "Whale-back" to the launching site was fitted out with P.S.F. slabs and by the first comer in order to permit the building up of stock.

At the end of March, the foundations of the rocket-mounting building were nearly completed.

In the laboratory area, the building which had served as a depot reverted to its original purpose as living quarters.

The drainage of the area surrounding three of the buildings (begun in 1964) was extended by the formation of a sink with channelling under the roadway.

CROZET
(France)

The fourth wintering team on Crozet, the "baby" of the French sub-Antarctic outposts, was installed without incident in spite of much more fog, rain and wind than they wanted. After stacking the new supplies, especially the equipment for the magnetic and radio-activity laboratories, they tackled the numerous routine pre-winter tasks such as ensuring that the roofs were watertight and that cable-railways and other installations were in good working order.

Several biological excursions were made, and in this connection the shelter at American Bay was put in order.

MARION ISLAND
(South Africa)

The weather relief teams to Marion and Gough Islands departed from Cape Town during March and April/May respectively. These men will man the island weather stations for the coming 14 months. Both teams are already firmly entrenched in their new homes and every indication is that they are enjoying their stay. Each team numbers seven: the leader, three meteorologists, radio operator and technician, and medical officer.

N.Z. EXPEDITION TO THE SNARES

A six-man expedition worked on the main island of the Snares group, 56 miles S.W. of New Zealand, from January 2 to January 23, three of the party, J. Warham (Leader), R. A. Anderson and P. M. Johns, staying on till February 10 after Prof. G. A. Knox, D. A. Knox and Dr. B. Stonehouse had returned to New Zealand. Transport between Dunedin and the island was provided by the U.S. picket ships U.S.S. "Thomas J. Gary" and U.S.S. "Mills".

An easterly swell had prevented a landing on December 30, so the "Gary" went on to Campbell Island where the expedition members with their stores were landed and spent a profitable day before being taken to the Snares two days later.

Radio contact was maintained with the New Zealand weather station on Campbell Island, itself in contact with Christchurch. During the expedition's stay a photographic reconnaissance of the islands was carried out by No. 14 Squadron and the Central Photographic Establishment of the R.N.Z.A.F.

Two members, Prof. Knox and Dr. Stonehouse, had participated in the 1961 expedition. They report no major alterations in the island's fauna and flora apart from some changes in the vegetation, in particular the extension in certain areas of the Coastal Veronica and a possible increase in the number of breeding fur seals.

The biological station is in excellent condition and the water tanks though extensively rusted, provided ample water. Some alterations and repairs were made to the main hut and the old "castaway hut", chiefly to provide additional freshwater storage and extra bench and shelf space. A permanent radio aerial was erected.

A number of tracks were cut to give easier access to the Sink-hole area, Signpost Hill, the west, south and east coasts, and other areas. These tracks were carefully prepared without disturbing the forest canopy, by-passing areas where extensive cuttting would have been needed. Metal squares with reflector tape were nailed to trees to indicate the track to follow back to the station.

The survey of the inter-tidal ecology commenced in 1961 was continued and further collections made, particularly of the marine algae. Extensive collections were made of land invertebrates. The previously known fauna may now be multiplied about three times and something like 40 species may prove new to science. Good samples of parasitic species were collected from birds and nests (some evidently new species), also from peat, soil and litter.

A carefully controlled number of bird specimens was collected for specific studies. A colony of the **Snares Crested Penguin** was chosen for long-term study and a substantial part of the breeding adults and all the chicks were flipper-banded. Details of behaviour and displays were recorded on film and tape, and significant weights and measurements taken. Observations and recordings were made and samples taken for specific purposes from the *Procellariiform* birds. Many birds were banded, including 500 adult Sooty Shearwaters.

No new breeding *vertebrate* species were found but N.Z. crested penguins. Erect-crested penguins and Swamp harriers, apparently unrecorded but not unexpected, were seen.

Large numbers of N.Z. fur seals were seen at many places round the coast and pups were plentiful in the more remote bays and coves. Male Hooker's Sea-lions occurred with increasing frequency during the expedition's stay.

About a dozen papers are in preparation and will draw extensively on material and data obtained.

MACQUARIE ISLAND
(Australia)

In February the paint store was thoroughly cleaned out and reorganised, and all timber neatly stacked — one day's hard labour for the whole party. The water supply system has been improved, so that the cook no longer utters dire threats when a shower is turned on, and the unfortunate bather does not freeze or boil when the cook is washing the pots and pans.

We had an unexpected visit from the U.S.N.S. "Eltanin" during the month, and there was an exchange of visits for the short time they were anchored in Buckles Bay. **Jim Hinds** rose to the occasion and produced a magnificent spread in a very short time. Unfortunately some of our guests had to be back on board before they could do justice to it.

The A.N.A.R.E. party who went on board will not forget the overwhelming hospitality given to us by Captain **Larry Wirth**, the Crew and Scientists who could not get ashore.

The beginning of March heralded the start of a fortnight's hard work crate-making and organising all equipment being returned to Australia on the "Nella Dan".

The "Nella Dan" brought down equipment for a tide gauge for Adelaide University. A spot was found fortunately not full of rock, and digging to below tide level commenced. About a thousand man-hours later, through continual cave-ins and water seepage at the rate of about 30 gallons per minute, and above all constructional genius on the part of our crew, we could say that we had installed all the piping. We now await the settling of the backfill of sand before we finally install the instruments.

Leader Rob Walker in the Macquarie news-letter for March wrote, "Now that the summer party have gone, **Jim Hinds** has begun to equip part of the Upper Atmosphere Physics building as a gymnasium. We suspect that he has a guilty conscience so that now he is about to help remove the extra inches almost all of us have put on round the waist as a result of his splendid efforts in the kitchen." (See below.)

Now that the Royal penguins are departing the interest of the biologists is moving over to Dominican gulls and Giant petrels.

The Macquarie Island team's newsletter for April referring to the illness of one of their number (see p. 521) says: "As you know we have had our problems during April. **John Evans** has made sterling efforts, and along with **Ken Shennan** and **Mike Chapman**, must be congratulated on nursing **Jim Hinds** during his illness. We wish **Jim** a speedy recovery in hospital back in Australia."

As Hinds was the cook, cooking has been a problem, but this seems to have been surmounted, thanks to the untiring efforts of **Svensson, Ryder, Poulsen, Ormay** and **Ackerley**. The first four are bachelors and have put the married men to shame.

The Meterological Staff should have been able to look for easier times ahead now that the second radio-sonde flight has been dropped, but the turmoil during the month delayed this rest period. The Micropulsation Unit has had to be moved. Schmidt expected to have the unit working in its new location shortly.

