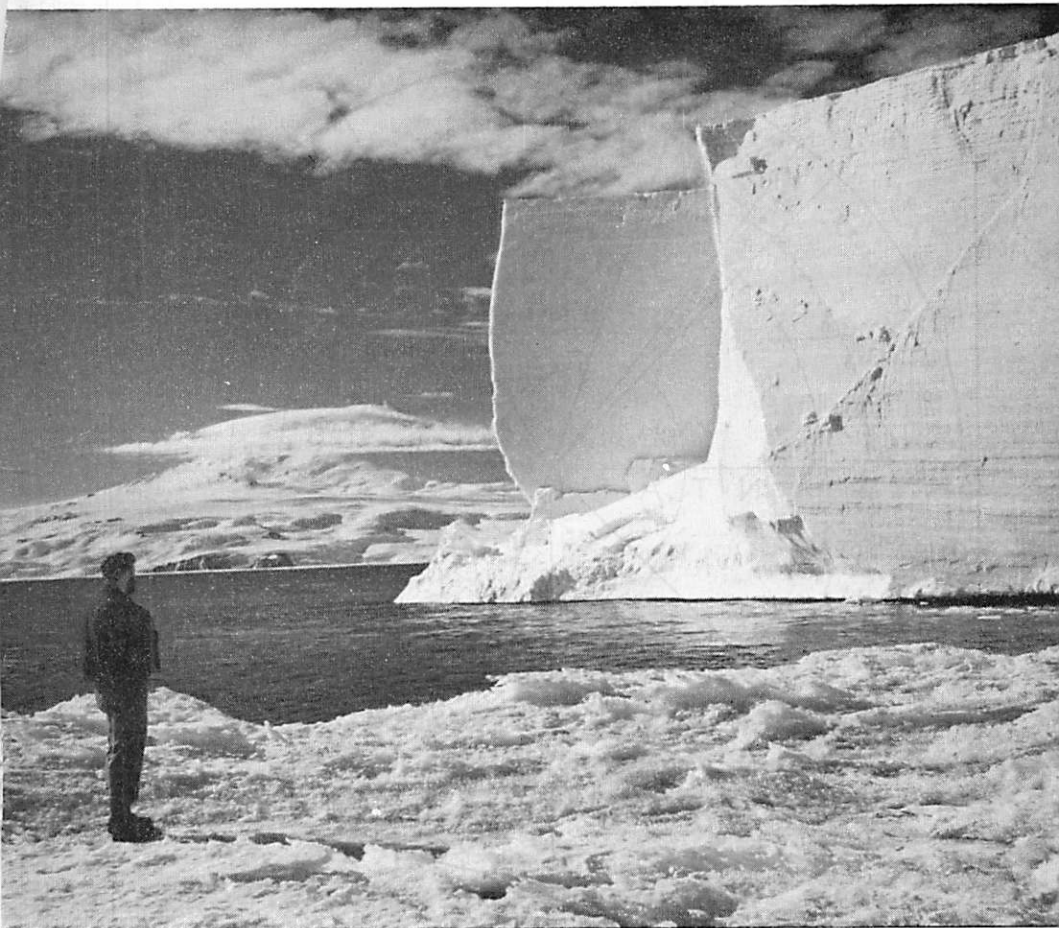


# ANTARCTIC

A NEWS BULLETIN

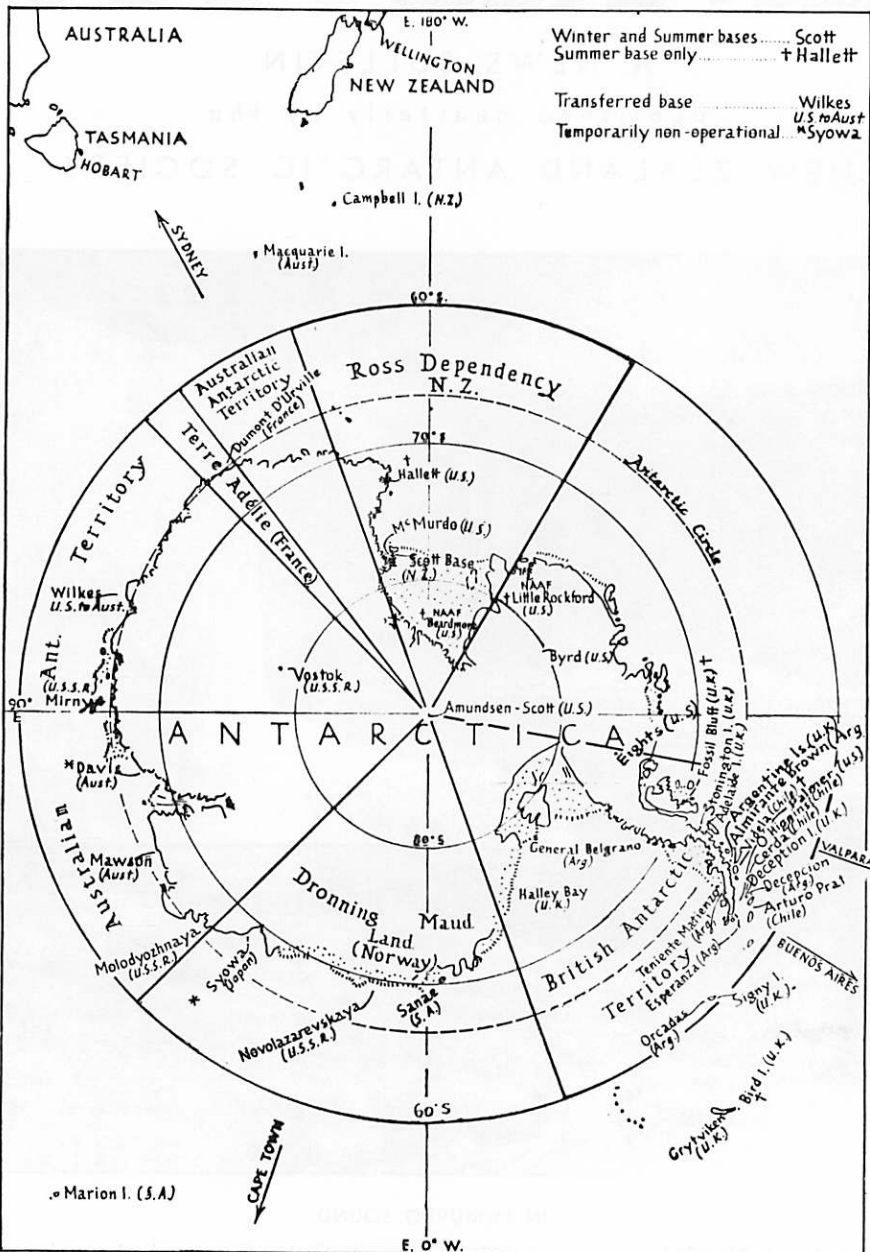
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IN McMURDO SOUND

H.M.N.Z.S. "Endeavour" crew member surveys a berg, Mt. Erebus in background.

R.N.Z.N. Official Photo.



N.Z.M.S. 161

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# “ANTARCTIC”

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# NEW ZEALAND PREPARATIONS FOR COMING ANTARCTIC SEASON

Preparations are in full swing for the 1965-66 summer field programme in the Ross Dependency, and for next year's scientific programme at Scott Base.

The scale of activities will be somewhat more restricted than in recent years, primarily because of the closing of Hallet Station for winter operations. New Zealand participation in the joint running of this station ceased in November 1964 because summer-operation only was not considered justifiable in New Zealand's case.

At Scott Base, studies in auroral physics, geomagnetism, earth currents, ionospheric physics, radio propagation, seismology and meteorology will be continued with some modification. The auroral radar equipment will be temporarily withdrawn in December 1965.

## FEWER DOGS

There is no intention to abandon the use of dog-teams for field work, but the proved effectiveness of motor toboggans for certain types of operation has made it unnecessary to maintain as many dogs at Scott Base as in previous years. At the peak period for field survey work in 1960-61 the Scott Base dog population numbered nearly 100. During the coming year the numbers will be reduced to 30.

These modifications will make possible the reduction of the Scott Base winter party from 13 to 12.

## FIELD WORK

The extensive dog-sledging journeys of the past nine years have virtually completed the topographical and geological reconnaissance of the Ross Dependency. The results are enshrined in the series of maps produced by the Lands and Survey Department and in the numerous scientific papers published in the New Zealand Journal of Geology and Geophysics and in many other publications. The programme for the 1965-66 summer is designed to fill the

relatively small gaps remaining in the reconnaissance survey of the Dependency, and to continue the specialised studies of particularly interesting areas which the earlier investigations have revealed.

The major expeditions planned are as follows:

**BEARDMORE GLACIER.** A four-man party will spend four to six weeks studying the stratigraphy of the coal measures and limestone of Mounts Buckley and Darwin at the head of the Beardmore Glacier, first seen by Shackleton's southern party in December 1908, in 84° 59' S and 85° S respectively. Mt. Buckley is named after George Buckley, a New Zealander who accompanied the expedition on the "Nimrod" as far as the pack-ice, returning to New Zealand on the towing-ship "Koonya".

**CAMPBELL GLACIER VALLEY.** A four-man party with either motor toboggans or dogs will spend four to six weeks on a geological study of the western side of Campbell Glacier in northern Victoria Land. This low-gradient, two and a half mile wide glacier was first explored by the Northern Party of Scott's Last Expedition in January, 1912, and is named after the leader of the party, Lieut. V. L. A. Campbell.

A New Zealand team, Gair (leader), Pain, Tobin and Sheehan dog-sledged down the glacier in January, 1963, and carried out geological work, chiefly on the eastern side. They were air-lifted out from a point about 20 miles up the glacier from Mount Melbourne. The 1965-66 team plans to strike in near Mt. Dickason and to work up-valley. They may share a common base with the Victoria University team working at Inexpressible Island.

The glacier flows slightly east of south to the west of Mount Mel-

bourne, into Terra Nova Bay. The lower portion of the glacier, south from Mt. Dickason to the Boomerang Glacier, is known to be badly crevassed.

**ICE SHELF PROJECT.** A three-man party will continue the long-term study of the McMurdo Ice Shelf. A separate party will undertake a drilling and geophysical programme on the ice shelf.

**NUCLEAR SAMPLING.** Sampling of snow, ice and water by the Institute of Nuclear Sciences, D.S.I.R., will be continued, in order to provide information both on natural nuclear products and on the product of nuclear explosions. The sampling will be done by men engaged on other projects, and will, it is hoped, extend from New Zealand to the South Pole.

**VICTORIA UNIVERSITY OF WELLINGTON.** A four-man team will study the well-exposed basement complex at Inexpressible Island, northern Victoria Land. They will be given U.S. aircraft support, but on the site will operate on foot. Biological observations will also be made and salt deposits investigated. It is expected that this programme will occupy about three weeks. Further work will probably also be carried out in the Wright and Taylor valleys, occupying about four weeks.

**UNIVERSITY OF CANTERBURY.** The biological work of past seasons will be continued by an enlarged group of seven men from the Zoological Department of the university. They will study the Adélie penguins, Weddell seals and skuas of the McMurdo Sound area and the Emperor penguin colony at Cape Crozier.

**DOMINION MUSEUM, WELLINGTON.** Three men will be working at Hallett Station and two men at Cape Bird.

**H.M.N.Z.S. "ENDEAVOUR".** During the supply voyages of "Endeavour" between New Zealand and McMurdo Sound, oceanographic and magnetic observations will be made and sediment thickness measurements taken.

Again a special cruise will be made to the south and west of New Zealand for scientific purposes.

## WINTER TEAM FOR SCOTT BASE

**M. M. Prebble.** Leader. (See last issue.)

**Dr. A. Porter (27),** Wellington. Senior Scientist. Dr. Porter was born in Newfoundland and was educated at the Grand Falls Academy, the University of New Brunswick (1954-59) and Syracuse University (1959-61). He studied forestry and physics, and was a chemical engineer in Australia before coming to New Zealand in January this year. He has been working as a wood physicist.

**D. M. Randell (22),** Levin. Technician. Mr. Randell is a technician in the Post Office. He was born in Levin and attended Horowhenua College. He worked for eighteen months with the N.Z.B.C. in Wanganui and then was engaged on construction work at the Levin Post Office.

**R. Vickers (23),** Wellington. Technician. Born in Wellington, he attended Rongotai College and Wellington Technical College (1955-59). He was employed in radio engineering, 1960-64, and this year has been engaged in aviation radio.

**I. P. Johnson (26),** Gisborne. Senior Technician. Born at Wanganui and educated at Wanganui Technical College. Mr. Johnson is a radio technician. He recently spent a month at the Chatham Islands at the request of the "ham" radio enthusiasts of America. He was at Campbell Island in 1959-60 and again in 1961-62, and also served on Raoul Island for the two-year period 1962-63-64.

**N. N. Dewson (41),** Auckland. Base Engineer. Mr. Dewson, who was born in Auckland, is a Naval rating. Leaving Napier Boys High School in 1939 he served in the R.N.Z.N. from 1942 to 1965 as an engine-room artificer and chief engine-room artificer. He is married and has one child.

**T. O. McGeough (38),** N. Ireland. Fitter Mechanic. After nine years at Derrylatinee P.E.S. Mr. McGeough became an apprentice motor mech-

anic. He left Ireland in 1950 and worked, chiefly as a heavy-duty mechanic, in Australia, New Guinea, Arabia, Canada, the Spanish Sahara and California before coming to New Zealand this year.

**A. G. Junge** (22), Te Aroha. Fitter Electrician. Mr. Judge was born in Rangiora and was educated at schools there and at Taumararui and Pukekohe, leaving Pukekohe High School, where he was prominent in sport, in 1959. He is an electrical fitter by trade.

**A. C. Davidson** (25), Levin. Cook. A naval rating, Mr. Davidson was born in Hastings and attended Napier Boys' High School. He joined the Navy in 1958 and served as a chef at Waiouru Camp and on "Otago", "Taranaki" and "Rotoiti". He is married and has one child.

**G. Ternahan** (24), N. Ireland. Radio Officer. Mr. Ternahan was born in Belfast, N. Ireland, and educated at Annandale Grammar School and at the College of Technology, Belfast, 1958-60. Until 1964 he was a marine radio officer with the Marconi Company in England, and before arriving in New Zealand, hitch-hiked through many countries, working as necessity arose.

In addition to the above, two men who will be serving as field assistants in the coming summer will be wintering at Scott Base. They are:

**R. O. Bartlett** (23), Warrington, Otago. Born at Wanganui, Mr. Bartlett attended Heretaunga College and Otago Boys' High School. He joined the Forest Service in 1960 and has served as a forest ranger in Southland, Nelson, Westland and Canterbury.

**A. C. Rayment** (26), Brighton, England. After attending primary and secondary school at Brighton he was an apprentice carpenter till called up for two years' national service. He then worked at his trade (for some time in Switzerland), but last year set out in a Land-Rover and travelled through Europe, the Middle East, and India before coming to New Zealand.

## SUMMER PARTIES

The following men have been selected by the Antarctic Division to carry out the projects planned for the 1965-66 summer.

### FIELD TEAMS

#### Campbell Glacier

D. R. C. Lowe, Leader, Mr. Lowe is wintering at Scott Base.  
R. G. Adamson, Senior Geologist.  
R. J. Cavaney, Geologist.  
D. R. Bates, Field Assistant.

#### Darwin and Buckley Nunataks

A. C. Bibby, Leader.  
D. J. Young, Senior Geologist.  
R. J. Ryburn, Geologist.  
A. C. Rayment, Field Assistant.

#### McMurdo Ice Shelf

A. J. Heine, Leader.  
K. Lloyd, Surveyor.  
A. Sim, Assistant Surveyor.  
R. O. Bartlett, Field Assistant.

#### Ice Shelf Drilling Programme

Dr. M. Hochstein, Geophysicist.  
G. Risk, Geophysicist.  
J. H. D. Hill, driller.  
B. T. Muddiman, driller.

### SCOTT BASE

W. J. Webb, Deputy Leader. Mr. Webb is a 28-year-old consulting engineer from Invercargill with wide sporting, tramping and climbing experience.  
I. Smith, Postmaster, Assistant Radio Officer.  
J. T. Murphy, Public Relations Officer.  
R. D. Greeks, Carpenter.  
C. E. Hough, Mechanic (wintered 1965).  
G. H. Banfield, Assistant Maintenance Officer.  
R. G. Rae, Assistant Maintenance Officer.  
J. M. Feist, Storekeeper.