BIRD STUDIES

Leader Walker reports: "**Smith** was just in time to get sixty Royal penguins into the seal tank and enclosure for his winter study. Four days later it was reported that apart from one or two stragglers, the penguins had migrated for the winter months. The captives' diet of frozen salmon and seal meat seems to be quite adequate. Many strange devices are appearing on the Isthmus purporting to be traps to ensnare Dominican gulls. The tally so far is only two, so considering the number of gulls on the island, either the birds are too clever or they don't quite understand the object of the exercise."

Magnetic storms made the even spread of magnetic absolute readings over the month difficult. These storms have meant that some amateur radio skeds have been postponed, much to the irritation of

MISSILE SHIP SUDDENLY CHANGES COURSE

When one of Australia's newest warships, the $40 million guided missile destroyer "Perth", left Melbourne on Friday April 28, it was for routine exercises off the Australian east coast at Jervis Bay.

When in Bass Strait she was suddenly ordered south, to steam at speed to Macquarie Island, where a cook of the Australian 24-man team there was reported seriously ill. Leader Robin Walker had radioed the Antarctic Division that Harris Hinds (45), a Sydney bachelor, would have to be removed to hospital urgently. There was a doctor on board the "Perth".

The weather on the lonely island, 1,000 miles south of Tasmania, was particularly bad. Next day "Perth's" commanding officer (Capt. Peter Doyle) in a radio message to Navy headquarters in Canberra said he expected to reach Macquarie Island late the following afternoon. But he warned that if the seas did not abate it might not be possible to take the sick man on board.

The "Perth" ploughed through near-cyclonic conditions to reach the island on the afternoon of Monday May 1, but heavy seas in sub-zero temperatures and winds of up to 50 m.p.h. prevented a landing party reaching the island. Every attempt to land was thwarted by high seas and breakers close to shore.

"Perth" remained anchored off a small cove, Buckle Bay, and the patient was transferred to the warship early on Tuesday May 2, when seven men took one of the ship's 26 ft. launches about 100 yards offshore.

Able Seaman Harry Brankstone (22) swam to shore through thick kelp and icy water in his frogman's suit, dragging a line attached to a small raft. The raft was then pulled ashore from the launch, with Leading Seaman Colin Thelan (28) hanging on to it. Brankstone and Thelan strapped Mr. Hinds to the raft on a stretcher, and the three were pulled back to the launch.

The two frogmen dismissed their rescue effort as "kid's stuff".

"Perth" berthed in Hobart on Thursday May 4 at 5 p.m. with the injured cook in a satisfactory condition. He spent the night on board the "Perth" and next day was flown to Melbourne.

The "Perth's" commander, Captain P. Doyle, said: "The two frogmen did a marvellous job in terrible conditions."

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those who had hopes of talking to folks back home.

The first taste of winter was a two-day freeze-up with snow remaining on the Isthmus. Skiing was tried on the Plateau but not really successfully. Quite a few people look forward to the colder weather.

STOP THE SHIP — I WANT TO GET OFF !

When "Perth" left Melbourne she had on board as passenger a retired Australian rear-admiral who was looking forward to a quiet and restful two-day voyage up the coast to Sydney as the guest of "Perth's" commander, Captain Peter Doyle.

But Rear-Admiral H. Becher, who in 40 years of naval service had not been to Antarctica, had a rougher trip than he had planned. He spent the two days in heavy seas and 30-knot winds heading towards Antarctica.

But, as a naval spokesman said: "The rear-admiral has probably been through many worse conditions during his career" and our headline is not attributed to the gallant Admiral.

The McCormick Skua in Southern McMurdo Sound, Antarctica

Ian F. Spellerberg*

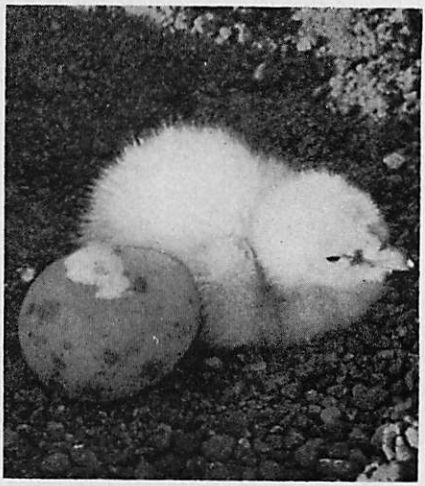
At New Zealand's Scott Base, you will frequently hear the question, "How far south do the Skua colonies go?" and "Where is the nearest Skua colony?" In the following article I have answered these questions, as well as including information which may be of value to those who have an interest in the wildlife of Antarctica.

During the austral summer seasons of 1963–64, 1964–65, 1965–66, a study was made of the breeding cycle and ecology of the McCormick Skua (*Catharacta maccormicki*). This was part of the programme of the Canterbury University Antarctic Biology Unit, and it was in the course of this work that a survey was made of the skua colonies in Southern McMurdo Sound.

In the summer of 1965–66 a reconnaissance was made of the colonies, which included two day-trips by helicopter; one on December 29 and one on January 14.

On Gneiss Point, immediately north of Marble Point (fig. 1, table 1), McCormick Skuas were found on and near the ponds and two scoops (nests) were found at the edge of one of the ponds, but no chicks or eggs were found. Skuas were flying from the south to the ponds and from the ponds in the direction of Marble Point. It appears that breeding birds come from the colony at Marble Point, where there are no ponds, in order to bathe at Gneiss Point. At Marble Point the Skua colony covers an area above the beach on the southern side, where shallow depressions and small rocks offer protection from the southerly winds.

The most southerly colony, south of Cape Chocolate, extends up to 100 metres inland by the many small melt streams and ponds which are found in the area. The nests are 50–100 metres apart and in this respect the colony is sparsely distributed compared with the colonies further north.



SKUA CHICK AND EGG.

The pair on the southern side of Observation Hill (Cape Armitage) have been recorded over three consecutive seasons, 1963/64–1965/66. This pair maintains a territory of approximately 400 square metres during the summer season when a large colony of non-breeding birds roost in the area and bathe in the pond.

Well known are the two Bases at the tip of Cape Armitage, McMurdo Station (U.S.A.) constructed in 1955–56 on the western side, and Scott Base (N.Z.) constructed in 1956–57 on the eastern side. The refuse from these bases is an attraction to many Skuas and accounts for the many birds in this area. In 1963–64 the population of non-breeding birds in the Scott Base McMurdo Station

* Zoology Dept., Canterbury University.

THIS IS OUR TERRITORY.

area reached a total of 525 during the middle of February.

Moving north on the western side of Ross Island, the next colony is at Cape Evans. F. A. de Hamel (unpub. report) reported 52 pairs nesting at the Cape in January of 1958. In January of 1964, 54 pairs were recorded, and in January of 1965, 55 pairs were recorded.