The members of parties organised by other institutions are as follows:

#### Victoria University of Wellington

Dr. E. Ghent, Leader.  
R. A. Henderson (served on V.U.W. A.E. 8), Deputy Leader.  
G. P. Hancox.  
Ian Smith.

#### University of Canterbury

I. Spellerberg (leader in field): skuas.  
R. Kirk: climate, micro-climate.

G. Yeates: Adélie penguins.

John Darby.

Ian Harkess: seals, 2nd year.

Ian Stirling: a Canadian M.Sc.

**Dominion Museum** biological team,  
Cape Hallett.

F. C. Kinsky.

J. H. Cranfield.

Dr. E. Choate (Univ. of Otago).

Dr. Ewan Young (Univ. of Canterbury), in an independent summer programme, will continue his skua studies at Cape Bird.

B. E. Reid may also work for a brief period at Cape Hallett.

Also working with the New Zealand team this summer as usual will be a number of youth-group members, in this case two Boy Scouts and two members of the Boys' Brigade. The boys selected are:

#### Scouts

Ian Maxwell, Invercargill.

Bill Atkinson, Auckland.

#### Boys' Brigade

Sgt. Paul Russell, Wellington.

Cpl. Trevor Hayes, Blenheim.

(Reserve: Sgt. Ross Porter,  
Napier).

### TRAINING COURSE

As usual, the teams to serve in the Antarctic during the coming summer, including the men who will then winter over throughout 1966, were required to undertake a rigorous course of training on mountain country, this year from August 13 till August 20.

A new feature was the fact that after a preliminary two days of lectures at Waiouru Military Camp, the whole party moved by Army trucks to Mount Ruapehu and lived from then till the end of the course in two Mountain Club huts at the end of the Top of the Bruce Road, 5,500 ft. up the mountain. Here the men received practical instruction and experience in field organisation (camping routine, tent pitching, radio operation) and mountain craft (step-cutting, roping up, etc.), with lectures in the evenings on snow and ice techniques, personal health and hygiene, field work and first aid in the Antarctic, and on Antarctic clothing and equipment. Practice in skiing and climbing occupied the whole of the final day.

## AT SCOTT BASE

The news items below are taken by permission from "News From the South", the winter monthly newsletter for the next-of-kin and other friends of the men wintering over at New Zealand Antarctic bases.

At the end of June, the correspondent at the Base reported:

"Since the last letter, the major event has been the arrival of Doug Foster-Lynam's first child—a boy. 'Yogi', as Doug is affectionately known to us, is a cheerful hearty person and his very evident joy on receiving the goods news brightened the Base to no small degree.

"Queen's Birthday was marked by a social function to which each of us invited an American guest including our good friend, Igor Zotikov. Toasts to Her Majesty, President Johnson, and the President of the U.S.S.R. were heartily responded to and once again the international cordiality that is a feature of Antarctic life was demonstrated. A buffet supper was served and a pleasant time ensued.

"The great Polar festival—Mid-winter Day—was observed in traditional fashion with a superb dinner prepared by John Haycock, who really let his talents have full rein. This was followed by the usual informal get-together and the day ended with everyone in a most happy frame of mind. We gave the occasion full respect by wearing our almost forgotten civilian clothes. A common complaint was that waistbands, together with shoes, appeared to have shrunk during the last nine months.

"On the 19th, we entertained McMurdo people at darts and a social, and on the 20th they returned the hospitality. Our relations across the way are very good.

"Several groups ascended Observation Hill recently and obtained excellent photos of the lights of McMurdo Station and Scott Base. Flares were sent up from Scott Base to further enlighten proceedings. The ice caves also still have their patrons, armed with flash light and camera."

As a goodwill gesture, the Sunday cooking at McMurdo was done by a party from Scott Base.

### THE "INVASION" OF McMURDO

"In the dark of the July 4 afternoon, while McMurdo lay silently under its mantle of snow, the rat-tat-tat of a kettle drum was heard and a small British Force appeared from nowhere to march down the main street, initially unopposed. They were dressed as General Cornwallis troops of 1776 in red coats and white breeches, armed with muskets and dragging a cannon on wheels. That cannon, when fed with signal flares and supported by smoke bombs, was the decision of history.

"The alarm was given just before the British troops reached the mess hall, when a powerful American Force quickly established a road block and a patrol carried out an encircling movement to cut the British line of communication. But the British kept advancing, undeterred by the hail of snow bombs breaking in their ranks, until in no time at all they were overpowered, trussed up hand and foot and placed in stocks, the newness of which indicated a fore-knowledge of their need.

"Just when all seemed lost a courageous British gunner managed to light a red signal flare in his cannon, with which he then charged through the enemy ranks throwing them into great confusion, allowing General Cornwallis to regain his dignity and read the terms of surrender. Briefly, they demanded the hand-over of all American Forces, including female camp followers, for safe custody, together with all military stores and munitions, plus the payment of £500 in compensation for several ship loads of good tea wilfully destroyed by immersion in sea water. A further clause, in compliance with the system which claims all men are equal, decreed that all American officers be stripped of their rank. This application of psychological warfare momentarily brought victory close.

"The British demands were rejected, whereupon a request was politely made for transport back to

Scott Base. The reply to this was withheld and instead the British General and his troops were offered an honourable parole, their arms were returned, and they were escorted to the wardroom where the discussion of the battle was to take as long as the battle itself.

"Both sides agreed that it was a most memorable 4th of July."

### COMING UP

"Spirits are rising as the first faint light of approaching dawn appears in the northern sky around midday, and everyone is looking forward to getting home."

A Scott Base report on August 2 said:

The temperature at Scott Base is still 90 degrees below zero, but spring is on the way.

Though the sun won't peep above the horizon for three weeks, its light is reaching higher and becoming more powerful.

It came suddenly a week ago, when a powerful glow lit the northern sky at noon, running in a reddish line along the horizon and rising in a great pale emerald green arc behind Mount Erebus. Then it faded into the starlit sky.

### OUT WITH THE DOGS

On August 1 the base party called it daylight and the two-hour noon glimmer was long enough to take the huskies on their first spring run.

During the long Antarctic night the 27 dogs have been chained to long wire spans just out of sight of the base. In yesterday's pale new daylight the dogs went crazy as the dog handlers arrived with sledge harness.

As the animals were slipped from their chains and taken to the sledge they fought viciously. The sledge party waded into the dogs wielding rope ends to break up the scrap, but the dogs loved every minute of it and their thick fur prevented any serious injuries.

With the scrap ended, the dog handlers harnessed the team and the sleds whipped away over the snow.

This was the spring run, and now the winter night is as good as over.



## ZOOLOGIST STIRS UP A HORNETS' NEST

Dr. Bernard Stonehouse, in an address to the 11th New Zealand Science Congress, Auckland, 1965, published later in "New Zealand Science Review", 23 (1), 1965, spoke frankly and in places provocatively about Animal Conservation in the Antarctic. The publication of some of his more pungent remarks out of context in New Zealand, and particularly Australian newspapers, aroused considerable indignation among New Zealand Antarctic men.

Dr. Stonehouse, as Reader in Zoology, University of Canterbury, and as an Antarctic man himself with many years of experience in the Antarctic Peninsula area and in the Ross Dependency, speaks with considerable authority on the problem of man's incursions into the world of the penguins and the seals. It is unfortunate that garbled versions of what he said should have been given wide publicity. The angry reactions from men who are themselves eager to protect the Antarctic fauna from injury, but now feel themselves branded as vandals in the eyes of the world, is perfectly natural and in justice to them and to Dr. Stonehouse himself it seems desirable that the main points he stressed should be reproduced in his own words.

"Continuous slight interference by well-intentioned visitors may break the breeding routine of a penguin colony and drive away young birds attempting for the first time to establish territories."

"Hunting for dog-food can be a serious danger to local animal stocks."

But Dr. Stonehouse also reminded his hearers that the representatives of twelve nations had "recommended a code of rules which, if ratified and encouraged by governments, could give Antarctica the status of an international wild-life reserve."

"With very little effort man can improve his sad reputation and keep Antarctica, if no other country, safe for its native animals."

Dr. Stonehouse's strictures on cer-

tain other aspects of the Antarctic scene will be shared by many who at the same time may feel that some of his statements are exaggerated (see, for example, the letter "Killing of Seals" in "The Reader Writes", page 160). Certainly, few if any New Zealanders have seen an Antarctic lake filled "with all the slovenly litter of a village duckpond". It must be added in fairness that the headline in one Australian newspaper, "Sub-Zero Slum in Antarctic", is an Australian journalist's brain-child, not Dr. Stonehouse's.

Dr. Stonehouse in his address made it quite clear that some of the actions and attitudes he deplores were observed in areas outside of New Zealand's Ross Dependency, and in years past. But this was not made clear in the newspaper reports allegedly based on his address. It is our purpose here to stress that a large proportion of Dr. Stonehouse's remarks are not applicable to New Zealanders working in the Ross Dependency, most if not all of whom are as anxious as he is to conserve the unique fauna of the Antarctic. All for instance must commend the successful efforts of Dr. Stonehouse and others to put a stop to the practice of landing V.I.P. laden helicopters on frozen lakes adjacent to penguin rookeries "scattering breeding birds in all directions".

This is a case where a few injudicious remarks magnified and placed in wrong perspective by journalistic sensation-mongers have marred the effect of a generally thoughtful and constructive address.

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### FOR LONDON

One of the three Ferguson tractors with which, in 1957-58, Sir Edmund Hillary, Peter Mulgrew, Jim Bates, Murray Ellis and Derek Wright made the first journey to the South Pole overland since Scott, left New Zealand on board the cargo-ship "Wai-pawa" in March en route to London's Kensington Museum. Another is in the Technology Museum in Auckland.

# SOIL STUDIES IN THE ANTARCTIC

by Peter R. Stevens and J. D. H. Williams

During late November and early December 1964, J. D. H. Williams and P. R. Stevens, members of a two-man expedition sponsored by Lincoln College, were based at two ice-free areas on the west side of the Koettlitz Glacier, McMurdo Sound. Mr. R. H. Wheeler and others (Victoria University of Wellington Antarctic Expedition 1960-61) had previously mapped the moraine areas and identified them as having been formed during four major phases of glaciation during the Pleistocene.

It was hoped that the moraines would reveal differences in degree of soil development, due to their different ages. After examination of the "soils" in the field, they were sampled at sites which were similar in relief and geological composition. As the sites were all from a fairly small area, it was assumed that climate, another major factor in soil development, was constant.

The party first investigated the area around Cape Chocolate, where delta terraces, formed by changes in sea level and the action of summer streams from the Hobbs and Salmon Glaciers, existed in addition to the moraines. They then moved 25 miles south to a camp near Lake Alph, an area virtually snow-free even in November. While there they were visited "out in the field" (emerging from sleeping bags) by a party which included the Minister of Agriculture (the Hon. B. E. Talboys) and the Chairman of the National Research Advisory Committee (Mr. J. T. Andrews). The previously perfect weather and midnight sunbaking was marred at this camp by a five-day blizzard with severe winds but no snow, unlike Scott Base, which had several feet.

In Antarctica, with its cold, dry climate and absence of vegetation, soil development processes are slower than anywhere else in the world, excepting the Arctic. Nevertheless, areas are known where weakly developed soils, probably of great age and possibly even relicts of the pre-glacial era, have been found.

On the west side of the Koettlitz Glacier, horizon differentiation (the formation of layers of different colour, texture and structure) was very slight. Nevertheless, some observations (few of them original) can be made:

Young moraines were uneven in surface, ice-cored, pitted with kettleholes, highly unconsolidated, and displayed salt accumulation (largely sodium sulphate) in places which received melt water during the summer. The older moraines had smooth surfaces, were more consolidated, and salt accumulation was confined to the formation of calcium carbonate "skins" on the undersides of stones. Polygon cracks were deeper, wider and better defined on young moraines, and the permafrost table (which was usually indistinct, presumably due to the dryness of the area) was closest to the surface on the oldest moraines. However, these effects may have been due to differences in altitude; the oldest moraines being also the highest. The highest of the moraines seems to lie consistently between 1,200 and 1,500 feet above sea level along the Koettlitz west side, and appears to correlate with similar terraces on Brown Island.

At the end of the trip two days were spent at Cape Royds looking at soils under past and present penguin rookeries. Digging through the surface cover ("lag gravel") of kenyte stones revealed the sites of several abandoned penguin colonies. These were sampled with the object of tracing changes in the chemical composition of guano with age, and its effects, if any, on the weathering of the kenyte underneath. Horizon differentiation in the guano deposit itself was evident; upper layers were dull white and those below bright yellow.

In the absence of distinct physical changes, it is possible that the degree of alteration of easily weathered minerals such as apatite may give some indication of the relative ages of the moraines.

# NOTABLE LANDINGS ON THE BALLENY ISLANDS

B. C. Waterhouse\*

During the recent Balleny Islands cruise some notable "firsts" were achieved, among which were helicopter landings upon previously virgin Sturge Island, and a landing on the ice-cap of Sabrina Islet.

The Balleny Group form a chain of volcanic islands extending over a length of roughly 100 miles between 300 miles and 400 miles north-west of Cape Adare, Antarctica. The most southerly, and largest of the group, Sturge Island, had, prior to the 1965 Expedition, resisted all recorded efforts to land upon its precipitous shores which rise in sheer ice or rock walls for many hundreds of feet. It

is appropriate to note, however, that even now this giant of inaccessibility has only allowed of a very brief touch landing lasting a few tens of seconds, and two harness and winch drops of longer duration. Sturge Island is thus technically conquered — but only just.

The landing on the ice-cap of Sabrina was accomplished in a rising wind but without incident. From the landing site, later established as the surveyors' base camp, traverses were made to the summit and to the beach via a steep rock and ice pen-guin track.

\* N.Z. Geological Survey, Auckland.



BACK ON "GLACIER" AFTER THE FIRST LANDING ON STURGE ISLAND  
New Zealanders B. Waterhouse, M. R. J. Ford (who landed); Americans F. Lobb  
and K. Kleiber (pilots), J. Shoup, (Crewman Stewart absent).

Dominion Museum—F. O'Leary photo.

### STURGE ISLAND

On the morning of January 31, 1965, a party from U.S.S. "Glacier" comprising M. J. Ford, N.Z. Lands and Survey Department, J. Shoup, University of Hawaii, and the writer, were flown by helicopter to a point roughly mid-way along the west coast of Sturge Island. The object of the flight was to make a landing at a suitable location for the purpose of establishing a surveyors' base camp, and for collecting geological and biological specimens.

Close inspection along some three or four miles of the west coast showed that in this locality at least prolonged landings would be highly dangerous because of the frequent avalanches, and land traverses limited to distances of a few hundred yards because of ubiquitous and crevassed ice. Finally, however, a very poor site was selected near the base of an ice-free rock wall and a touch landing lasting perhaps 10 seconds was made during which time Malcolm Ford jumped out and gathered up a handful of rocks.

#### "BY HARNESS AND WINCH"

In the evening of the same day, and during the interval between snow showers, a party consisting of F. O'Leary and C. J. R. Robertson, both of Dominion Museum, Wellington, and the writer, were flown off "Glacier" from near the southern extremity of Sturge Island. Two landings by harness and winch were made by the writer, on rock outcrops near the south-eastern extremity of the Island, near the end of a prominent ice tongue east of Cape Smyth; and although these outcrops might be considered islets, they were, at the time, land-tied by an ice-capped shingle spit. During this exercise, the helicopter remained airborne, largely as a precautionary measure against sudden snow showers which were encountered at frequent intervals. Nevertheless, even though movement on the rock was restricted, the writer collected good samples of in situ rock for a radius of about 15 ft. from the helicopter.

#### SABRINA ISLET

On February 3, 1965, a reconnaissance flight over Sabrina culminated



Barry Waterhouse collects rocks from a small island east of Cape Smyth, Sturge Island—January 31, 1965.