A flight by helicopter was made around the Dellbridge Islands, off Cape Evans, and the close inspection showed no signs of Skuas nesting on the islands.

Cape Barne, immediately north of the Barne Glacier, is dotted with many small ponds, some of which thaw during the summer, and there are some melt-streams in late December and early January. Young (1963a, p. 205) reported 21 nesting sites on the coast of Cape Barne. Over the three seasons 30 breeding pairs have been found, some of which are nesting well inland.

Cape Royds, three miles north of Cape Barne, is backed by irregular lava peaks and terraced moraines containing several small ponds around which a few Skuas breed.

Cape Royds itself with its characteristic irregular lava flows of Kenyite and low lava cliffs, is a strip of ice-free land dotted with small lakes and ponds in the numerous valleys. Breeding colonies of Skuas are found in the valleys on the black volcanic detritus and on the slopes of Mount Erebus in the snow-free areas. There are six colonies of breeding birds consisting of 57 breeding pairs.

Immediately north of Cape Royds there is a colony on the southern side of Horseshoe Bay and there are two colonies (one on each side) on Rocky Point.

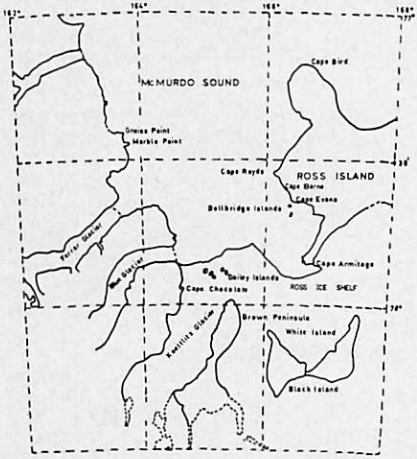
The population of breeding Skuas in this area of McMurdo Sound is not large, and together with the low breeding success, there is a definite need for conservation of this bird. In 1963–64 only 39.8 per cent. of the

Locality.	Situation.	Breeding pairs.	Remarks.
Gneiss Point.	Non-breeding colony around the lake.	—	Some scoops. No breeding pairs resident.
Marble Point.	Breeding birds above beach on southern side.	20	20 clutches — 6 with 1 egg; 14 with 2 eggs.
Southern tip of Blue Glacier.	Breeding birds amongst stranded ice-cored moraines.	15–20	All nesting on the edge of ponds.
South of Cape Chocolate.	Breeding birds amongst ice-cored moraines.	25	Nests found as far south as 78° 5′ S.
Dailey Islands.	Nests on raised beaches beside ponds on the south and east sides.	14–16	—
Brown Island Peninsula.	Northern tip.	—	Several birds roosting near ponds.
Cape Armitage.	Southern tip.	1	Nesting beside a pond.
Cape Evans.	Widely distributed around ponds.	55	—
Cape Barne.	Breeding birds around small ponds.	30	Colony extends to ¾ mile inland, and scattered nests on moraines above Cape Royds.
Cape Royds.	Around lakes on volcanic detritus (talus).	57	—
Horseshoe Bay.*	South side.	23	—
Rocky Point.*	North and south sides, above and on beaches.	68	Concentrated colonies.

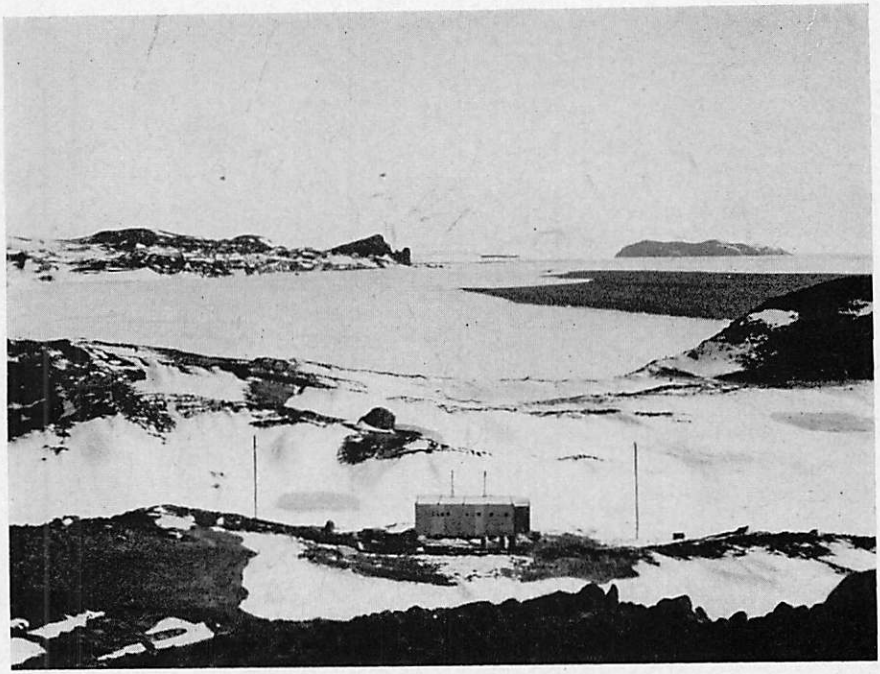
eggs laid at Cape Royds gave rise to chicks that left the colonies. In 1964–65 it was up to 42.4 per cent., but in 1965–66 it was as low as 16.5 per cent. Although the Skua suffers much from the harsh weather conditions, interference by man and his machines is a factor which has played a part in lowering the breeding success.

As well as taking care not to disturb the colonies unduly, the observer may assist in the collecting of information which will help in the study of these birds. Records of banded birds, of band numbers, and the return of bands from dead birds together with relevant information, would undoubtedly be appreciated by the banding operators. The biologist in the Antarctic depends much on the accurate information collected by the casual observer.

Fig. 1 McMURDO SOUND



* Immediately north of Cape Royds.



THE BIOLOGICAL HUT AT CAPE ROYDS.
Looking South across Cape Barne.

FILM HONOUR

The New Zealand Antarctic film **"140 DAYS UNDER THE WORLD"** produced by the New Zealand National Film Unit in 1964 is one of two Unit productions to be selected by the Educational Film Library Association of New York for the 1967 American Film Festival in May. The two films (the other is "Through Scrummage, Three Quarters and All") have also been nominated by the Library's pre-screening Committee for the blue-ribbon award competition at the Festival.

"140 Days Under the World" was nominated for the Documentary award of the Academy of Motion Picture Arts and Sciences at Hollywood in 1965 and has been distributed throughout the world.

TWO TV WINS

Readers who saw the following programmes should let the N.Z.B.C. know that they were appreciated.

SCOTT OF THE ANTARCTIC

The Ealing Studios' full-length motion picture made in 1948, re-enacting Scott's Last Expedition with John Mills as Scott. A sincerely-made film, accurate and not glamourised, it brings the great story to life with moving poignancy. To be shown on DNTV-2 on Sunday June 25.

THE TERRIBLE JOURNEY

A shorter film showing the retracing of the journey of Shackleton, Worsley and Crean in 1916 across South Georgia. How the British combined Services Expedition did this was described in "Antarctic", December 1964 and March 1965. This is one of the TV series "Survival".

ANTARCTIC STATIONS

9

NOVOLAZAREVSKAYA

70° 46′ latitude south.
11° 50′ longitude east.
87 metres above sea level.

This scientific research station is situated on outcrops of rock at the eastern extremity of Schirrmacher Oasis. To the north of the station for a distance of 80 kilometres the ice shelf stretches with a gently undulating surface which comes to an end in the "Leningrad" glacial dome. The continental ice shield, which at a distance of 50 kilometres already attains a height of 1,000 metres, slopes down from the south. On this slope a number of nunataks rise above the ice. Under the ice shelf, which separates the Schirrmacher Oasis from the ocean, are channels. These connect basins located at the northern edge of the oasis with the sea. The clearly marked tidal fluctuations of the water level in these basins provides evidence of this.

The station buildings. On the establishment of the station in 1961 four prefabricated shelter buildings were erected accommodating radio stations, a photo-laboratory, rooms for meteorologists, aerologists, geophysicists and a doctor, mess rooms, galley, bakehouse, power plant, mechanics' workshop, laundry, bathroom and living quarters. In addition, huts were built on the station precincts, one for aerological, three for magnetic and one for glaciological studies, also a storehouse for material and technical stores and three Shaposhnikov cabins. A diesel fuel storage tank with a capacity of 25 cubic metres was installed. To the north of the station a cold store for provisions was built in the snow.

In 1962 construction work at the station continued. One hundred metres to the south-south-west of the main buildings another prefabricated shelter building was erected, containing geophysical apparatus. Fifty metres to the north-west of this structure a fourth cabin for magnetic studies was built and at the same time an 18-number telephone exchange was installed.

In the vicinity there are take-off and landing strips for light and heavy aircraft.

On January 18, 1962, the building of Novolazarevskaya station was completed.

Station Personnel

Year	Classification General	Classification Scientific
1961	12	6
1962	21	12
1963	12	6

Besides the 17 men who comprised the basic complement of the station in 1962 there were the leader of the 8th Soviet Antarctic Expedition, A. G. Dralkin, and three Czechoslovak geophysicists.

The main branches of scientific work carried out at Novolazarevskaya are: (1) meteorology, actinometry and aerology; (2) geomagnetism; (3) seismology; (4) earth currents; (5) glaciology; (6) hydrology.

In the summer seasons Novolazarevskaya Station serves as a base for carrying out polar research in geology in the mountains of Queen Maud Land, and also glaciological observations in this region.

We record with deep regret the death on Kerguelen Island of **Raymond Guillou,** aged 31, of the 16th Kerguelen expedition. An able seaman in the French Navy, he was in charge of the Port aux Francais flotilla. He was taken ill with peritonitis on September 21, while away on duty at Pointe Morne, was taken back to the base and operated on next day, but died on the 27th. After a service, he was buried in the little island cemetery at Port aux Francais with military honours. He is survived by his widow and three children.

We regret to announce the death on May 31 in Queensland of New Zealand-born

CLARENCE H. HARE

of Scott's first expedition, one of the "Four Discovery Men" honoured in our June, 1966, issue. A fuller reference will be made in our next issue.

THE VETERANS

JOHN KING DAVIS

It is with regret that we record the passing of Captain Davis who died in a Melbourne private hospital on Sunday, May 7, aged 83.

Most ANARE men of the Collins Street era will remember the tall, dark-suited figure looming along the corridor or sitting in the library. Those of us who were fortunate enough to get to know J.K. found him to be a gentleman of the old school, helpful, considerate and understanding, always ready to give advice if asked, but never forcing his opinions on the latter-day explorer.

Like most people of his generation, Captain Davis was conservative in many ways, and yet he always showed a keen interest in new developments and encouraged their use.

John King Davis was born in London in 1884. He was educated at Burford Grammar School, Oxfordshire, and Colet College, London. His father, James G. Davis, a teacher who had earlier taught for four years at Sydney Grammar School, was sent to South Africa with the Field Force Agency during the Boer War. He took his son with him.

Left alone in Cape Town, J. K. Davis decided to return to England and apprentice himself to the sea. He worked his passage home on the mail steamer "Carisbrooke Castle", on which, unknown to him, E. H. Shackleton was serving as a junior officer.

In 1900, Davis signed on as an apprentice on the Liverpool sailing vessel "Celtic Chief". He completed his four-year articles while the ship was in Callao, Peru, and was appointed as third mate. He obtained his discharge from the ship in America and worked his passage home as an A.B., on a tanker, in order to sit for the Board of Trade examination for the certificate of second mate, which he obtained on August 16, 1905.

Davis joined the barque "Westland", sailing between England and

New Zealand, as second mate and later sailed on the training ship "Port Jackson" in the same capacity. He passed the examination for First Mate's Certificate in Sydney in December 1906.

At the age of 23, Davis was appointed Chief Officer of the "Nimrod", expedition ship of Sir Ernest Shackleton's expedition of 1907–9. While in Lyttelton, New Zealand, on the "Nimrod", in August 1908, Davis obtained his Extra Master's Certificate, the highest qualification he could obtain in his calling. He obtained his first command at the age of 25, when he succeeded Captain F. P. Evans as Master of the "Nimrod" for the return voyage to London, where he received the Polar Medal for his work with the expedition.

Davis was appointed Master of the "Aurora" and Second-in-Command of the Australasian Antarctic Expedition of 1911–14 under Dr. (later Sir) Douglas Mawson. In later years, he considered that the three years spent with that expedition was his main life's work. He commanded the "Aurora" on three Antarctic voyages and two sub-Antarctic voyages during which he landed the shore parties at Macquarie Island, at Commonwealth Bay and on the Shackleton Ice Shelf, and later withdrew them; he explored over 1,100 miles of coastline of the Australian Antarctic Territory and obtained much geographical data. For this work he was given the Murchison Award by the Royal Geographical Society.

During the early part of the First World War, he arranged the embarkation of Australian troops and commanded several Australian transports on voyages between Australia, Egypt, England and America. In 1916, he commanded the Relief Expedition in the "Aurora" which rescued members of Shackleton's Transantarctic Expedition who were marooned at Cape Evans, Ross Island. He then joined the Royal Australian Naval Reserve and later as Lieutenant-Commander became inspecting Naval Transport Officer, London, for the repatriation of the A.I.F.