Dominion Museum—F. O'Leary photo.

in three parties being landed on a wind-swept saddle some 320 ft. above sea level near the southern end of the islet. The saddle represents an ice carved bench cut in basalts, and affords the only comparatively flat area on the islet, a factor which influenced the surveyors in establishing their base camp nearby. Later, this site was swept by winds exceeding 100 knots which kept the surveyors pinned down for three days, but it appears that it is the only relatively safe place on the islet since high seas made the beach quite uninhabitable.

The path from the saddle to the beach is via an initially steep and exposed penguin track to a lower ice carved bench at 150 ft. above sea level. From here to within roughly 100 ft. above the beach, the traverse is easy, but the final 100 ft. is over hard glazed ice which requires the use of crampons, or necessitates step cutting. Once on the beach, where previous helicopter landings have been made, traverses can be made with ease along its entire length of about three-quarters of a mile.

A traverse from the saddle to the

## FRANCE PREPARES

Preparations for TA16 and for next summer's programme at Terre Adélie are proceeding apace. Expedition Leader for TA16 is René Merle who will be wintering for his fourth time. Bernard Morlet, who previously wintered in 1958, will be the Scientific Leader on this expedition. The winter party will number 30, of whom several are "anciens" (O.A.E.'s).

It is expected that the summer party will number 25 men. Paul-Emile Victor will accompany the expedition as he has done each year. Robert Guillard and Marcel Renard will participate in the activities of the summer programme.

Included in the programme are several important construction projects, including the "communal" building, water and telephone installations, sleeping quarters for summer personnel and a third gas-oil container. On the scientific side, outstanding is the installation of the ionosphere station provided with the most modern equipment.

### TIME TABLE

The chartered vessel "Thala Dan" will depart from le Havre in mid-October, arriving at Hobart on December 2 and at Dumont d'Urville on December 11 or 12. Cargo should be unloaded by the end of the year. The vessel will then return to Australia for service with ANARE, but will call at the French base with nine additional wintering men on board about January 16. "Thala Dan" will return to Dumont d'Urville on March 3 and leave for Hobart two days later.

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summit at roughly 500 ft. above sea level was accomplished without difficulty. The path lay northwards along the crest of a rock ridge composed of scoriaceous basaltic fragments and volcanic debris. The summit is flat from east to west, but in the northern and western extremities the ice cap ends abruptly above sheer rock cliffs, and safe movement is restricted to the eastern and southern quadrants.

## BASE ROI BAUDOIN

Information received from the Belgian-Dutch expedition at Base Roi Baudouin indicates that the expedition is fulfilling its programme according to plans.

The buildings are now covered by over one metre of snow. Owing to the subsidence of the floor important maintenance work has had to be carried out. A shelter for the dogs and for the smaller vehicles has been excavated.

Mid-winter Day was celebrated according to Antarctic tradition and custom.

Maximum and minimum recorded temperatures in June-July were: July, max.  $-11.1^{\circ}$ , min.  $-30.3^{\circ}$ ; July, max.  $-11.6^{\circ}$ , min.  $-39.4^{\circ}$ .

An important part of the work of the winter personnel has been the exchange of telegrams giving lists of the available stock of food and spare parts, as well as recommendations concerning the different technical and scientific branches. This information is welcomed by the Brussels office of Expédition Antarctique Belgo-Neerlandaise, where the expedition which is to take over the base in the coming summer is now being prepared.

## NORWAY

Although no Norwegian Antarctic base has been in operation since December 1959, and no expedition is planned for 1966, Norsk Polarinstitutt has continued to publish reports of the Norwegian-British-Swedish Expedition of 1949-52 and of work at Norway Station from January 1957 until the base was occupied temporarily by a South African team in January 1960. The latest is "On the radiation balance and micrometeorological conditions at Norway Station" by T. E. Vinje, 1964. Two maps of sections of Dronning Maud Land were also published last year.

# AUSTRALIAN TEAMS MAKE ARDUOUS WINTER JOURNEYS

Features of life at the two Australian continental stations during the winter months have been a number of field journeys, chiefly for biological research and to the station being rebuilt to take the place of the old Wilkes Station.

## MAWSON

In May, with mid-winter approaching, only three hours of sunshine were being experienced with the long twilight hours providing very beautiful sunrises and sunsets.

In mid-May a survey party camped near Fischer Nunatak erected a beacon on Onley Hill. Meanwhile Paul-ton had spent much time on the plateau and the harbour ice with radiation equipment.

Sea ice breakout somewhat curtailed the dog team activities, but Bensley, Carter, Gordon and Baggott managed to do a few short trips, despite interference by the young pups.

May ended with a short, but furious blizzard, which deposited heavy snow drifts round the camp and broke out much of the freshly formed sea ice. The survey party had returned to Fischer and spent three days confined to their sleeping bags, unable to leave the caravan.

This May was one of the warmest on record with an average temperature of 9°F, with extremes of plus 25°F and minus 15°F. During three blizzards, wind gusts up to 105 m.p.h. were recorded.

## COLD CALM JUNE

Visits were again made to Fischer Nunatak during June, this time by two dog teams.

Mid-winter day was enjoyed with a magnificent feast prepared by cook Ritchie. An uninvited guest, husky Jenny, joyously trotted off with a freshly cooked ham placed outside to cool.

While May's weather was unusually mild, June was a near record month for low temperatures. The maximum temperature was 17.5°F,

with a minimum of minus 17.6°F and an average temperature of minus 5.9°F. Nevertheless, with a maximum wind gust of 65 m.p.h., and no blizzards, Mawson experienced a calm month.

## COLDER STILL

Mawson had a spell of fantastic clear, calm days for the greater part of July. Conditions such as these have only one drawback—it gets cold. The men watched with fascination as each day the temperature dropped until minus 30°F (or 62° below freezing) was reached. By this time no one was very keen to remain outdoors for long, and the field party that was preparing to leave for Auster Rookery were not over-happy with the prospect of spending five days or so in such cold conditions. All others on the station were keen to see the mercury fall a bit lower in an effort to record the lowest temperature ever recorded at Mawson, surpassing the -31.8°F of 1962. Unfortunately for the would-be record breakers, blizzard conditions set in with the corresponding rise in temperatures. The Field Party's E.T.D. was put back until conditions eased.

## FIELD JOURNEYS

July was an active month as far as field trips were concerned. It began with a shakedown trip to Gibbney Island by Corry, Bensley, Lachal, Baggott, Watson and Cameron. As a shakedown trip they certainly shook—it was cold. However, all learnt from the trip and the run was beneficial to the dog teams. This trip was closely followed by two others, one to McNair Nunatak, about 25 miles south of Mawson, where Corry, surveyor, was to erect a survey beacon. The other trip was

to Taylor Glacier to conduct biological research at the Emperor Penguins' Rookery, and to check conditions of the hut and depot last visited in 1962. Unfortunately, neither team fully achieved their objectives. Corry and his party reached McNair, using two dog teams, but failure of the rock drill prevented the erection of the beacon, which they assembled and depoted on the site. They also established a small depot at the foot of McNair before beginning an exhilarating 25-mile run home in four and a half hours.

The other team, taking two Polaris motor toboggans for experience, encountered fuel lead and carburettor troubles. These factors, plus considerable drift worries and lack of fuel, caused it to return after having crossed the most difficult section of the route, Jelbart Glacier. Their final day's run of 30-odd miles in four hours' running time augurs well for the future use of Polaris Sno-Travellers once modifications are made to the fuel leads, etc.

The next trip was another sea ice trip by motor toboggan to Auster Rookery, 30-odd miles east of Mawson. The party comprised Woinarski, Vrana, Corry, Allison and Gavaghan. Unfortunately, the party failed to locate the rookery and were only able to sight two dozen or so Emperor penguins. Fuel and vehicle trouble necessitated a return to Mawson. Preparations were being made for the long run to Kloa Rookery. This was to be the longest dog team field trip. Leader Bensley and his team of Watson, Baggot and Lachal were to be accompanied as far as Taylor Glacier by a party travelling by Polaris which was to carry a supply of dog food to depot for the Kloa team for its return run.

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### PHYSICIST FIRST DIRECTOR MAWSON INSTITUTE

Dr. Jacka, formerly on the staff of A.N.A.R.E., has taken up a position as first Director of the Mawson Institute for Antarctic Research at the University of Adelaide.

### WILKES

At the beginning of May the autumn traverse party of six men led by Lanyon were still in the field on the glaciological study of the ice-dome near Wilkes Station.

A special feature of the glaciological work was the use of tellurometers — extremely accurate electronic instruments which can measure distance with an error of only one or two inches in 10 miles.

Combining this method with the geophysical technique of seismic sounding, the party surveyed a 210-mile line of markers established last summer on an extensive ice dome near Wilkes.

The same markers are to be re-surveyed for a number of years, beginning next summer, to reveal the motion and distortion of the ice in this region.

This programme will help scientists to understand more clearly how the whole Antarctic ice cap is changing.

Before its return the party was immobilised for 15 days by severe blizzards.

The team covered more than 200 miles in two Snowtracs, with two tractors pulling caravans, fuel, spare parts, and seismic sounding and other equipment.

Lanyon said three of the men suffered frostbite when the temperature fell to minus 38° while they were trapped in a series of 15 blizzards.

### MORE FIELD TRIPS

The Vanderford Glacier traverse party of four men led by Hicks, the station doctor, left almost immediately after the return of Lanyon's party, and on May 25 a further party set out for Satellite Station S2, this party led by Bennet.

The S2 party defied the approaching lack of daylight and low temperatures by taking tractors and snowtracs 50 miles inland on a combined scientific and fuel depot-laying trip. They also took a great quantity of empty fuel drums to better mark the route to the inland station. While pinned down for a week by blizzards their main concern was whether they would be back for the mid-winter celebration, but they made it with days to spare.

### MID-WINTER

A five-course meal with a menu printed in French was served to the 23 men at Wilkes to celebrate the shortest day of the year.

While this was going on, the tail-end of a 100 m.p.h. blizzard raged outside in a temperature of 40° below zero. Snow covered the huts, and the darkness was only broken by two hours of sun, low on the horizon.

"But it was a real party atmosphere inside," said leader Lanyon. "The temperature was a comfortable 70°, and we wore tropical shirts and light trousers.

"We began with hors d'oeuvre, went on to fruit, a steak entree, half a chicken each, plum pudding, ice-cream, coffee, and finished by toasting the Queen's health in cognac."

While they were not singing, they exchanged greetings with other Antarctic bases—the French to the east and Mawson to the west.

The mid-winter celebrations lasted for several days, but everyone eventually recovered.

In June the maximum wind speed was 104 m.p.h., drifting snow was recorded on 16 days during the month, while the lowest temperature was minus 28°F.

July was very much an indoor month with inclement weather and restricted daylight, limiting outside activity.

### TRAVEL HAZARDS

Journeys to Repstat, the replacement station being constructed a mile and a half south of Wilkes, were numerous until, one day, four men managed to locate a previously unknown crevasse en route and marked this spot for all to see with a Weasel. Forecast, giving up his seal-hunting, dashed to their rescue on a sturdy motor bike, only to be given the honour of locating two more crevasses and parking the bike 12 ft. down one of them. It was left to Glenny to retrieve both landmarks and then demand considerable salvage rates.

The dogs had been receiving increasingly more attention in readiness for the Vanderford Glacier

excursion coming up in August. War-riner, Holmes, Gibson and McLaren comprised the party to carry out this survey work. In preparation, Holmes and Gibson constructed a new dog sledge and all have been frantically making dog harnesses and traces for the dual purpose of tuning up dogs and human bodies. Several short dog trips across the sea ice have been made.

### "REPSTAT"

Considerable work had been done on the new station during the ten days before the departure of the relief ship "Thala Dan" despite appalling weather: first day—wind, second day—decreasing wind, third day—thick wet snow, fourth and fifth days—fine, the final five days, very windy, with winds reaching 70 knots.

Writing in "Aurora", the A.N.A.R.E. Club journal, Geoff. Smith reports: "When the ship finally departed Repstat was equipped with three-quarters of a mile of good roads, the main building line was levelled, a DUKW landing constructed, a sub-structure completed for the first building, and some of the sub-structure completed for the second building. The road had been cut through to the plateau. Extensive surveys had been carried out and the ship had found a safe anchorage within a quarter of a mile of the station.

"In the meantime the normal Wilkes change-over had been completed.

"Within a few days of the 'Thala Dan's' departure for Melbourne . . . the first Repstat building had been completed. The second building, several lengths of passageway and platforms will be completed early this year and the remainder of the programme will be tackled progressively over the next few years."

The weather data at Wilkes for July was: Average temperature plus 7°F, minimum temperature minus 15.4°F; maximum wind speed 113 m.p.h., with drifting snow recorded on 19 days.



# WINTER DAYS AT SANAE

The following lively account of life at the South African base, SANAE, is abstracted, with permission, from the monthly reports forwarded by Leader Sewes van Wyk.

"At S.A.N.A.E.," he says in May, "we have bid farewell to the sun and are preparing ourselves for a long night of two months. The most important task of replenishing diesoline supplies within the base was recently accomplished under very extreme conditions. Temperatures in the region of minus 37°C made the diesoline jelly-like and simply pumping it from outside was impossible. Drums had to be carefully dropped down the hatch and stored in the snow passage for at least a day before Joubert and Hodsdon could start pumping the partially thawed and more fluid diesoline into the storage drums.

"With the sun low on the horizon phenomena such as sun pillar and parhelia were often to be seen, evoking much activity from amateur photographers.

## SURVEY

"Recently surveyor Strydom, assisted by base doctor de Wit, myself and Sharwood, made preparations for a last attempt at a tellurometer survey to link points on the 1,000 ft. Bloenga ice rise west of S.A.N.A.E. with points in the vicinity of the base. The idea was that two would remain on the ice rise while two, leaving the caboose behind, would return to operate the S.A.N.A.E. end. Unfortunately extremely poor visibility forced the party to return when half-way to the ice rise and the project had to be abandoned.

"Radio technician Smit is at present busy constructing a two-way short range VHF transceiver which is certain to prove invaluable to field parties when contact between caboose and Muskeg is desired.

## IT'S COLD OUTSIDE

"Those expedition members who have outside work to do, find it necessary to summon a fair amount of will power to leave the warmth of

the base and brave the uncharitable cold outside. Geomagnetist Ezekowitz has to tend the variometers and change magnetograms in the variometer hut once daily; Smitty has to change seismograms every day and attend to the seismometers; the meteorological men have to pay regular visits to the Stevenson screen, and find the tending of meteorological instruments on the tower no joke under present conditions. The daily balloon ascent provides problems of its own, especially with winds higher than 25 knots.

"Recently it was a familiar sight to see the young huskies Kiek and Fidel accompanying geologist Pollak on his daily round to the snow accumulation net. However, with both dogs now on chain, it is a solitary figure that strides out.

"Cosmic ray geophysicist Joubert is to be congratulated on a partially successful balloon flight so deep in winter. Much credit is due also to the meteorological team for their assistance with the launching of the balloon.

"The chaps are all very well and putting on weight as a result of the excellent standards of cooking. It is only our geographical position that prevents our being available for the Springbok rugby trials.

"The mean temperature for the month was -24.8°C and the absolute minimum -39°C.

## ROUND THE CORNER

"Although June temperatures have been exceptionally 'mild' for the peak winter period, storms have been frequent and often of a freak nature. For example, a 30-knot westerly wind would suddenly die down and within five minutes a wind from the north-east would be gusting to more than

70 knots. The varied storm directions have resulted in heavy drift-snow accumulation in the immediate vicinity of the base, but it is hoped that a few strong easterly storms will whittle down the level somewhat before lower temperatures consolidate the snow.

"Republic Day (May 31) was celebrated in grand style and after a delicious chicken peri-peri by cook Potgieter, some of the chaps settled down to a great party. All the while Piet, the budgie, and JJ the non-talking parrot looked on from their perches in the rafters. It was a novel experience to JJ and he eyed it all with a demure and often apprehensive expression. It is perhaps just as well that his talking capabilities are well hidden and apparently very limited. Piet, now in his fourth year at S.A.N.A.E., was unconcerned.

"Thereafter preparations for mid-winter were in full swing. Many new woodwork items in the form of cupboards, racks, etc., took shape. Everybody assisted in repainting the kitchen and we were rather amazed at the ingenious colour schemes that emerged, although it must be admitted that these were mostly hit upon by chance. The kitchen floor was re-covered and the kitchen's electrical system rewired.