In 1920, Captain Davis was appointed Commonwealth Director of Navigation. In 1921, he established a cyclone warning station on Willis Island in the Coral Sea, remaining on the island for six months.

He was again associated with Sir Douglas Mawson in 1929–30 as Master of the "Discovery" during the first voyage of the British, Australian and New Zealand Antarctic Research Expedition. He returned to his position as Director of Navigation in July 1930, and continued in that position until 1949, when he retired.

When, in 1947, the Australian Government set up a Planning Committee to advise it on the formulation and implementation of Antarctic policy, Captain Davis was appointed a member and remained on the Committee until 1962, when he resigned.

The Second ANARE Station on the Antarctic Continent was named Davis in honour of this pioneer Antarctic navigator.

He was elected a Fellow of the Royal Geographical Society in 1915. In 1920, Captain Davis joined the Royal Society of Victoria. He became a Councillor in 1924 and served in this capacity for over 40 years. After serving as Vice-President, he was President in 1945 and 1946.

Captain Davis was the author of three books: "With the 'Aurora' in the Antarctic", 1920; "Willis Island, a Storm-Warning Station in the Coral Sea", 1923; and "High Latitude", 1962.

He was made a Commander of the Order of the British Empire in 1964.

— G. W. McKinnon.

NEXT STEP?

The Director of British Antarctic Survey, Sir Vivian Fuchs, is turning his attention to small hovercraft. When a ship could get no further through ice, he said, hovercraft would complete the trip to land. "Perhaps next season we will take a small hovercraft out," he said.

ANTARCTIC BOOKSHELF

ILLUSTRATED GLOSSARY OF SNOW AND ICE, by Terence Armstrong, Brian Roberts and Charles Swithinbank. Scott Polar Research Institute Special Publication No. 4. 60 pages. 39 plates. Price 21/- or $3 (U.S.).

Not only workers in specialist Antarctic fields but all persons sufficiently interested in the Antarctic to read this journal, will have realised the need for a reliable reference book giving clear, internationally recognised definitions of snow and ice terms. This strongly-bound, clearly set out and admirably illustrated book is a revised and augmented edition of the Illustrated Ice Glossary first published in the Polar Record. New terms and new illustrations have been added and equivalents for the 150 terms are given in Danish, Finnish, French, German, Icelandic, Norwegian, Russian and Spanish.

PROCEEDINGS OF THE SYMPOSIUM ON PACIFIC-ANTARCTIC SCIENCES will be published at the end of February by the National Science Museum as a special issue of the Japanese Antarctic Research Expedition, Scientific Reports.

This volume is the collection of papers presented at the 11th Pacific Science Congress held at the University of Tokyo, August 23–27, 1966. It contains all the twenty-six papers presented, and is divided into three main branches — geomagnetism and aeronomy, general earth sciences, and fauna and flora. Distributed free to universities, institutes and persons to whom JARE regularly sends its publications, JARE Scientific Reports. It will also be sold for about $10 by Maruzen Co. Ltd. (275 pp.)

SURVIVAL IN ANTARCTICA. Division of Environmental Sciences, Office of Antarctic Programs, N.S.F. 66 pp. Diagrams.

This American "Survival Manual" is a preliminary limited edition and is not available for sale or for general distribution. It covers a very wide field: the environmental background and history, clothing, common mishaps, first aid, shelter, travel, crevasses, emergency landings, survival on sea-ice and at sea, fire, emergency signals. It is hoped to publish this manual in a more permanent form when it has been critically examined and tried out by Antarctic men. A copy is available for perusal in the Antarctic Division's Library, and comments are invited.

THE RUSSIAN ATLAS

The Antarctic Division has received a copy of **Atlas Antarktiki**, volume 1, published in 1966 by the Chief Directorate for Geodesy and Cartography, Ministry of Geology of the U.S.S.R. The massive volume — it weighs about 16 lb. and measures 23 in. by 14 in. — contains 225 plates in colour, text on facing pages and a geographical index — and costs £22 10s. The result of eight years' Soviet Antarctic work, it also incorporates international data on the Antarctic from the time of Captain Cook to 1963. Over 300 scientists are named as having collaborated in its production. The result is a magnificently produced atlas of immense value to those who know Russian. It will await a transliteration into English before it can be of commensurate value to the rest of us. A second volume of text is in preparation.

DIZIONARIO DEGLI ESPLORATORI, by Silvio Zavatti. Feltrinelli Editore, Milan, Italy. 800 lire.

Dr. Zavatti, Director of the Italian Polar Geographical Institute and a well-known writer on Polar subjects, here aptly epitomises (in about 150

words each, on the average) the exploits of nearly 900 explorers, from Hui-te-Rangiora to Thor Heyerdahl, from Bouvet to Fuchs and Hillary, not forgetting the explorers of space from Gagarin Jurij and Alan Shepard to the Gemini II astronauts of 1965. The names are in alphabetical order, but there is a full chronological table in continents, also a locality index and 25 sketch maps. The Italian is not too difficult, especially if you know some French.

PUBLISHED IN NEW ZEALAND

WATER MASSES AND FRONTS IN THE SOUTHERN OCEAN SOUTH OF NEW ZEALAND. T. J. Houtman. Wellington, Govt. Print. 40 pp. illus., 1 col. map in pocket, diagrams, tables. 11 in. (Dept. of Scientific and Industrial Research. Bulletin 174.) 10s. N.Z. Oceanographic Institute. Memoir No. 36.

ANOTHER ANTARCTIC NOVEL

Reeds have published an exciting novel with an Antarctic setting by well-known three-times-in-the-Antarctic Sydneysider David Burke. It is called

"MONDAY AT McMURDO".

Review in our next issue.

THE ANTARCTIC ATMOSPHERE: Climatology of the Troposphere and Lower Stratosphere. Antarctic Map Folio Series. Folio 4. Plates compiled by National Weather Records Center. Text by W. S. Weyant. Published by the National Geographical Society, 1966. $3.50.

The Folio consists of four coloured plates depicting, for the region south of 30° S. latitude, mean values of the thermal regime and circulation pattern at the 700 mb., 500 mb., 300 mb. and 100 mb. pressure levels for the months of March, June, September and December. There is also one plate of the mean tropopause heights for these months, while coloured graphs superimposed on a map of the region are used on three plates to show station monthly mean tropopause heights and temperatures, and station seasonal relative humidity values at the 700 mb. and 500 mb. pressure levels.

A short text gives a discussion on the plates and also on the remarkable spring stratospheric warming phenomenon.

This Folio summarises in a concise and convenient pictorial form, data from 44 stations up to and including 1964. The simplicity of the presentation is good, and this feature should encourage those who desire a background climatological picture of the lowest 50,000 ft. layer of the atmosphere over the region concerned. It must be recognised that there are still large areas within the region from which little, if any, relevant information has been obtained, and this reservation must be kept clearly in view, whenever the analyses here presented are used as basic material for any research or operational programme.

However, the Folio is an up-to-date source of information concerning the Antarctic atmosphere, and will prove useful not only to those associated with atmospheric sciences, but also to those whose interests only briefly enter this field of study. — E.G.E.

SOUTH TO THE POLE

(the Early History of the Ross Sea Sector, Antarctica), by L. B. Quartermain, is to be published in England on July 6. Supplies are unlikely to reach New Zealand before September.

IN PREPARATION

Philip Temple, author of "The Sea and the Snow" reviewed in our December issue, is writing a book on New Zealand mountaineers overseas, their achievements in exploration and climbing, with emphasis on the men and what they did rather than on day-to-day details of the expedition.

Bob Thomson, Superintendent of the New Zealand Antarctic Division and in 1962 Leader at the Australian Wilkes Station, is writing the story of the remarkable trek that year from Wilkes to Vostok, which he personally led.

The Photographer who Revelled in Danger

ONCE MORE ON MY ADVENTURE. The Life of Frank Hurley, by Frank Legg and Toni Hurley. Ure Smith, Sydney. 227 pp. with 32 pp. of Hurley's photographs.

This effervescent story of the life of a dauntless adventurer who was also a consummately skilled photographer should interest every reader, but particularly those who are especially interested in the Antarctic. Before we have read a dozen pages we are sailing south in Mawson's "Aurora" in 1911, and of the 220 pages of text, no fewer than a hundred are devoted to Hurley's Antarctic journeys: with Mawson in 1911–14 and 1929–31, and with Shackleton in 1914–16. The remaining pages show the same indomitable "Burly Hurley" at work in vastly different environments — in two World Wars (he and Wilkins were dubbed "the mad photographers"), high flying with Ross and Keith Smith on some of their perilous pioneer flights, among the head-hunters of Papua, or still adventuring, in the wildest corners of his native Australia.

Hurley combined delight in danger with an irrepressible sense of humour, and it is a heady mixture. Fortunately, he wrote as vigorously as he lived, and his biographers have made full use of his life-long diary to bring to startling life many of his most exciting adventures told in his own words. Here is just a typical morning during the 1912 winter at Cape Denison:

"At 7.50 a.m. the cook and night-watchman combine their voices in a raucous 'Rise and shine!' and make noise vigorously with kitchen utensils. One after another, unkempt bearded men turn out drowsily, dress, and take their respective places round the table. Water is scarce so the luxury of the toilet is postponed until the cook who attends to the ice-melter is unwatchful or favourably inclined. At 8 a.m. the cook calls 'Breakfast on the table!' The meal proceeds silently except for the night-watchman who prates jovially about the night's experiences — of wind reaching 90 miles an hour, of wonderful auroral displays, dogfights, of the garments he washed, and so on. After porridge the night's drowsiness has worn off and by the time the preserved fruits course is eaten a much more cheerful atmosphere has developed. The night-watchman, tired, has dozed off to sleep. We gleefully revenge ourselves for his disturbance of our slumbers. There is a hush — a signal is given — a whispered 'One, two, three!' — and seventeen voices cry jubilantly 'Rise and shine!' The sleeper awakens with a start."

Hurley was a "character", and readers — Antarctic or otherwise — will enjoy the story of the lightning wooing in Cairo of the vivacious and beautiful Latin soprano by "the huge Australian, resplendent in his Light Horse uniforms, complete to cavalry breeches and cockaded hat" — Hurley. They were married ten days after their first meeting.

Hurley with Bage and New Zealander Eric Webb made the great sledge-journey attempt to reach the South Magnetic Pole — "Suddenly . . . a sickening sensation of falling followed by a violent jerk. As before, I shouted to my mates, 'Right-o! haul away!' As I began slowly to ascend, to my dismay I discovered that the thin line had sawn deeply into the crevasse lid, which extended well out over my head like a roof. I came up against it with a bump and loudly made the others aware of my predicament. My position, gently swinging to and fro, and slowly rotating on the slender line, gave me qualms, but I could not help noticing the unearthly beauty of the abyss into which I had fallen.

"Presently I heard Webb's voice and observed his dull shadow stretched full length on a marble-

like ceiling overhead. Then his face peered through the opening and he told me they had managed to overturn the sledge, anchor it, and make the rope fast, and that he was going to chip away the overhanging snow.

"I called back, mocked by the hollow echo from the depths, 'Don't chop through the line!' The position was dangerous for both of us as there was great peril of the broken lid collapsing under our combined weights."

And at journey's end: "As we drew closer, we three knit together by a great comradeship and affection, our hearts swelled with thankfulness and joy over our deliverance."

There are a few errors in the background of Antarctic history, but the overall impression of high adventure lit up with sheer joy of living makes such minor flaws of little importance. As Laseron (another of the 1911–14 band) wrote: "The rougher things were, the more cheerful he became and the more he poked fun at anything and everything. One could never be downhearted with Frank, even when things were at their worst."—L.B.Q.

POLYCHAETA MYZOSTOMIDAE AND SEDENTARIA OF ANTARCTICA, by Olga Hartman. American Geophysical Union, Antarctic Research Series, Vol. 7, 158 pp.

This is the second volume of a compilation dealing with the polychaetous annelids of the Antarctic seas. The first volume dealt with the free-living or errant species. It is an extremely valuable reference work for workers on the taxonomy of polychaetes from Antarctica and adjacent areas. It will also be of great value to the benthic ecologist in sorting out the large number of species of this group which he encounters in his samples. In terms of both numbers of species and specimens they are the most abundant animals in soft bottom sediments.

Included in the volume are keys to the genera and for each species references to all Antarctic records are cited, followed by a diagnosis and a summary of the world distribution. There are figures of the diagnostic features for each species. In most cases these are copied from various authors and inevitably any errors in the original drawings are repeated. This is a drawback for many of the earlier described species.

Up to now the literature on the polychaetous annelids of Antarctica has been scattered throughout the many reports of expeditions to the region. Now for the first time a list of species with descriptions is available and the present work can be used to check back to the original descriptions. Dr. Hartman is to be congratulated on the assembly and production of this volume. It is to be hoped that it will act as a spur to other workers in the field to work up recent collections and thus sort out the many taxonomic problems which await solution.

G. A. KNOX.

Department of Zoology,
University of Canterbury.

THE LICHENS AND MOSSES OF MACROBERTSON LAND. Rex B. Filson. No. 82 of the ANARE Scientific Reports (B2) Series. The Antarctic Division, Commonwealth Department of External Affairs. 169 pp., figures, plates and maps. Price in Australia, 9 dollars.