### MID-WINTER

"Mid-winter's Day proved to be a most enjoyable and memorable day for all. After sundowners and various toasts we sat down to an excellent dinner of roast chicken a la Jan de Wit. It was also a pleasure to again taste fresh lettuce and radishes. After dinner a variety concert was held in which all expedition members took part. All tastes were catered for as the numbers ranged from a guitar solo to an exhibition of 'Russian ballet'.

"There were also presents for everybody; from fellow expedition members, from friends, wives, sweethearts and also from the Department of Transport. In general, a good time was had by all and it will probably be the most memorable day of the year.

"The mean temperature for the

month,  $-20.6^{\circ}\text{C}$ , showed a rise of  $4^{\circ}\text{C}$  as compared with May. The absolute minimum of  $-39.6^{\circ}\text{C}$  was, however, slightly lower than the May figure.

### INTO JULY

"After an absence of two months the return of the sun on July 22 was a joyful sight. The past month was again one of frequent storms and overcast skies. One storm in which winds gusted to over 100 m.p.h. is one the meteorological chaps are likely to remember for a long while. An unnoticed slit between two panels of the balloon hut hatch was sufficient to allow the hut to be almost completely filled with drift snow. About 100 skivvy drums of snow and 100 gallons of sweat later, the hut was again usable.

"Meanwhile, when the weather permits, Johan and Wilf have been working on the replacement by a new unit of the worn-out engine of the old Muskeg, Bernadine, and making repairs to the two new Muskegs in a hastily erected garage to the west of the base.

"The huskies have wintered over admirably outside for the second year in succession. Kiek, the young husky bitch born here last November, has grown into a beautiful animal and may well rival her mother Fielies as first lady of S.A.N.A.E. Meanwhile two men have been making dog harnesses in preparation for runs with the dogs.

"Jan de Wit is progressing admirably as gardener and we are all eyeing the rapidly swelling fruit of several tomato plants.

"The average temperature for the month, viz.,  $-27.9^{\circ}\text{C}$ , showed a sharp drop from the June figure. The lowest minimum was  $-43^{\circ}\text{C}$ ."

### INCREASING THE FAMILY

The snowcat train returning to Mirny from Vostok in January (see March issue, p. 30) increased by three cross-country vehicles. These had been left behind on the stretch Pionerskaya-Mirny by the members of the Franco-Soviet glaciological expedition in the 1963-64 summer.

# Soviet Comment On Changing Antarctic Methods

## FROM THE AIR

Up until fairly recently Antarctica appeared just as a huge white expanse. Individual explorers, succeeding in landing on its shores, made attempts at mapping its coastline. Little was known of a large part of the interior of the continent until the arrival of aircraft carrying photographic equipment and accurate scientific apparatus for scientists to determine the elevation of the land.

Research has proved the usefulness of combining aerial surveys with geomagnetic surveys: the magnetic declination was determined to within  $1\frac{1}{2}$  degrees of exactitude, but experts estimate that it can be reduced to one degree. Observations have shown that the usual magnetic compasses used in Antarctica work well.

Aerial surveying has also been used for determining the movement of glaciers. It was found to be very irregular within very wide limits. Around the Soviet polar station Mirny, for instance, it is 44 to 60 metres per year, and in a region of small glaciers, up to 130 metres per year, reaching 600 metres per year with strongly outlined glaciers.

An aerial survey was undertaken also to determine the accumulation of snow, which greatly facilitated the work of glaciologists. This survey helped to ascertain the number of penguin colonies, the different species in each, and even to determine, by the size of the birds, their age groups.

Aerial map-making produces much material, but in our opinion is not highly accurate. "Reading" such photographs is extremely difficult, and bad mistakes can arise in deciphering them. We must render Japanese and German scientists their due for maps compiled by them, accurately enough, which cover small areas only, however.

Next year an atlas of Antarctica is to be published.

(From an article by Fedor Shipilov).

## THICKNESS BY RADAR

(See "Antarctic", March 1960)

Soviet scientists report that the greatest depth of the ice cover in the Antarctic has been determined by radar. In an area up to 60 miles from Mirny it is nearly 6,000 ft.

The research carried out by scientists using this method in the Antarctic for the first time revealed its high precision, says Vitaly Bogorodsky, chief of the Arctic and Antarctic Institute. "Now it is possible to measure the thickness of glaciers from a plane or helicopter, to register continuously the profile of the Antarctic continent hidden under ice. It is also possible to measure the mass of ice."

Radar methods will be used by the eleventh Soviet Antarctic expedition, which will go to the sixth continent late this year.

## "COASTLINE" CHANGING

[We have referred several times to the huge break-off in 1963 from the Amery Ice Shelf. For this "eye-witness" account of the new "coast-line" as sighted from air and sea we are indebted to an article by L. Dubrovin.]

When a Soviet aircraft was flying from Mirny to Molodezhnaya the navigator and scientific personnel, carefully following the plane's flight on the map, easily recognised the familiar outlines of the ice coastline, above which they had flown more than once before. But when the plane came to one of the very largest ice shelves of Western Antarctica, the Amery Ice Shelf, an expression of bewilderment came over the pilot's face.

"Look at the map," he said to one of the scientists, "there should be a solid ice shelf here, what is that clear water doing down there? Could we be off course?"

But the plane was following the exact route set, and at that moment,

instead of the monotonous snow-covered ice shelf, a vast expanse of clear water stretched out before them, on which pieces of ice and small white-crested waves could be seen.

The only explanation could be that part of the Amery Ice Shelf had split off, turning into icebergs, which, blown by the wind for some length of time, had begun to move to the north.

To confirm this theory, the diesel-electric vessel "Ob" went to the Amery Ice Shelf this year with a number of scientists on board, who established the fact that actually the Antarctic's ice coastline in this place had receded almost 75 kilometres to the south. The vessel then passed over an area where the ice continent should have been, according to all maps, and under the "Ob's" keel a depth of 900 m. was recorded. On a preliminary calculation, a piece of the shelf of from 75 to 150 km. in size had disappeared. Thus the area of Antarctica has diminished by approximately 1,100 square kilometres. A huge ice mass, which until not long ago still appeared to be part of the ice continent has formed into icebergs which are now floating somewhere in the waters of the Southern Ocean. That part of the ice shelf which has broken off would cover in area approximately two-thirds of the Kama reservoir. The volume of fresh water contained in these icebergs would exceed the volume of the Kama reservoir, when full to capacity, more than twenty times. This much water flows down the Kama River at Perm in four years.

The fact that Antarctica's coastline is changing has been known for a long time. Even last century it was established that the thick ice cover of the southern polar continent was spreading, continually moving out into the sea. It covers the continental shelf in vast expanses, in some places extending out into the ocean over great depths. From time to time the edge of the ice shelf breaks off, and the slow, even advance of the ice continent into the ocean changes into a sharp jagged regression. The ice continent, at the same time as it gives up a part of its ice to the

ocean, is gradually building up its coastline again from the sea about it.

## 11th EXPEDITION

Over 300 scientists and technicians will be participating in the eleventh Soviet Antarctic Expedition, which is scheduled to leave Russia in mid-October, a month earlier than has been usual in order to provide a longer summer working period.

Four stations will again be in operation during the 11th (1965-1967) expedition: Mirny, Novolazarev, Molodezhnaya and Vostok, where the current I.O.S.Y. programme will be maintained. During the 1965-66 summer period Kom-somolskaya Station will also be activated.

Fuel will be transported to Mirny and Molodezhnaya, where oil containers will have been constructed by the time the tankers arrive.

At the inland station Vostok, investigations will be continued in ionosphere, aurora, cosmic rays, the earth's magnetic field and radio waves. Further study of the ice cover will be undertaken using radio altimetry for the first time.

From "Ob", oceanographic and hydro-biological research will be undertaken.

Aqualungs will be used for the examination of the sea-bottom off the coast at Mirny and Molodezhnaya, to a depth of 30 metres.

### MOLODEZHNYAYA

Work on the enlarged Molodezhnaya Station on Alashev Bay, Enderby Land, will be continued. The new buildings will be elevated on piles to avoid the accumulation of drift snow and will be constructed of arborite, a fireproof building material.

### MIRNY

Scientist Dolgin at Mirny reported on July 7 the observation of noctilucent clouds at an altitude of 80-85 Km. Noctilucent clouds ("silver cloud") are very seldom seen in the Antarctic, though fairly frequently observed in the Arctic regions, and this occurrence should provide further opportunity for study of the higher atmospheric layers and of circulation at these altitudes.

# SUMMARY OF THE YEAR'S WORK AT ARGENTINE STATIONS

The report here summarised, of the work carried out at Argentine Antarctic bases during 1964 was issued by the Argentine Antarctic Institute in May 1965.

Argentine Antarctic work is carried out by the Argentine Antarctic Institute (Director: Contraalmirante (ret.) Rodolfo N. M. Panzarini) and by the Armed Forces, Navy (Naval Antarctic Group and Naval Hydrographic Service), Army and Air Force.

## WINTER WORK ARGENTINE ANTARCTIC INSTITUTE

At the Army General Belgrano Base, Jose Brasbous (aurora) and E. Pedroni (ionosphere), assisted by Base Army personnel, carried out a programme in Upper Atmosphere Physics. The programme included vertical ionospheric soundings every 15 minutes with automatic equipment; the taking of all-sky photographs at one-minute intervals with the automatic auroral camera as well as colour and black and white photographs of the aurora with non-automatic cameras and visual observation of auroral phenomena every 15 minutes.

This involved the exposure of 1,700 metres of film with ionograms and 1,230 m. with the automatic camera, giving some 160,000 photographs. In addition 153 photographs of the aurora were taken on non-automatic cameras, 115 of them in colour; and 11,187 records of visual observations were made.

All this material will be analysed in the Ionospheric Laboratory of the Navy and of the Argentine Antarctic Institute. Records have been kept in this area (at Belgrano and at the former American base Ellsworth) of ionospheric soundings since 1957 and of visual observations of the aurora, and photographs, since 1958.

## ARMY

**Esperanza** (Hope Bay). Army patrols

made 14 sorties during the winter months as follows: 1-7, to the Guemes Refuge Hut, each journey of 20 km for attention to the dogs; 8 and 9, reconnaissance and observations in the vicinity of Duse Bay, Edith Bay and Prince Gustav Channel (221 km.); 10, to instal a depot of fuel in the vicinity of the San Nicolas refuge hut (32 km.); 11-13, recovery of the motor of a Muskeg tractor which had been damaged to the north-east of Esperanza (176 km.); 14, seal hunt in the vicinity of the Criste Redentor and San Nicolas refuge huts (124 km.).

Work was carried out in the disciplines of meteorology, topography, cartography, tides, human physiology and polar techniques.

**General Belgrano.** Eight journeys were made during the year: 1, south-west and west of the Base (390 km.); 2, east of Belgrano (140 km.); 3, cartage of material to the base east of Belgrano (300 km.); 4, for the same purpose to Ellsworth (140 km.); 5, laying of intermediate depots in the triangulation zone (280 km.); 6, transfer of material to the "west" refuge hut (310 km.); 7, cartage of fuel and food to the Santa Barbara refuge hut (550 km.); 8, to the ice shelf east of Belgrano.

## AIR FORCE

**Teniente Matienzo.** At this Air Force base work was carried out in meteorology, glaciology (aerial photography of the Larsen Ice Shelf between Cape Longing and Robertson Island, and glaciological observation of the Esperanza-Matienzo route and of the coastal channel between Robertson Island and 72° 30' S), topography (Christensen Island), photography (Larsen Ice Shelf as above) and polar techniques (experiments with personal equipment of Argentine manufacture).

## SUMMER PROGRAMME ANTARCTIC INSTITUTE

**Almirante Brown.** Reconstruction and manning of this former Naval Base as a scientific base for the Argentine Antarctic Institute as follows:

(1) Commencing on November 28, 1964, a team of ten men led by Capitan de Fragata (ret.) Federico W. Muller restored the main building and the emergency shelter in order that they could be used as living quarters, and were billeted there while they constructed the cook-house, generator hut, "ham" radio station and a tide-gauge.

(2) On Christmas Day the second group under Capitan de Navio (ret.) Carlos Perticarari disembarked at the station and the second phase of the programme began. A barracks building of 292 square metres was erected, and a laboratory block of 170 sq. m. containing three laboratories, photographic dark room, emergency radio station, office and library for the scientific leader, bathroom and heating system; also a snow-melter capable of producing 1,000 litres of water daily, and a wooden ramp to facilitate unloading.

The Almirante Brown Scientific Station was duly inaugurated on February 17, 1965, by the Director of the Argentine Antarctic Institute. The first wintering party comprises ten men, with Alfredo Corte as leader and Carlos Galmarini as deputy-leader and medical officer. There are two scientific assistants and three technicians, a radio-officer, a cook and a mechanic.

### FIELD PARTIES

A group comprising two glaciologists and a surveyor worked at Esperanza (Esperanza Glacier) and in the Weddell Sea area, taking sea-ice observations also during the voyage of the ice-breaker. At the Los Mangrullos nunatak and at Belgrano and Ellsworth Stations, determinations of latitude and longitude were made. In the southern Weddell Sea a reconnaissance was carried out on board the ice-breaker "General San Martin", and the location of the Filchner Ice Shelf front was deter-

mined from the air, between Moltke nunatak and Cape Adams.

Another group, Jan M. Ageitos (Museum Director) and a biological assistant, worked on penguin studies on Deception Island, and made bird and marine invertebrate collections at Esperanza as well as banding 45 young Adélie penguins. Later, at Almirante Brown, this group assisted in the collection of specimens of the local fauna, the stocking of the laboratories and the instrumentation of the base.

### NAVAL GROUP

The Antarctic Naval Group for 1964-65 was under the command of Capitan de Fragata Gonzalo Bustamante. The "General San Martin" left Buenos Aires on October 9, 1964, and after visiting Deception, Melchior and Teniente Matienzo bases and the Suecio and Betbider refuge huts went on to Esperanza before returning to Ushuaia (Tierra del Fuego) on December 8.

The second cruise began on the 21st. The Filchner Ice Shelf and the bases at Belgrano and Ellsworth were visited, the ship penetrating as far south as 78° 13' S. A depot of provisions was laid at Cape Fisket, at approximately 75° 47' S, 58° 22' W. The cruise ended at Ushuaia on January 31 after a call at the Orcadas del Sur.

During the third cruise the vessel went as far south as Marguerite Bay and the General San Martin base was inspected. On February 9, Alexander I and Peter I Islands were visited; then the ship proceeded via Melchior, the Bismarck and Gerlache Straits, Almirante Brown and Deception back to Buenos Aires on March 10, 1965.

Meanwhile the supply vessel "Bahia Aguirre" made three voyages between December 10, 1964, and March 2, 1965, re-provisioning the bases and relieving the personnel.

### HYDROGRAPHIC SERVICE

As usual, the Naval Hydrographic Service re-charged and repaired the lights and beacons in the Antarctic Peninsula area and carried out

meteorological observations as well as making 371 oceanographic stations.

The "Commandante Zapiola" under Capitan de Corbeta Luis A. Morandi carried out an oceanographic cruise in Drake Strait during February and March, 1964. The programme comprised current-measurements at various depths, examination of the ocean bed, salinity, bathythermographs, density measurements, meteorology, etc.

The "Capitan Canepa" under Capitan de Corbeta Hector A. J. Silva carried out the third "Productivity" cruise in Drake Strait between May 22 and July 9, 1964. This involved a study of the nature and extent of plant plankton production. The fourth "Productivity" cruise was carried out in Drake Strait and the Mar de la Flota between October 17 and December 21, 1964. Twenty oceanographic stations were occupied with a maximum depth of 200 m.

At Melchior Base between December 24 and February 27, an eleven-man team under Teniente de Fragata Eduardo M. Cueli carried out research in marine biology. The party included two Americans, a Frenchman and, says the report, a Swiss-American and a Scottish-American.

### WINTER TEAMS 1965

**Decepcion:** 15 men (Leader: Teniente de Fragata Daniel A. Parisse).

**Orcadas:** 13. Teniente de Corbeta Miguel Sosa.

**General Belgrano:** 30 (Capitan G. A. Giro).

**Esperanza:** 20 (Mayor E. J. Peyregne).

**Mattienzo:** 17 (Ier Teniente Eduardo Fontaine).

### SOBRAL

The new Argentine Army Station Sobral commenced operations on April 28, 1965. It is located on the Filchner Ice Shelf, 330 km. south of Belgrano Base, at lat. 81° 04' S, long. 40° 36' W.