MacRobertson Land lying south of the Indian Ocean in Australian Antarctic territory between 60° and 73° E. longitude is remote, both from the relatively species-rich Antarctic Peninsula and any major land to the north. An account of the plants to be found there is therefore of major interest. In this excellent book, Rex Filson enumerates a flora of 25 lichens (6 new species and 1 new form) and 2 mosses (1 new species). The material studied includes earlier BANZARE and ANARE collections but is mainly composed of gatherings made by the author and his colleagues during the 1962 Australian National Antarctic Expedition based on Mawson. The author reduces the number of lichen species variously recorded from MacRobertson Land from 37 to 25.

The area studied includes coastal rock outcrops, mainly between Mawson and the western boundary of MacRobertson Land, and various inland nunataks and mountain peaks. The southernmost lichens were found at about 160 km. from the coast (69° 0.5′ south) and the southernmost moss was a specimen of the new species *Grimmia lawiana* at about 16 km. south of the coast.

The introduction contains a brief account of previous work, methods used, etc., and is followed by a survey of the coastal and inland rock outcrops with descriptions of their extent, nature of the rock and degree of weathering, and a list of the species found on each of them. This is followed by a detailed botanical description of each species. After each description there is a list of specimens, first from MacRobertson Land and then from any other lands on the Antarctic Continent. The reader would have been assisted in interpreting such distribution data if the regions mentioned (George V Land, Queen Mary Land, etc.) had been marked in on Figure 3 (map of the Antarctic Continent) where the position of Mawson could also have been noted.

In an appendix on the citation of specimens it is stated that "Types representing the six new species and one new form of Lichenae and one new species of Musci described herein have been lodged in the National Herbarium of Victoria, Melbourne (MEL)". A brief additional 1964–65 collection mentioned in Appendix 2 is also given MEL herbarium numbers. But the 1962 collections are only given numbers which are defined as the "author's herbarium number".

A map of distribution in MacRobertson Land is given for each species and each species is excellently illustrated by the author, both in colour for external features and in black and white for anatomical characters.

An extensive glossary of terms used is given in an appendix.

A discussion of the geographical relationships of the flora of MacRobertson Land is not attempted, but, on present knowledge, the situation seems to pan out as follows. In the lichens, 8 species are at present known only from MacRobertson Land; 9 species are known from MacRobertson Land and other regions in East Antarctica; and 8 species are also found in West Antarctica, with 2 of them as far afield as the Antarctic Peninsula. In the mosses, *Grimmia lawiana* is so far known only from MacRobertson Land and *Bryum antarcticum* from as far away as the Antarctic Peninsula. An obvious gap in our knowledge of distributions appears to be Norwegian Antarctic territory.

The author is to be congratulated on his diverse talents, as botanical explorer, herbarium botanist, and artist, and on the prompt way in which his results have been so attractively published.

E. J. GODLEY.

WHALERS' CATCH DOWN

In the 1966–67 season up to February 4, 1967, a total of 1,807 blue whale units had been caught by the nine expeditions at work in the Antarctic, two Norwegian, four Japanese and three Russian.

Up to the same date, the Norwegian expedition had produced 36,585 barrels of whale oil and 19,475 barrels of sperm oil (corresponding figures for 1965–66, 37,785 and 22,050). The Japanese expeditions had produced 117,259 barrels of whale oil as compared with 131,810 barrels in the previous season at approximately the same time.

Dr. Phillip Law, in the first Griffith Taylor Memorial Lecture to the Geographical Society of N.S.W., said that the rate of precipitation of snow (there is practically no precipitation in the form of rain) is so low that Antarctica must be regarded as the world's greatest desert. In some places the deposition per year is as high as 35 inches of equivalent water, but over most of the continent it is less than eight inches, and inland on the high plateau of Greater Antarctica it is less than two inches.

Will American Tourists Visit McMurdo Sound?

If the hopes of an American tourist agency and the Wellington firm of Holm and Company are fulfilled, wealthy American tourists are to have an opportunity of visiting Antarctica and isolated islands south of New Zealand next January and February.

The Holm Company has chartered the "Magga Dan", a Danish ship which has made many tours of duty to Antarctica and was support vessel for Sir Vivian Fuchs' transpolar expedition in 1957.

The 1,800-ton "Magga Dan", owned by J. Lauritzen Lines of Copenhagen, is a fully-refrigerated cargo vessel with accommodation for 34 passengers. She was built and equipped for navigation in ice, and enjoys a world-wide reputation for her Arctic and Antarctic expeditions.

Tentative plans have been made for two cruises next summer.

On each cruise 20 passengers would be accommodated. The first party would join the vessel at Lyttelton, and the proposed itinerary is Scott Island, McMurdo Sound, Cape Hallett, Balleny Islands, Macquarie Island, Auckland Islands, The Snares, Milford Sound, and Sydney.

Passengers in the second cruise would join the ship at Sydney, visit the islands in the reverse direction and terminate their cruise at Lyttelton.

Captain J. F. Holm, the managing director of the company, says that "at a guess" he placed the cost of the trip at £1,500. Within a week of announcement of the cruises the agent had 30 prospective tourists seeking bookings.

"We have the 'Magga Dan' on charter for one year with the option of another year."

Captain Holm said the company was arranging a cargo for the ship to bring to New Zealand. He hoped it would arrive some time in June.

"The ship will be used mainly for trading with the Pacific Islands and the Chathams," he said. "It is equipped with large refrigerated holds which make it suitable for this type of work."

COLD WATER

There was less enthusiasm among the men who are concerned with the more "serious" aspects of Antarctic research.

Rear-Admiral James L. Abbot, commander of U.S. naval support forces in Antarctica, said that visits by tourist ships to Antarctica would be premature at this time without full co-ordination with the U.S. Navy.

The New Zealand Minister of Science, Mr. Talboys, said in Parliament that New Zealand had no facilities to help a tourist ship if it encountered difficulties in the ice in McMurdo Sound.

In areas of unbroken ice adjacent to land in McMurdo Sound it might be possible to assist by sending tracked vehicles from Scott Base.

ANTARCTIC SOCIETY

CANTERBURY BRANCH

At the recent annual meeting of the branch the following committee was elected: President, R. M. Heke; Vice-Presidents, J. H. M. Williams and Miss Rata McLean; Hon. Secretary, Mrs. E. F. Cross; Hon. Treasurer, J. A. Cross; Committee, J. Claydon, A. Anderson, F. Gurney, B. Hearfield, G. Hurrell, J. Mather, D. Stubbs, Rev. J. Keith, Mrs. D. Braxto, Mrs. M. Williams; Immediate Past President, Mr. H. Griffiths; Hon. Auditor, Miss I. Orchard.