Several trips were necessary to transport 40 tons of material on six Sno-cats from General Belgrano Base to the site of the new station. The leader of the transport group of 13

men was Captain G. A. Giro of the Argentine Army.

Observations on the aurora will be made. The first wintering party comprises Lieutenant E. Goetz, leader; Sgt. J. C. Ortiz, mechanician; Sgt. A. Moreno, surveyor; and Cpl. L. Guzman, cook.

### MYSTERY OBJECT IN ANTARCTIC SKIES

It was reported from Santiago on July 7 that the commander of a Chilean Antarctic base had taken 10 colour photographs of an unidentified flying object over the weekend, but believed it would be "adventurous" to say it was a flying saucer.

"But what we saw was real," said Air Force Commander Mario Jahn Barrera. "Something that moved at a frightening speed, zigzagging and giving off a blue-green light. And it was something solid, which caused interference in the base's electromagnetic equipment."

But he emphasised in a radio-telephone interview published in the newspaper "El Mercurio": "It was not a star. Neither did I think it was an earth-built aircraft."

"I belong to the Air Force and no apparatus constructed by man to date has anything like this, either in shape, speed, manoeuvrability or other characteristics."

The object, said the Chilean report, was first sighted by a British Antarctic base, and confirmed the next day by both Chilean and Argentine bases in the Antarctic Peninsula area. The British scientists, the report went on, said the object was yellowish red varying to green and zig-zagged about the horizon for ten minutes.

Unfortunately the "colour photographs will not be available until next March as the base has no facilities to develop colour film".

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### ERRATUM

"A Different Way of Life", by John R. Green, Vol. 4, No. 2, June 1965: p. 107, col. 1, l. 46, between longitudes 160 degrees and 170 degrees West". For West read **East**.

# Outline Of Chilean Programme For 1965

Chile maintains four permanent bases in the Antarctic Peninsula area: Arturo Prat (62° 30' S, 59° 41' W), Bernardo O'Higgins (63° 19' S, 57° 54' W), Pedro Aguirre Cerda (62° 56' S, 60° 36' W), and Gabriel González Videla (64° 49' S, 62° 52' W). Of these, Gabriel González Videla will temporarily be operated as a summer facility. There are two temporary bases, the Sub-base Yelcho (64° 52' S, 63° 34' W) and the Guesalaga Refuge Hut (67° 47' S, 68° 53' W). The construction of another permanent station in the Antarctic Peninsula is being considered for the 1965-66 season.

The organisational set-up for the conduct of Chilean Antarctic activities has undergone some changes with the establishment last year of the Chilean Antarctic Institute. This Institute now plans, directs, and coordinates the scientific and technical aspects of the programme under the direction of a council of representatives from public and private organisations with direct interest in Antarctic work. The logistic support of the Chilean Antarctic Expedition remains in the hands of the Armed Forces.

The 19th Chilean Antarctic Expedition left Valparaiso on December 12, 1964. In the party were 10 scientists who planned to carry out geological research in the South Shetland Islands, ornithological investigations on Nelson Island, and volcanic observations on Deception Island over a three-month period. Radioactivity measurements and geomagnetic observations at Pedro Aguirre Cerda Base were also included in the summer programme.

The ornithological observations, a three-year project, are expected to culminate in the publication of a catalogue and guide to the birds of the Antarctic Peninsula and adjacent islands.

As part of the expedition "Marchile IV" aboard the "Yelcho", sounding work was to continue during January-March in the area 53°-65° S and 75° 30'-85° W and was to include ten north-south oceanographic profiles with a separation of 30 miles. Oceanographic stations were to be made along three profiles every 40 miles to a depth of 3,000 meters. During each profile bathythermographic, surface temperature, and bathymetric observations were to be made.

The following winter programmes were planned:

## Cartography

Continuation by the Institute of Military Geography, of topographical triangulation work initiated in 1964, and establishment of first-order astronomical fixes at O'Higgins or Gabriel González Videla for geodetic observations.

## Earth Sciences

Installation of a volcanological observatory, consisting of a subsoil thermograph and a vertical short-term seismograph, at Pedro Aguirre Cerda Base.

The seismological equipment at Gabriel González Videla Base was to be dismantled for repair in Santiago. The seismological observations were to continue at General Bernardo O'Higgins Base, where new equipment is to be installed during 1966.

## Meteorology

Continuous surface observations at all bases, including synoptic observations every three hours.

[We are indebted to the "Antarctic Report" of U.S.A.R.P. for the above outline. — Ed.]

## PENNEY'S PENGUINS

In 1959 Dr. Richard L. Penney released five Adélie penguins after they had been flown the 3,800 miles from their point of capture. Eight months later three of them came back home, one scientist said "probably cussin' the Navy every step of the way".



# BRITISH ANTARCTIC SURVEY STATIONS REPORT

As with all Antarctic stations, outdoor activities have declined with the onset of winter. Nevertheless, some momentum has been maintained by field workers, comparatively near to base.

## STONINGTON ISLAND

Occupation of the old "Y" Base hut on Horseshoe Island has enabled a geological party to remain active in the fjord region east of Adelaide Island throughout the months of May and June. Other geologists and their helpers were busy sledging depots towards the Traffic Circle in preparation for next season's work on the east coast just inside the border of Palmer Land. The surveyors concentrated on extending a local survey trig scheme during which they visited the McClary Glacier area and measured a tellurometer line from Base to Neny Island.

## HALLEY BAY

On May 30 two Muskeg tractors left base for the junction of the shelf and inland ice. Their object was to establish a second auroral observation point for parallactic photography. One tractor returned to base the next day but the other, towing a portable observation cabin, returned a week later. A short trip was made to one of the local Emperor penguin rookeries to check the population.

## SIGNY ISLAND

Experiments on limpets appeared to reveal a direct relationship between migration and temperature but subsequent analysis of the results seems to indicate that it is the presence of ice rather than lower temperatures which is the main factor. A benthic plankton sampler was designed and constructed at base. Two of the field huts on Signy Island were re-provisioned.

## LIFE IN GENERAL

"The usual indoor winter maintenance tasks," reports the Survey, "have been going on at all bases. Perhaps the most significant of these was the completion of repairs on the remaining Otter aeroplane at

Deception Island. Its serviceability cannot be judged until it is air-tested in September but we are all keeping our fingers crossed.

"Reports of proceedings on Mid-Winter's Day and inertia on the day after imply that there will be a need for strict rationing in the interval before the ships arrive. The 'Halley Comet' was on sale as usual, its circulation unaffected by the publication of the upstart 'Galindez News' at the Argentine Islands. Sporting interest, which declined with the closure of the Hope Bay dog track, was revived by the inauguration of a bob sleigh championship at Adelaide."

## PLANS FOR NEXT SEASON

No projects have been planned which depend upon air support, which means that work in the region of George IV Sound must be discontinued. A reduced number of field workers will be based on Stonington Island to continue the geological work on the east coast described above and to improve the detail in the map of the area. Any support which the one remaining aeroplane can give will, of course, be available. It will save a lot of hard slogging laying depots and allow the scientists to stay longer on the job.

The new tractors being sent to Halley Bay will be used to establish a route to the Theron Mountains so that detailed geological studies and mapping may start. A somewhat conservative approach has been adopted towards objectives until experience has revealed the tractor's potentialities.

In other respects the Survey's programme will be maintained at the current level apart from the special I.Q.S.Y. observations at Halley Bay which will be discontinued.

## SOUTH SANDWICH ISLANDS

The "Geographical Magazine" (England) for February 1965 contains an interesting and well illustrated account by Lieut.-Cdr. C. J. C. Wynne-Edwards, R.N., of a British Antarctic Survey expedition to the South Sandwich Islands last year. The group was discovered by Cook 190 years ago and has been little visited since, except by whalers and sealers in the 19th century, whose visits were in no way geared to exploration. Bellingshausen landed on some of the islands in 1819 but could not carry out any significant exploratory work.

The underwater volcanic eruption early in 1963 stimulated the British Antarctic Survey to mount a full scale expedition to the group in the summer of 1963-64. A party of six scientists led by biologist Dr. Martin Holdgate boarded "Protector" at Port Stanley in the Falkland Islands on March 1, 1964. They were equipped to study the geology, volcanology, botany and zoology of the islands, and Lt.-Cdr. Wynne-Edwards was in charge of the survey work.

Members of the party were landed by helicopter (sometimes much in the precarious way also used by the Balleny Islands survey group whose work is described in this and preceding issues of "Antarctic"), on Leskov Island (March 5), Candlemass Island, where a base camp was set up "on level ground close to the terminal moraine of a glacier", Bellingshausen Island, Thule Island, Cook Island (a first landing) and on Freezeland Rock off the western coast of Bristol Island: the island itself repulsed all attempts to land.

The party on Candlemass Island was ashore from March 6 till the middle of the month, and made a careful study of the island, whose wild life included an "enormous" Rockhopper penguin rookery "with hundreds of thousands of birds".

The two northern islands defied all attempts to get ashore: "For three days dense fog prevented all flying

operations and although we caught whiffs of sulphur fumes drifting down from Zavodovski's volcano, we failed to make a landing". Indeed, it was only by a "nightmare operation with the 'choppers' flying to and fro in very low visibility picking their way over icebergs" that the party on Candlemass Island was brought back to the ship.

### THE NEW "PROTECTOR"

The new ice-breaking ship to replace the Ice Patrol Ship "Protector" will have a displacement of about 7,000 tons, a length of 260 ft., a beam of 64 ft. and 30 ft. draft. Propulsion is to be diesel-electric driving twin screws. Survey boats and two helicopters are to be carried. The hull is to be all welded and designed for breaking thick ice, and a stabilising system is to be fitted to reduce rolling although heeling tanks will be installed to "rock" her free should she become wedged in ice. It can be assumed that the vessel will be on the lines of the American "Wind" class ice-breakers. It is also thought that the Navy tradition of painting their vessels grey will be discarded in the case of the new ship and she will be painted red similar to that of the "Shackleton", "John Biscoe" and "Dan" ships. A test showed that an aircraft flying at 5,000 ft. could see a red painted ship 20 miles away while a conventionally painted vessel was only visible four miles away.

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### "ELTANIN"

U.S.N.S. "Eltanin" has completed two more cruises. Cruise 16, an unusually fine, calm cruise, was planned primarily to check out the new submarine geophysical equipment, although biology, meteorology, oceanography and upper atmosphere physics were not neglected.

Cruise 17 saw thirty-six stations occupied along the 135° W and 95° W meridians and along the ice front between them. Special studies on the continental shelf and slope were made off Valdivia, Chile, en route to Valparaiso.

# ACTION ON U.S. HOME FRONT WHILE BASES HIBERNATE

**Changes in the administrative set-up of the United States Antarctic programme bulk more largely than reports of activities at the Antarctic stations themselves during the long winter night.**

A wintering-over party of 290, under the command of Commander Jehu Blades, is maintaining research and support activities in five United States Antarctic stations, with 39 scientists and the remainder military personnel.

At Byrd Station are 28 men, at Eights 11, at Palmer 9, at the South Pole 21, and 220 at McMurdo. One other United States representative is spending the months of darkness with the Russians at Mirny, biologist George H. Meyer from the University of Texas, who is conducting microbiological studies, while, in exchange, a Russian from the Institute of Geography of the U.S.S.R. Academy of Sciences, is working from McMurdo.

## HOME FRONT

Stateside, the organisation of Antarctic activities, has been re-cast. An Antarctic Policy Group, established by direction of President Johnson and comprising representatives of the International Organisation of Affairs, International Security Affairs and the National Science Foundation, will define United States policies in Antarctica, promulgate overall objectives and review and approve plans for activities and programmes. Special importance is attached to the Group's work as part of the Government's observance of the International Co-operation Year.

After receiving the Group's first progress report in May, President Johnson announced its establishment and reviewed U.S. work, past and present, in Antarctica.

"The United States today pursues a vigorous programme in Antarctica. We have begun to explore the Southern Ocean and the last great unknown reaches of the Polar Plat-

eau. We have established new research stations in West Antarctica and on the Antarctic Peninsula. We have completed geologic surveys of most of the ice-free areas of West Antarctica. We have photographed hundreds of thousands of square miles for mapping purposes. We are conducting scientific programmes to study the unique physical and biological features of the area.

"We are pioneering new concepts of operations on the ice. We introduced nuclear power to Antarctica. Advanced construction techniques soften the rigours of polar life. Specialised aircraft and surface vehicles enable us to reach any point on the continent, and to operate effectively when we get there."

President Johnson stressed the peaceful co-operation of 12 nations in the Antarctic as evidence how nations of different outlooks can work together for peaceful purposes and mutual benefit and voiced the hope that the same success in international co-operation would extend to every field of international endeavour.

At the same time hearings on four bills, introduced after the opening of the 89th Congress to establish the Richard E. Byrd Antarctic Commission, began. Witnesses spoke of the past achievements of the U.S. in Antarctica and of future plans for not only American but international endeavours there under the Antarctic Treaty.

In June the United States Antarctic Projects Office was disestablished. While Dr. James E. Mooney was transferred to the Pentagon as Special Assistant on Antarctic matters to the Assistant Secretary of Defense, International Security Affairs, the remaining members of the Projects Office were reconstituted

to form the History and Research Division, U.S. Naval Support Force, Antarctica. The Division will continue to maintain a working library, to exchange publications and to carry out historical and informational functions. The new address for correspondence previously sent to the U.S. Projects Officer is: History & Research Division (70); U.S. Naval Support Force, Antarctica; Building D; Sixth and Independence Ave., S.W.; Washington, D.C., 20390, U.S.A.

## JUNE STORMS

### McMURDO

Three storms battered McMurdo Station during the week ending June 19. Winds were up to 80 knots and visibility was reduced to zero. The temperature varied between zero and minus 25°. The station was not damaged and operations soon returned to about normal.

During the storms snow was piled high throughout the station. The last storm isolated a section at the site of the nuclear power plant for more than 20 hours. There were sufficient men at the section to allow turns to be taken for rest and the continued maintenance of the plant.

### POLE

At the same time at the Amundsen-Scott South Pole Station men were able to work outside again for the first time in days. Many tons of accumulated snow was moved out of the main tunnel. Men were also reported busy on remodeling and redecorating the "Club 90 South" in readiness for the mid-winter party.

For most of the preceding week there were clear skies although visibility was at times reduced by ice crystals. On June 10 the station experienced something of a heatwave when the temperature rose to minus 33°F. The average low temperature at the South Pole was minus 83°F.

But late in June men were busy shoring up the main thoroughfare of the station as the plywood bulwarks were showing strain under the pressure of accumulated snow on top. The average temperature at the station last week ranged from minus 45°F to minus 90°F.

## EIGHTS

At Eights Station in Ellsworth Land, the weather was cold but calm during the preceding two weeks. A new low temperature of minus 59°F was recorded in the first week of June.

### HOME SAUNA

The temperature fell to a record low of minus 113.2°F at the Pole Station on July 21, but it did not prevent eight men from stepping out naked from a newly-constructed steam bath and rushing headlong outside—into snowdrifts.

The men had been relaxing in the steam bath in a temperature of plus 119°F.

According to the officer in charge of the station (Dr. R. M. Beazley), the men were none the worse for their 232° temperature change.

The new record low temperature at the station was recorded at 11.45 a.m. The previous record was minus 109.8°F established on July 14, 1963.

## PALMER STATION

Some six to seven weeks after U.S.N.S. "Wyandot" and U.S.S. "Edisto" landed the pioneers on Anvers Island, and two weeks ahead of schedule, work on the construction of the newest U.S. scientific station in Antarctica was completed and on February 25 Palmer Station was officially declared open.

Modification of the existing British hut to a laboratory and construction of living quarters were accompanied by a survey of adjacent areas with a view to the possibility of conducting limited air operations to resupply the station in the future. Four navy men, three glaciologists and two biologists are wintering over at Palmer Station, the biologists studying the only permanent land-dwelling animals in Antarctica—insects and related species as well as the lush (for Antarctica) plant life—algae, fungi, lichens, mosses, liverworts and even three flowering plants, the most southerly in the world.

With glacial movement and the sources of ice accumulation and wastage confined to Anvers Island, glaciological study here will be made less complex.

Oceanography, geology, meteorology and studies in upper atmosphere physics, seismology and geomagnetism are also expected to profit from the work possible at Palmer Station.

### McMURDO

Hope is again deferred!

This news item gave great delight to our assistant editor.

No longer will the weaker sex be restricted to mere stop-overs on return air flights to, and more emphatically from, Antarctica. This very year, 1965, will see the construction, at McMurdo Station, of barrack space for six female scientists.

This was revealed by an officer of the U.S. Navy Antarctic Base at Harewood, N.Z., recently, at the annual dinner of the local branch of the N.Z. Antarctic Society. For New Zealand, Mr. R. B. Thomson, superintendent of the Antarctic Division, D.S.I.R., decried, in reply, any suggestion that New Zealand, even taking a long-distance view, could be planning any such revolutionary step, even though plenty of women were applying for consideration.

But

**The report has been emphatically denied by Admiral Bakutis.**

The report that the desalination plant ran on waste steam from the nuclear power plant has now been amended. The steam is produced by boilers in the distillation building. A regular watch is maintained during operation of the plant.

Also maintained, during the operation of the Nuclear Power Plant, whenever it is producing power for the station's electrical load, is a 4 ft. by 16 ft. flashing red sign — "PM-3A". Several hundred feet up the slope of Observation Hill, this eye-catching signal emphasises the Unit's contribution to the comfort and economical running of the whole station. The reactor took over from the old generator operating on costly fuel oil on March 31 and has a record of a 90% operating season.

Students at McMurdo's University of Antarctica may now enrol for yet another course, the Trades School

Division, which provides a five-week course in welding, arc and gas. Lecturers in the school are the station's three shipfitters. Other courses include language study, with instruction in Russian by the Soviet Exchange Scientist, and in German and French by two Navy officers, as well as another popular course, in personal and family financial management.

### RUSSIAN COURSE

United States scientists and sailors at the Antarctic McMurdo station for the winter are being taught Russian by Dr. Igor Zotikov, a thermophysicist from the Soviet Academy of Sciences in Moscow.

### COOKS' DAY OFF

It was "galley appreciation day" at McMurdo Station on Sunday, July 4. To celebrate, the cooks all had a day off and the three officers and 23 men of the VX6 Squadron prepared meals for the 220 servicemen and scientists at the station. The VX6 detachment commander (Lieutenant-Commander B. W. Johnson) cleaned the pots and pans. Highlight of the day was a Swedish-Italian dinner at which the galley staff were guests of honour.

### ICE PROBLEMS

In a paper read to an Australian architects' convention, Mr. Alan M. Brown, Senior Engineer of A.N.A.R.E., states that the U.S. South Pole Station, which is built on 8,800 feet of ice, is moving away from the Pole at a speed of 50 feet per year. The air-field on the floating ice-shelf at McMurdo, he says, moves about a quarter of a mile per year towards the open sea: one of the reasons why it must be moved "inland" to a new site every few years.

Major U.S. development for the coming season, it has been reported, will be the establishment of another new Antarctic station, mid-way between Amundsen-Scott South Pole Station and the Belgian Queen Maud Land base. A logistic base for other expeditions into eastern Antarctica, this station was primarily intended to support the Pole-Roi Badouin four-year traverse.

## SCIENCE ODDMENTS

The world, no longer envisaged a perfect sphere but known to be nearer pear-shaped, is yielding another secret to man. Using a satellite tracking unit at McMurdo Sound, scientists from New Mexico State University are measuring the changing shapes of satellite orbits to map the exact shape of our globe.

Variations in the strength of the earth's gravity field reflect variations in the shape of the earth itself and are themselves indicated by the satellite orbits. The shape of the world affects mapping, geophysical processes within the earth and, of course, the fate and value of future satellite orbits.

Further use of the data being collected by this group is to enable calculation of the precise latitude and longitude of the tracking station, which will then be usable as a reference for establishing accurate coordinates of other points on the continent. Three satellites at present passing near McMurdo a total of 42 times a day are being observed, and will be for some 14 months before observers cease operations. This project, along with a Stanford University observation post at Byrd Station, is the first to utilize orbiting satellites to assist U.S. Antarctic Research.

## FROGMEN

The waters of the Ross Sea below the ice have for the first time yielded some of their secrets to man. A team of underwater explorers, Dr. Jacques S. Zaneveld and two graduate students, all from Old Dominion College, Norfolk, Va., spent the last summer season working under the ice of most of the accessible points along the 350-mile western coast of the Ross Sea, and from several island shores in the Ross Sea and Antarctic Ocean.

Wearing black rubber "frog man" suits, the two students, James M. Curtis and Jack K. Fletcher, dived into the 29° brine, which immediately flooded their suits. Within a few moments, the water in the suits warmed enough to allow them a maximum of 45 minutes under the water, although two or three 15-

minute dives a day were normally as much as they could manage without undue exhaustion. Their principal task was the observation and collection of seaweeds, although collecting specimens for other biologists and inspecting the damaged propeller of an ice-breaker were also undertaken.

Dr. Zaneveld, who hopes to discover the types, location, extent and growing patterns of Antarctic seaweeds, had already found that beds of red seaweed can grow in semi-darkness under several feet of ice. Such beds were found in abundance on the sloping rocky bottom, reached by the divers, frequently after submergence through Weddell Seal breathing holes.

## THE UNFINISHED MAP

Antarctic men have long pondered the possibility of an ice-filled strait linking the Ross Sea and the Weddell Sea. Surface traverses and air observations in recent years seem to have proved conclusively that no such frozen water-way exists. Dr. T. O. Jones, Head of the United States Office of Antarctic Programs, states categorically, "no 'Channel' below sea level connects the Ross and Weddell Seas". The Heritage Range, the Ellsworth Mountains and the Horlick Mountains completely bar the way.

Not long ago such a conclusion would have seemed to be definite proof that the Antarctic is one great continent. However, the probing of the ice-cap in recent years by seismic sounding and radio altimetry has disclosed that much of the earth's surface beneath the ice of West Antarctica (the area, north of a line joining the Ross and Weddell Seas, which terminates in the Antarctic Peninsula) is below sea level, and that ice filled fjords extending far inland from the Amundsen and Bellingshausen Seas (between the Ross Sea and the Weddell Sea) make the northern part of West Antarctica west of the Antarctic Peninsula an archipelago, a vast group of mountainous islands hidden beneath the ice.

The true picture of the Antarctic's sub-glacial topography has obviously still to be revealed.

## PERSONAL

With full honours at the Washington Navy Yard Annex, Washington, D.C., Rear Admiral Fred E. Bakutis, U.S.N., relieved Rear Admiral James R. Reedy, U.S.N., as Commander, U.S. Naval Support Force, Antarctica.

### REEDY

Rear Admiral Reedy, who assumed command of the support force at a historic ceremony at Amundsen-Scott South Pole Station in November 26, 1962, has seen during his tenure of the position the construction of Eights and Palmer Stations, the installation of the distillation plant, Antarctica's first completed road and the new ship docking facility at McMurdo. He also pioneered two previously-unflown air routes, one from Cape Town to McMurdo, the other from Melbourne, via the South Pole, to Byrd.

At the handing-over ceremony, Rear Admiral Reedy was presented with the Legion of Merit for his performance while commanding the support force and he has also been awarded the Navy League's Decatur Award for Operational Competence.

### BAKUTIS

Rear Admiral Bakutis has a distinguished record in naval aviation as well as administration. Executive Officer of Fighting Squadron 16 in 1942 aboard U.S.S. "Lexington", he later assumed command of a similar squadron of Hellcats, VF-20, aboard U.S.S. "Enterprise". During his war service he participated in strikes on the Bonins, Yap, Palau, the Philippines, Formosa and Okinawa; was shot down by a Japanese destroyer and adrift for seven days. A Navy Ace, he is credited with 11 planes destroyed, as well as much damage to shipping, grounded aircraft and installations, and was awarded the Navy Cross, Legion of Merit with Combat "V", Distinguished Flying Cross with Gold Star in lieu of a second, Bronze Star Medal with Combat "V", with the Air Medal and six Gold Stars in lieu of additional awards.

His post-war positions include Group Commander, Carrier Air Groups ONE and FIVE, service in Korean waters as Executive Officer of U.S.S. "Valley Forge", Air Train-

ing and Readiness Officer on the Staff of Commander Air Force, Pacific and many other operational posts.

## VETERAN PASSES

Veteran Antarctic explorer, Retired Marine Corps Major Vernon Davis Boyd, who served with the late Admiral Byrd on some of his Antarctic expeditions, died in California in May, 1965. He had served in the Navy from 1926 to 1930, and the Marine Corps 1942 to 1955.

A machinist on the second Byrd Antarctic expedition of 1933-35, Major Boyd was a master mechanic on the 1939-41 U.S. Antarctic Service Expedition; a Marine Corps Captain in Operation High Jump (1946-47); and in Operation Windmill the following season he was Transportation Officer. He did not join Operation Deep Freeze I, although he participated in its planning. He was also a veteran Arctic explorer.

## AUSTRALIA — MAGNETIC POLE

Some 20 Australian scientists and a few newsmen had a real field day in June when invitations reached them from the U.S. Air Force to sit-in on a flight from Avalon, Victoria, to the Antarctic by two long-range C-135 jets, the military equivalents of the Boeing 707.

After cruising above the Pacific for a week observing the solar eclipse, the two aircraft, each equipped with some £3m worth of scientific apparatus, made a six-hour return flight to the Antarctic.

During the flight, Australian Dr. Farrands and American scientists measured cosmic radiation in the vicinity of the Magnetic South Pole, electro-magnetic phenomena arising from the earth's magnetic field and high-energy gamma radiation from outer space.

The scientists also used special equipment to study and photograph stars in the clear Polar atmosphere.

Comparison with the last such readings, taken some ten years before, would reveal any alteration in the density during that period. Tests were also to be made in more northern regions on the planes' homeward flight.

## JAPANESE PLANS

### MORE ABOUT "FUJI"

The "Fuji" (see June issue, p. 80) is the first Japanese ship specifically constructed for Antarctic observation purposes. Since it will have to make a voyage to the Antarctic alone and act as an ice-breaker, transport equipment and land it on Ongul Island and then engage in various observation activities, the ship is equipped with every conceivable apparatus and device needed to achieve its goals.

The "Fuji" is 100 m. long, 22 m. wide (328 ft. by 72 ft.) with a displacement of 7,760 tons, a maximum speed of 17 knots and a cruising power of 15,000 nautical miles. It can carry a total of 235 men. The ship is equipped with a 11,900 h.p. diesel engine of the electric acceleration type enabling it to move and reverse direction quickly. The engine can be controlled from four places in the ship.

"Fuji" is also equipped with U-pipe type anti-rolling tanks to counter rolling. These tanks are claimed to be the first in the world to be installed in an observation ship. The tanks will reduce rolling by one-third.

The ship's ice-breaking power is tremendous. It can crush ice floes up to 2.5 m. (8 ft. 2 in.) thick. It can also force its way through ice floes up to 6 m. (20 ft.) thick.

Three large-type helicopters will transport the cargo from the ship to Showa Base, moving 24 persons or four tons of equipment at a time. There is a take-off and landing deck as well as a hangar on the ship. "Fuji" has elevators, four cranes, fork lifts and conveyors in order to make it possible to transfer the equipment to the base in the shortest possible time.

The ship itself is equipped with various types of observation instruments which will enable the men to make observations from the ship and gather valuable data during the voyage.

Included among the instruments are sonar, radio sonde, mud-and-water-gathering instruments and

other pelagic, meteorological, cosmic ray and terrestrial magnetism measuring instruments. The "Fuji" is a floating research institute.

The Defence Agency will carry out training in the take-off and landing of helicopters on the ship's special deck as well as training for long voyages. Equipment will be taken on board in October and the ship will start on its voyage to the Antarctic about the middle of November, carrying 400 tons of food, fuel and instruments for Showa Base as well as 42 members of the land party and 182 crew members.

Japan first participated in Antarctic observations in 1956 when an observation team landed on Ongul Island and established its Showa Base. The team spent a winter on the island that year. Since that time Japan has sent six observation teams, with a total complement of 299 men, to the Antarctic.

Observations by Japan were temporarily suspended in February, 1962, but are scheduled to resume this year.

The generator hut to be erected by the 1966 expedition has been designed by the building and construction firm Takenaka Komuten Co. Ltd. It will contain two sets of 45 kw generators.

Constructed of aluminium panels, the hut has a floor space of 740.5 square feet and in addition to the generators will accommodate additional accessory equipment, a dark-room and a bathroom.

"Fuji" will call at Fremantle, Western Australia, on her maiden voyage to the Antarctic.

### DEFLATED EGO

Dr. Phillip Law, Director of A.N.A.R.E., recently slated today's Australians for "softness". An Australian newspaper sought the views of a number of young men and women on the point and among the published replies is the following by an attractive-looking 22-year-old girl teacher from Sydney:

"What does Dr. Law mean by the word soft? Going to the Antarctic doesn't prove you're a man."



# NEWS FROM THE SUB-ANTARCTIC

## MARION ISLAND

(S. Africa)

Sciocatti sent the following report for May:

"So far this month we have had six days of snow but no heavy falls occurred. The lowest sea-level pressure ever experienced by most of us, viz., 968.9 mbs, was recorded during the month.

"With most of our supplies stored and unpacked, more time is now available for walks inland and along the coast. During two exceptionally clear days with lots of sunshine and no cloud or wind, our cameras really worked overtime.

"The biologists are not very pleased with the frequent spells of bad weather that sometimes last for days, keeping them from doing their research which is done mostly in the field."

## IDYLLIC JUNE

Apart from the excellent meal and gay celebration afterwards on Mid-winter's Day, June was quite uneventful, with very little snow, lovely sunshine and a few days with strong winds. With a high pressure area stationary in the area for a few days, calm winds were measured in the upper air.

The Gentoo penguins were also nesting now so that the coastline did not look as completely desolate as a few weeks ago.

## ANOTHER STORY

Compared with June, there was a remarkable change in the weather during July. On the average it was a much windier month. The maximum hourly wind was 34 knots SW with a maximum gust of 55 knots. All upper air soundings were nevertheless done. Pressure varied from a maximum of 1032.5 mbs to a minimum of 979.6 mbs. Snow occurred on 10 days.

In a wistful final sentence, Sciocatti reported:

"Since we have been here for four months now, we already are looking forward to seeing ships but somehow

only Prince Edward Island seems to be looming up through the mist on the horizon."

## GOUGH ISLAND

On Gough Island the men had their first snowfall on June 9. The mountain peaks were all covered in snow and created a picturesque scene against the dark background.

Elephant seals have made their appearance on the island and gave at least one of the men the fright of his life when he unsuspectingly almost bumped into one of the bulls.

Fishing is good and rock lobster have also been caught.

## MACQUARIE ISLAND

(Australia)

We are indebted to the monthly "Newsletter" of the Australian Antarctic Division for the following description by Leader Bruce Ellwood of the Macquarie Island Station and its work.

Macquarie Island, situated at 54° 30' S, 158° 17' E, is 22 miles long and three miles wide. For approximately 19 miles of the length of the island there is the plateau, about 800 feet above sea level. The station is situated on an isthmus, about 20 feet above sea level, on the northern end of the island. There are no trees here but much of the island is covered by tussock grass, Kerguelen or Macquarie cabbage and various mosses. Twenty-nine species of birds and two species of seal breed here, the seals being the Sea Elephant and the Fur Seal. During the 19th century the latter were wiped out by sealers taking skins, and the Sea Elephant population was seriously depleted by their being killed for oil. The seal population is now on the increase with a count in February showing over 700 fur seals and, in the breeding season, approximately 11,000 Sea Elephants.

Of the birdlife here, the most numerous is the Royal Penguin with one rookery at Hurd Point holding up to one million birds. Along with a number of other birds, Royal and

Rockhopper penguins migrate from the island during the winter, while Gentoo and King penguins remain. The weather at the island is usually wet and overcast, with temperatures ranging from 16° to 55°F. Strong winds and heavy seas usually pounding the west coast have been the reason for so many ships being wrecked here.