Baden Norris, who was appointed Curator of Antarctic Relics on behalf of the branch, has also been appointed to the same position with the Canterbury Museum.

50 YEARS AGO

When the first World War broke out, there was a flourishing whaling industry in the Falkland Islands and the Dependencies. In 1912–13 two floating factories with 21 catchers were in use at South Georgia, and twelve factories with 32 catchers in the South Shetland Islands, as well as several transport vessels taking out coal and stores, and bringing back oil, guano and other products.

During the war, whale oil was in great demand as a source of glycerine for explosives and for tempering guns and armour plate. So in spite of the conversion of many factory-ships to war use and the sinking of many vessels by German submarines, production of whale-oil grew from 253,000 barrels in 1909–10 to 564,000 barrels in 1915–16, falling again to 258,000 barrels in 1917–18. (One barrel equals 40 gallons; six barrels equals one ton.) The price of whale oil in Britain rose to £62 10s. a ton, making the value of the whale oil produced in this area in the 1917–18 season about two and a half million pounds.

Although the whaling season 1915–16 was exceptionally productive, Humpback whales were decreasing in numbers. It became evident that internationally recognised legislation would be required to prevent depletion of stocks and the ruin of the industry. The British Government controlled the world's best whaling grounds, so in **1917** the United Kingdom Colonial Office, with the active support of the Admiralty, the Board of Agriculture and Fisheries, the Department of Scientific and Industrial Research and the British Museum, constituted the **INTER-DEPARTMENTAL COMMITTEE ON RESEARCH AND DEVELOPMENT IN THE DEPENDENCIES OF THE FALKLAND ISLANDS**, with the following terms of reference:

"To consider what can now be done to facilitate prompt action at the conclusion of the War in regard to the preservation of the whaling industry and to the development of other industries in the Dependencies of the Falkland Islands: and to consider not only the economic questions above referred to, and the scheme for the employment of a research vessel, but also what purely scientific investigations are most required in connexion with these regions, and whether any preliminary inquiries by experts in this country should be instituted."

The Committee met 21 times before it produced in April 1920 a 164-page Report which stressed the urgent need for greater knowledge of whales with a view to their conservation and the regulation of whaling, and strongly advocated "the employment of a special vessel or vessels . . . in order to carry out in the Dependencies scientific and economic researches" to this end.

This momentous Report led to the formation in 1924 of the **Discovery Committee**, so called because the first ship purchased and refitted for oceanographical research, in 1925, was Captain Scott's "Discovery" (736 tons), specially built for his first Antarctic expedition in 1902–4. The first "Discovery" Expedition began work early in 1925 at a Marine Station close to one of the whaling stations in South Georgia, carrying out research not only on the general biology of whales, their distribution and movements, but also marine survey, sealing and fisheries, "a comprehensive oceanographical survey".

In 1925 a smaller steel ship, "William Scoresby" (324 tons), was built with "some of the features of a trawler and some of a whale catcher",* designed for marine research and, specifically, for the firing of whale markers to enable the migrations of the marked whales to be traced. The R.R.S. **"Discovery II"** (1,036 tons), built in 1929, has a cruising range of 10,000 miles, and this has transformed the "Discovery Expedition" into a survey of the whole Southern Ocean.

Over the years, 34 "Discovery Reports" have been issued, 25 of them

* "The Work of the Discovery Committee" N. A. Mackintosh, Proc. Roy. Soc. A. 1950.

by the Discovery Committee before its work was merged in the activities of the National Institute of Oceanography in 1950. The Interdepartmental Committee of 1917 laid the foundations for a massive research programme of great scientific and economic importance, and laid them well.

(We are indebted to Dr. N. A. Mackintosh and to the Librarian of the National Institute of Oceanography for valuable assistance in the compilation of this note. — Ed.)

NEW ZEALANDERS ABROAD

GEOLOGIST

One of several New Zealand scientists who have carried on from work under the New Zealand Antarctic Programme to study in the United States and then to work under the U.S. Antarctic Research Program, is **Peter J. Barrett**, who led a four-man team during November 1966 to February 1967 studying the geology of the Central Transantarctic Mountains.

Peter hails from Hamilton and was in Vic. McGregor's Southern Party in the Queen Maud Mountains in 1963–64, working on the Liv and Strom Glaciers, Mount Fridtjof Nansen and the Duncan Mountains. Barrett geologised to a height of 11,000 feet. (See "ANTARCTIC", vol. 3, no. 9.) He is now studying at the Institute of Polar Studies, Ohio State University, where Colin Bull is Director.

Using motor toboggans, the group's task was to work across the Transantarctic Mountains between the Beardmore and Shackleton Glaciers, studying stratigraphy and structure in an effort to determine structural relations between East and West Antarctica. Their findings will be useful in interpreting the geological history of the Queen Alexandra Range of the Transantarctic Mountains.

The party was put into the field on November 16 by a C-130 ski-equipped Hercules. They were landed 40 miles from their cache, on the Polar Plateau, with Polaris toboggans, and were picked up after some delay due to radio black-outs and weather, on February 7. They covered about 900 miles of heavy hauling in two groups of two. They made some interesting finds, including a petrified log 66 feet long, and the cross section of another log which had over 200 annual rings visible. Well preserved plants were also found. (Dicroidium.)

GLACIOLOGIST

A two-year polar glacier study has been completed in the Antarctic this season by G. Holdsworth, of Christchurch, on a United States National Science Foundation grant. He left Christchurch for the United States on February 28. For the next two years he will co-ordinate and evaluate the information he has obtained.

Mr. Holdsworth first visited the Antarctic in 1962–63 as deputy leader of the Federated Mountain Club's expedition, and in the next season as a glaciologist for the Institute of Nuclear Sciences. He was awarded an Institute of Polar Studies fellowship in 1964 and left for the United States for post-graduate study at the Ohio State University.

He began the polar glacier project last season and expects to return to the Antarctic again for the 1968–69 season. The material he has obtained from his studies will be used for his Ph.D. at Ohio University where his adviser is Professor Colin Bull, late of New Zealand, the director of the Polar Studies Institute.

Mr. Holdsworth said, before leaving, that his studies had been made at the base of the Meserve Glacier in the Wright Valley, about 60 miles from McMurdo Station. Four or five persons had been in the group during his three and a half months in the field this season.

The studies had been made to discover the processes which took place at the base of a polar glacier at temperatures below freezing point. A tunnel 112 metres long, two metres high and one and a third metres wide had been driven into the glacier for the studies to be made.

The tunnel was cut with a chain saw, sawn-off miners' picks and heavy ice axes.

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Copies of our predecessor, the Antarctic News Bulletin, are available at 5/– per copy, except for numbers 9 and 10. The copies of numbers 1, 2, 3, 4, 7, 11, 17 and 18 are authorised reprints.

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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