### SCIENTIFIC WORK

The main purpose of the station is to make scientific observations, and this year we are recording weather, earthquakes, ozone (condensed oxygen) and tide measurements. We are also tracking satellites, photographing the aurora, studying botany and the life cycle of Elephant seals and penguins. This programme necessitates buildings, power, light, cooking, communications and, of course, somebody to look after the general health. Consequently, in all cases there is a specialist in each field who can, with assistance from others in the party, keep the work going.

Recreational activities include the usual table games, such as snooker, pingpong, cards, etc., with films once or twice weekly, but radio also plays quite a big part in this. Friday night's "Calling Antarctica" on Radio Australia has a 100 per cent. following listening for messages and records from family and friends at home. This programme is ably presented by Norma Ferris. During May, the A.B.C.'s Russ Tyson broadcast a special programme for us on his "Hospital" half-hour. As can be imagined, this was heartily appreciated by all.

Weather details over May follow: Highest temperature 44.8°F, lowest 30°; highest wind speed 79 m.p.h. There was rain or snow on 28 days and a total of 25.2 hours of sunshine.

"Recent news over the radio about the cold snap back home," said Ellwood at the end of June, "has many of us thinking that perhaps this is becoming a south sea island paradise of sorts. Perhaps some of you will agree, after reading our weather information for the past month:

Lowest temperature 24.8°F, highest 45°; rain or snow on 28 days, with a total of 275 points of rain;

21½ hours of sunshine; highest wind speed, 86 m.p.h.

"Working on the Plateau during the freezing weather, both Jenkins and Simpson had their beards frozen, so Bryden and Dart shaved theirs off. The change had so much effect on the remainder of the party that all other beards were left on."

"Mid-winter's Day, the hardest worked man at the station was chef Ted Giddings. The magnificent six-course dinner would certainly not have been out of place were our mess the Waldorf Astoria. Just to mention a few items on the menu: Crayfish Newburg, Carpetbag steak with mushrooms, Bombe Alaska. The centrepiece of the buffet was a huge cake forming a relief of the island. Table decorations were enhanced by menu-serviette holders carved from wood in the shape of Gentoo penguins carved and painted by Pocock.

"The evening brought out many budding entertainers. Next morning Lim expected a rush on stomach powders, etc., after excessive eating, but he was pleasantly surprised to have no patients. The mid-winter magazine was an immense success."

In July, Simpson gave a lecture on geology, earthquakes, etc. Much thought was given to his remarks at the time, but many probably forgot about it over the next few days. On August 2, at 11.20 p.m., thoughts immediately went back to his lecture after two tremors severely shook the station. Most of the party were in bed and on leaping out to the floor found that it was hard to keep balance. One even complained of symptoms of seasickness. After developing the seismograph trace, Sutton showed that there were 20 tremors between 11.20 p.m. and 9.30 a.m. the following morning. Top song on the local hit parade is now "Shaking all over".

Anxiously awaiting the arrival of some wandering birds and animals are Bryden, who is hoping to take a five-ton elephant seal specimen, and Dart, who is carrying on the skua studies.

Whilst awaiting good weather for the new aerials to be erected, Jack-

son and Bishop wielded paint brushes; it is hoped to finish painting by September. Pocock made a trip to Caroline Cove to dismantle a hut and begin transferring it to a new site some miles away. Once again the usual bad weather and shortage of time stopped the job's completion. Jenkins is probably one of the few who will not have to worry about waist line, with his many trips to the plateau carrying instruments, etc., weighing up to 100 lb., and carrying this weight up a steep 800 ft. hill.

Weather information for July: highest temperature 43.8°F, lowest 29.3°; maximum wind speed 71 m.p.h.; 35 hours of sunshine, and rain or snow on 27 days.

### WILL MACQUARIE BE BLOWN AWAY?

Two scientists said in Melbourne in June that rabbits were eating the island bare of vegetation and exposing soil and rocks to rapid erosion.

Dr. P. G. Law, of the Antarctic division of External Affairs Department, said: "There mightn't be any Macquarie Island left in 50 years.

"Rabbits have eaten out much of the natural vegetation, and in parts erosion has got through the top soil and reached gravel."

Rabbits were taken to the island so that shipwrecked survivors would not starve.

Dr. Law said a major programme was needed to protect the island, but there was disagreement on how to go about it.

### CAMPBELL ISLAND

(New Zealand)

(Received from the Officer-in-Charge, Colin Clark)

We have had a busy time on Campbell Island since our last report. As any psychologist will tell you, that is the best way to ward off those old "sub-Antarctic blues". Pretty well all the buildings that can be painted have now made acquaintance with bright new colours and the station is beginning to look quite a picture.

Our winter weather has been a mixture of good and bad, but mostly bad. In June we had the ludicrously low figure of 3.9 hours of sunshine,

an average of six minutes per day. In the same month a violent westerly storm caused temporary havoc in the aerial farm. The wind reached a maximum 98 knots and was bitterly cold. It says much for the design and construction of the station that we can withstand such fierce winds and suffer relatively little damage.

Mid-winter's Day was the social highlight of these last three months. Great credit must go to Chef Gordon Surrey for turning on another gastronomical masterpiece. Genuine Russian caviar, a variety of Californian wines and the choicest New Zealand foods made for a memorable meal.

We heard from Macquarie Island recently that their biologists are planning to "knock off" the biggest beachmaster bull telephant seal to take up residence this spring as part of their scientific programme. One of the projects is to get the accurate weight of one of these giants. So we are running a competition between the two islands to see who will be closest in guessing the correct weight. A game of chess is also going on with Macquarie—one move each per week. Next year's expedition may have to finish it off.

We would like to take this opportunity of congratulating former Campbell Islander Bob Thomson on his appointment as Superintendent of N.Z. Antarctic Division, a most fitting climax to an outstanding Antarctic record.

Next year's party, which will be taking up residence in October, is a mixture of old and new hands. "They keep coming back." The line-up is as follows:

Officer-in-Charge: Don Nightingale.  
Senior Meteorological Observers: Ron Craig\*, John Squibb.  
Meteorological Observers: Dave Paull\*, David Shone, Anthony Bromley.  
Ionosphere Observer: Douglas Leigh.  
Telecommunications Technician: Warwick Fergusson.  
Mechanic: Alan Guard.  
Electronic Technician: Peter Hughes.  
Chef: Gordon Surrey.  
\*Coming off island last transport February.

# Whaling Nations Still Reluctant To Reduce Quotas

Despite ominous and repeated warnings that whale stocks in Antarctic waters will very shortly be reduced to a level which will make whaling uneconomic unless killing is drastically curtailed, the June meeting of the Whaling Commission seems to have made little progress towards any effective joint action.

At the International Whaling Commission last year it was recommended that the catch be limited to 4,000 blue whale units and Japan was allocated 52% of the total, Norway 28% and the U.S.S.R. 20%, but the total catch figure remained at 8,000, and the season ended without any quota agreement being reached. In point of fact the whalers were, for the first time, unable to reach their own proposed catch figure, an indication of the truth of the biologists' warning that at the current rate of slaughter whaling will soon no longer be worthwhile.

A private emergency conference of the "whaling nations", Japan, Norway and the Soviet Union, was held in May in an effort to reach agreement on a cut in the annual catch.

Prior to this year's full meeting of the Commission spokesmen for wild life conservation bodies (including Peter Scott, as chairman of the World Wildlife Fund) urged the main users of whale products to switch to substitutes wherever possible until the world's whale population returns to a more self sustaining basis.

A five nation private meeting was also held involving the three whaling nations as well as the United Kingdom and the Netherlands.

## WITH LITTLE SUCCESS

The 17th annual meeting of the 17 nation Commission began in London on June 28 with the quota for the 1965-66 season tentatively fixed at 4,500 blue whale units, which is 50% above the figure recommended for this season by the Commission's Scientific Committee. Only 14 of the 17 member nations were represented: Brazil, Mexico and Panama were absent.

The Commission agreed to the 4,500 unit limit, with stricter cuts to follow, but no pronouncement has apparently been made on the vexed quota question. The killing of whales in the Pacific north of the equator has been forbidden, for 1966 in the case of humpback whales, and for five years from 1966 in the case of blue whales.

To the great relief of Australian land-based whaling interests, the Commission also agreed to forbid using whale catchers attached to a factory ship for the killing of sperm whales between 40°S and 40°N. It is reported that seven countries supported this Australian proposal, but Japan and the Soviet Union opposed it. The decision, to be effective, must be ratified by the seven Governments concerned.

It is reported, however, that Japan will send only five fleets to the Antarctic for the 1965-66 season. The usual number recently has been seven. This presumably reflects the reduction of the total permissible catch from 8,000 to 4,500 blue whale units.

The proposal to place independent observers on whaling fleets has apparently again been scotched.

## HARD WORDS

So the death of a vast industry seems to be looming ever nearer. As a writer in the N.S.W. Financial Review caustically puts it:

"Whale are very short-sighted", but "it is not their own lack of vision which threatens them but that of the industry which surrounds them".

Or in the words of a less restrained observer: At the Whaling Commission "Commercial greed sank to a

## THE SEASON'S CATCH 1964-65

We are indebted to Norsk Hvalfangst-Tidende for the following statistics of pelagic whaling during the 1964-65 season.

### Blue Whale Units

Permissible catch, 8,000 units.  
A blue whale unit represents 1 blue whale, or 2 fins, or 6 seis.

Norway (4 expdns.) .....	1,273
Japan (7 expdns.) .....	4,125
Soviet Union (4 expdns.) .....	1,586
<b>Total .....</b>	<b>6,984</b>

In 1954-55, 10 years ago, the permissible catch was 15,500 blue whale units!

### Species Caught

	N.	J.	Sov.	Total
Blue .....	—	—	19	19
Fin .....	701	4,780	1,824	7,305
Sei .....	5,506	10,402	3,937	19,845
Sperm .....	1,617	3,071	4,132	8,820
	<u>7,824</u>	<u>18,253</u>	<u>9,903</u>	<u>35,989</u>

### IN RECENT YEARS

The catastrophic fall in the blue whale catch is only partly explained by the restrictions imposed on the catch of this species. The rapid steady fall is significant. "The great increase in the catch of sei whales is due to the fact that the expeditions have, owing to the fall-off in the catch of fin whales, concentrated their activity on the fields where occurrences of sei whales are largest." The sperm whale catch is not included in this table.

Season	Blue	Fin	Sei
1960-61 .....	1,740	27,374	4,310
1961-62 .....	1,118	26,438	4,749
1962-63 .....	947	18,668	5,503
1963-64 .....	112	13,870	8,286
1964-65 .....	19	7,305	19,845

new low of arrogant, myopic stupidity. . . . For the sake of short-term profit they threaten an irreplaceable world heritage."

## "ANTARCTICA"

The important new work on Antarctic Research produced by the New Zealand Antarctic Society and edited by Dr. Trevor Hatherton will be on sale about the end of September. (See review in "Antarctic" March 1965, p. 50).

"Antarctica", a very handsome production, is being published in America by Praegar, in New Zealand by Reed, and in the rest of the world by Methuen.

## INDEX

### "ANTARCTIC" VOLUME 3

1962-1964

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### WANTED URGENTLY

Will any reader who has a copy of "Antarctic", Vol. 3, No. 5, March 1963, which can be spared, please forward it to the editor. (This issue has for its cover-picture a photograph of mother and baby seals.) We are unable to supply the demand for this issue.

### ROYAL SOCIETY POST

Mr. G. W. Markham, who retired recently from the post of Superintendent, Antarctic Division, Department of Scientific and Industrial Research, has been appointed as the first full-time executive officer of the Royal Society of New Zealand.

Increasing activities in many scientific fields had brought considerable executive duties to the societies' elected officers in recent years, said Dr. Fleming, the Society's President. Mr. Markham, who would commence his new duties in about four months, would carry out this work, and the considerable future expansion of activity planned by the society.

Mr. Markham will bring to the society a considerable experience in the administration, organisation and promotion of scientific research.

## ANTARCTIC STATIONS

### 3

#### THE ARGENTINE ISLANDS

Although this is not the oldest continuously occupied British Base, it has had a long run and is important scientifically. There are many interesting features about the Argentine Islands, not the least of which is their reputation for fine weather which is why the area is commonly called 'the banana belt'. Those who winter there can usually be relied upon to appear on board the first relief ship looking fit and well fed and wearing a golden tan.

The Argentine Islands are about 180 in number, of which only 11 are more than half a mile long. They lie in latitude  $65^{\circ} 14' S$ , longitude  $64^{\circ} 15' W$ , some five miles off the west coast of Graham Land. The group on which the base is situated consists of three of the larger islands (Skua, Winter and Galindez). These are set very close together, none of the dividing creeks being more than one hundred yards wide. The majority of the islands are low lying and are snow free in summer but the largest have permanent ice caps and an elevation between 100 and 200 feet. These ice caps are peculiar in that they rise gently from the north and terminate abruptly in ice cliffs of up to 100 feet high in the south. An explanation suggested by the British Graham Land Expedition was that they are remnants of the continental ice cap. Others contend that they are merely the result of the accumulation of drift snow in the lee of high rock. Geologically the islands are composed of mainly Upper Jurassic volcanics. There is a good deal of exposed rock and in summer bright green patches of moss provide a welcome relief from grey, black and white. On Galindez Island a large area of moss has formed deep deposits of fibrous peat in which Wilson's Petrels burrow to make their nests. Other breeding birds are Skuas, Dominican Gulls and Shags and there is an Adelie penguin colony on the nearby Jal-

lour Islands. Weddell seals haul out to pup around the islands in September and in the summer many large pods of Crabeater seals may be seen basking on ice floes or swimming around in hundreds feeding on surface krill.

The islands were discovered by Dr. J. B. Charcot during his "Antarctic" expedition of 1903-5. He named them in appreciation of the help he had been given by the Argentine Government. What a pity he never thought of wintering there, either then or later on his "Pourquoi Pas" expedition of 1910-12. His ships could have been securely moored in one of the creeks without any of the troubles he had with drifting ice bergs at Booth Island and Peterman Island. Though only a few miles further south, he would certainly have experienced better weather and perhaps have made more extensive journeys into Graham Land over firmer sea ice in the winter.

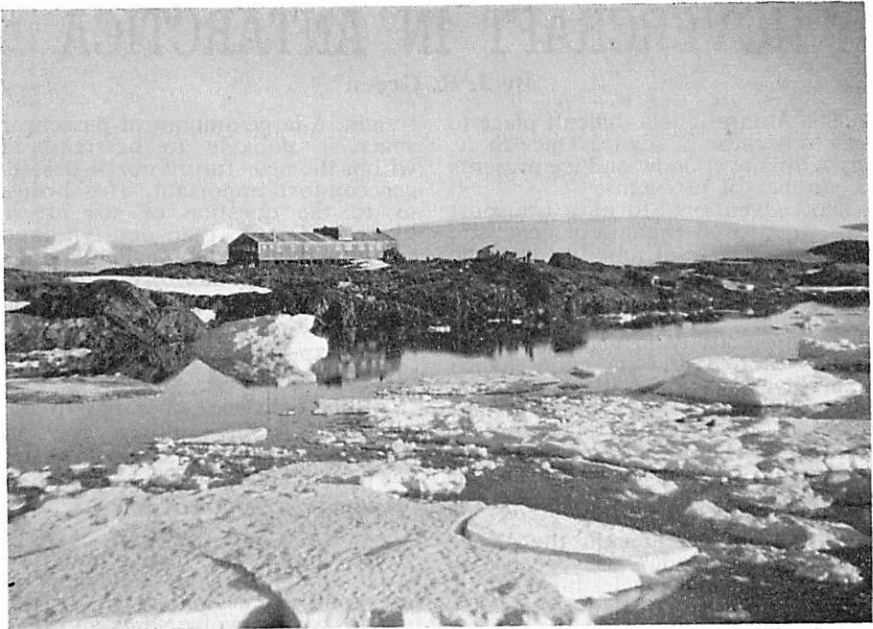
It was left to John Rymill of the British Graham Land expedition, 1934-37, to discover the value of the Argentine Islands as a place to build a base and moor his ship, the "Penola", for the winter.

The expedition hut was built on a sheltered spit of Winter Island at the junction of the three creeks. From Rymill's point of view this was an ideal site for a hut and it was close to the tiny cove in which he moored the "Penola". There was ample snow for the dog spans and enough flat sea ice from which to fly his light aeroplane.

During 1935 the B.G.L.E. accomplished some valuable scientific work. They were fortunate in having good winter ice and ran topographic and geological surveys, down the Graham Land coast to Cape Everson, thus disproving the existence of Crane Channel in latitude  $65^{\circ} 20' S$ . (When, later, they disproved the existence of Casey and Lurabee Channels they finally disposed of the theory that the Antarctic Peninsula was an archipelago.)

The area abounds in wild life and so very useful biological work on seals and birds was done.

There is no record of anyone visit-



B.A.S. photo.

ing the Argentine Islands between 1936 and February 1942 when a ship of the Argentine Navy called to leave marks of sovereignty. These were found by Surgeon Commander E. W. Bingham, R.N., leader of the Falkland Islands Dependencies Survey when he called on 19th February 1946, in M.V. "Trepassey" to inspect the hut. For him, as a member of British Graham Land Expedition, the visit was nostalgic and he was pleased to find the hut in good condition. Imagine his surprise therefore when almost a year later, at Stonington Island, he received a report that "Trepassey" had called at the Argentine Islands with the intention of installing a party there, only to find that the hut had completely disappeared. There were signs to suggest it had been washed away by a tidal wave. For some reason or other it was thought to be necessary to build a new base on the same site and a few men were accordingly left ashore on 8th January 1947 to start work. Using timber brought down for general use they built a small shed in which they lived until the materials for a small

but comfortable hut arrived later in the season. It was named Wordie House after Sir James Wordie of Shackleton's "Endurance" expedition.

Base 'F', as it was then called, remained in existence on this site until 1954 when, early in the year, a new base was erected on Marina Point, Galindez Island. The new site had three main advantages over the old. Firstly, there was more room for the huts and equipment required for upper air observations. Secondly, there was a better exposure for meteorology. Thirdly, it was far easier to re-supply, being close to a sheltered anchorage in Meek Channel (ships have even tied up alongside a steep rock face of the shore). Since that time, spurred on by the I.G.Y., there has been a considerable expansion in the scientific programme and in the size of the base. The disciplines now include ozonometry, solar radiation, seismology and ionospherics and upper air winds are measured by radar. The base has a permanent staff of 15 men.

# HOVERCRAFT IN ANTARCTICA

by J. R. Green\*

The Antarctic is a difficult place to get to because of sea ice. Once there, travelling over snow and ice presents a number of problems.

No conventional form of transport has yet proved capable of achieving the same degree of mobility that one expects and gets elsewhere. Obviously the aeroplane has considerably extended the range and scope of Antarctic activity in general but its use is limited and its maintenance expensive. What we want is something which can travel over land and sea, which can ignore the nature of the surface and yet remain in contact with it. The answer seems to lie in the Air Cushion Vehicle (A.C.V.) or Hovercraft.

At first it was thought the A.C.V. would not be much use because it could not clear obstacles higher than about 1 foot (e.g. SR. NI.). A substantial improvement resulted, however, from the introduction of the flexible skirt. The SR.N5, for instance, can now clear solid obstacles of about 4 feet and waves between 6 and 8 feet. This opens the way for an A.C.V. to "step up" from the sea to pack or fast ice since sea ice (as distinct from ice shelf) which has not been under pressure, rarely stands more than 3 feet above the surface. Once on the higher level of the ice any protruberance above 4 feet can often be avoided without undue deviation. On land gradients may be steep and deformation of the snow surface will be encountered. The most prevalent of these are sstrugi which may be 5 feet high or crevasses which may be anything from 1 to 50 feet wide, either bridged or open. Routes which may be negotiable by an A.C.V. may therefore be restricted but to what extent is hard to say. It seems likely that it can be adapted to surmount some of the apparent difficulties.

In looking for something which can travel relatively freely over sea, floating ice and snow covered land we are concerned mainly with

freight. A large amount of passenger space is unlikely to be required within the near future nor is passenger comfort important. This brings us to the question of size. It is likely that more than one type and size of A.C.V. will be called for depending on the nature of the task.

As far as the British Antarctic Survey is concerned—and many other expeditions too—there are three sorts of task:

- (a) Bulk deliveries of cargo to the coast
- (b) Consignments of stores to maintain inland stations
- (c) Carrying supplies for scientific traverses.

Discounting the small amount of cargo which can be delivered by inter-continental air services, the first task will involve ships and it is not conceivable at present to replace them with A.C.V.'s. However, a ship can be held up as much as 200 miles from its destination by pack ice and perhaps 50 miles by fast ice. The situation will normally improve with time but not always completely. Because time is valuable and success ought to be assured ice breakers are often employed at least to break fast ice. Alternatively ships will be held back until optimum conditions are likely to obtain. This causes delay and may not result in success. It is slow work even with an ice breaker which costs a lot to build and run and has no worthwhile cargo capacity.

What we need here, then, to ferry cargo over the ice is the largest A.C.V. currently in production. The Westland SRN 4 with a payload of about 65 tons is a good example. It has a range of about 1,500 miles with extra fuel tanks, a cruising speed of 80 knots in calm conditions and can traverse waves up to 12 feet in height at 30 knots. An unsupported journey from South America to Graham Land in 12 hours is clearly within its capability especially if a fine day is chosen. For a journey

\* Operations Officer, British Antarctic Survey.



of 2,000 miles taking, say 36 hours, it could refuel from a ship stationed half way. If bad weather unexpectedly develops it can sit on the sea and ride it out. Using the SRN 4, a small ship carrying 1,000 tons of cargo could be discharged over 200 miles of pack and fast ice in 3 days.

To maintain an inland station of the size and distance from the coast of Byrd or the South Pole would probably require a vehicle of the size of the SRN 4 for the job to be done effectively. Smaller stations may not require anything larger than the SRN 5 with a 2 ton payload; a lot depends on the distance.

As for scientific traverses the SRN 5 is clearly the sort of A.C.V. which will prove suitable and it may therefore serve a dual purpose. Its leading particulars are:

Power rating: 900 h.p.

Maximum speed

0.5 ft. skirt clearance: 70 knots.

Maximum speed

0.75 ft. skirt clearance: 57 knots.

Gradient

1:6 slope: hover

1:3 slope: climb 50 yards with 23 kt. initial velocity

Obstacle clearance

Vertical obstruction: 3.5 feet

Earth banks: 5 feet

Range: 240 nautical miles with 3,300 lbs. payload

Endurance: 3.5 hours

It seems that the SRN 5 has a reasonable performance on gradients. For traversing slopes it might put down some sort of keel. Slopes beyond its capability might be overcome by winching. In any event it seems desirable to have the vehicle mounted on skis to support it clear of the snow and to permit manoeuvring at rest. If it can run on skis on smooth flat surfaces, fuel might be saved. Its performance over crevasses is unknown but with a vehicle 30 feet long most open crevasses could be bridged even if lift is lost which seems unlikely if sufficient momentum can be maintained.

Bridged crevasses would appear to pose less of a problem even if the bridges collapse under pressure. Sasstrugi may prove to be the most difficult obstacles to negotiate.

There is undoubtedly a future for A.C.V.'s in Antarctica. The sooner they are put to the test the better.

### ANYTHING IN NAMES?

In our March issue we noticed that one of the weather observers to be stationed at Wilkes this year is Mark J. Forecast.

Mr. John Milne, Observer-in-Charge, Apia Observatory, Western Samoa, points out that with the A.N.A.R.E. expedition on Macquarie Island in 1961 the meteorological Observer-in-Charge was Reginald J. Frost.

### AIRSHIPS AGAIN?

A Leningrad institute has started design work on an airship intended for use in agriculture. The designers believe that air-ships would reduce costs to a fifth of that of ordinary aircraft and to a twelfth of that of helicopters.

The discussion started with a letter to "Izvestia" last year in which a group of engineers suggested that dirigibles were now a safe and economic proposition, thanks to the availability of inert helium in place of the dangerous and highly inflammable hydrogen gas previously used. There are also now much lighter and stronger materials available for harness and gondolas.

Airships could deliver complete intricate, heavy pieces of equipment which now have to be dismantled and reassembled on the site.

In the discussion Soviet polar explorers declared that airships would be particularly handy in the Arctic, where they could land exploring parties and cargoes in places inaccessible to ordinary aircraft.

So over 60 years after Scott's first air-view of the Antarctic, at Balloon Bight in the Ross Ice Shelf on February 4, 1902, perhaps lighter than air aircraft may again be seen in the Antarctic skies.

## A STONE FROM THE DRY VALLEYS

You send me this stone,  
From the uttermost ends of the earth,  
From Antarctica.  
From the depths of the night  
When the sun comes no more,  
And where men are as seals  
Plunged deep in a world  
Dim, 'neath its pack-ice of stars,  
Where their long winter lives  
Turn in the gyre of the darkness:  
Where the hyena voiced winds  
Howl the half empty camp,  
Savage to lick skin from an ear,  
A cheek or a hand.  
In that land  
Men return further back into time  
Than legends or gods,  
Further than pot shards,  
And the strange incantations  
Of their own nation's birth.  
Before then, lay this stone  
In the dry valleys, lost to time,  
Tongued by the wild beasts,  
The many, onsetting gales  
That slip-stream from a wilderness;  
Till it changed to a frond or a leaf  
Or the wing of a bird.  
Refined by eons of torture,  
Nothing so lovely, esthetic,  
So blizzard-honed  
Has lain in my hand.  
What a message is sent me  
In this ravaged and eloquent stone.  
For so, their hearts suffer  
Beset in her solitude  
Men who love her, Antarctica.

*Alison Sanson*

*Hokitika*

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## ANTARCTIC BOOKSHELF

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**ANTARCTIC GEOLOGY.** Proceedings of the First International Symposium on Antarctic Geology, held at Capetown, 16-21 September, 1963. Edited by R. J. Adie; North Holland Publishing Company, 1964.

*Reviewed by R. W. Willett*

At this Symposium, attended by 50 delegates, the 76 papers covered sub-Antarctic Islands, geomorphology, glacial geology, general geology, stratigraphy, mineralogy, petrology, geophysics, geochemistry, geochronology, paleontology, structure and tectonics, submarine geology, and the relationship of Antarctic and Southern continents. A number of papers and particularly the discussion that followed highlighted some of the problem points of Antarctic Geology, such as the question of tillites, the Beacon Sandstone and the correlation and similar formations in South Africa (and other Southern Continents).

The volume is plainly and clearly printed, fully illustrated with black and white maps with numerous photographs although some maps and photographs have suffered because of their smallness.

An overall map of Antarctica to enable the reader to orient and locate himself in a wilderness of new place names would perhaps have assisted. The New Zealand authors have indicated the areas covered by their papers in a locality map accompanying a paper by Grindley and Warren.

Nine papers by New Zealand authors cover regional geology largely explored and mapped during the 1962-63 summer season and, often in common with papers from other nations, deal with relatively small areas. Other papers make contributions covering some of the important Antarctic-wide stratigraphic and structural problems. One such paper by Grindley and Warren discusses the stratigraphic nomencla-

ture and correlation of the formations of Western Ross Sea Region. This paper is one of the most important contributions to the stratigraphy of Antarctica. Over the years New Zealanders have had the good fortune to work in an area of almost a third of the exposed rock of Antarctica and so are responsible for many Antarctic formational names. Other important review papers are those of Nichols (U.S.) on Antarctic glacial geology; Mirsky (U.S.) on the "Beacon" as a stratigraphic name, Campbell Smith (U.K.) on petrography of igneous and metamorphic rocks, Plumstead (S.A.) paleobotany of Antarctic; Klimor, Ravich, and Solovier (USSR) on the geology of the Antarctic Platform. The importance of these papers is measured by the discussion which follows each paper. It is a cause for regret that no Russian geologist attended the Symposium and consequently there was no opportunity for discussion with the authors of these papers nor for Russian geologists to contribute to other discussions.

An interesting paper linking this symposium with the earlier "heroic" age of Antarctic exploration is that by W. Campbell Smith. Here is the final description of the igneous and metamorphic rocks of South Victoria Land based on the collections made by the "Terra Nova" Expedition 1910-13.

An important section of this volume is a collection of papers on absolute dating of basement rocks of Antarctica. This study of Antarctic geology since the advent of SCAR has had the advantage of the relatively new tool of isotope dating in an area of the world where basement rocks are insufficiently exposed to permit lithological correlation.

Continental drift has a fascination for many and for some South African geologists it amounts to almost a faith. This was a frequent point of animated discussion at this Symposium, especially when sweeping correlations were made: the Beacon

Sandstone and the Karroo, the tillites of Antarctica and the tillites (Dwyka) of South Africa. The presentation of discussion following the papers is especially valuable where it follows the papers covering broad reviews of the Beacon, the Antarctic Paleobotany and those on the broad structure of Antarctica. Especially useful is the discussion following a paper by King and Dornad on the "Importance of Antarctica in the pothesis in the Continental Drift". In many ways too much is taken for granted by King and other South African geologists whereas others are not so thoroughly convinced. Nevertheless, hypothesis is stimulating and Antarctic geology offers a new area, uncluttered with the prejudice of dogmas that built up in the geological literature of older countries and is being attacked by new and young minds. It may well be that the lack of exposures in the Antarctic is definitely a stumbling block but if this symposium is any evidence then what is exposed is being examined carefully and objectively.

The volume is one which all earth scientists interested and working in the Antarctic will want. Although many of the papers presented will be expanded and changed by later work, there are a number which will remain as source material vital to the study of Antarctic Geology. The whole volume is a tribute to Dr. R. J. Adie, editor, and the North Holland Publishing Company.

Finally, one may be forgiven a parochial note. This volume, the product of 12 nations, is of 750 pages and by way of comparison New Zealand geologists have over the years produced papers in three special issues of 660 pages of the *Journal of Geology and Geophysics*. New Zealand has every reason to be proud of her geological work in the Antarctic and it has given many of our young graduates a chance to work on original geology outside New Zealand, meet other geologists and an opportunity for adventure. The unseen dividends from New Zealand's Antarctic work are difficult to estimate.

**PRINCIPLES OF STRUCTURAL GLACIOLOGY**, by P. A. Shumskii, translated from the Russian by David Kraus. Published by Dover Publications, Inc., New York, 1964. Price \$3.00. 497 pp. + xiii, 124 figures, 7 tables. Bibliography of 400 entries.

Professor Shumskii (Director of the Soviet Institute of Permafrost) visited Wellington during the Symposium on Antarctic Research in February, 1958, and has taken an active interest in Antarctic research for many years.

This book, written by one of the leading specialists in the field, offers a systematic treatment of structural glaciology (the study of ice structure)—the only authoritative work available on the subject. No study goes more deeply into the geochemistry and geophysics of ice substances than does this work. The book is divided into three parts; *The Mineralogy and Crystallography of Ice*, *The Petrology of Ice* and the *Geography of Ice*, each part being further subdivided into chapters. The Introduction sets out clearly the history of glaciological research in the Soviet Union and gives a general description of the science of glaciology as studied at present.

The translation by David Kraus is an excellent one, and while much of the book deals with glaciology in great scientific detail, I am sure it will be of interest to Society members superficially concerned with snow and ice. Unfortunately, glaciology, as such, is not taught in any New Zealand university, or for that matter, in very few universities outside the Soviet Union. However, there appears to be scope for such work, particularly in the Antarctic, so here then is the beginning of a sound study of this new (to us here in New Zealand) and exciting science.—A.J.H.

## A.N.A.R.E. REPORTS

We have received copies of the following reports published recently by the Australian National Antarctic Research Expeditions.

**THE ANARE 1963 EXPEDITION TO HEARD ISLAND.** G. M. Budd. 53 pp. Antarctic Division, Aus. Dept. Ext. Affairs.

This narrative of the expedition which included an unsuccessful attempt to scale Big Ben is, for the record, "ANARE Reports, Series A, Volume 1", but it is actually as readable as a good fictional adventure story, and will form an admirable introduction to any accounts of the past summer's successful assault on the mountains (see last issue). It is excellently illustrated and there is a first-rate new 1:50,000 map of the island, 34 in. by 23 in. The Publications Officer, Antarctic Division, Dept. of External Affairs, 568 St. Kilda Road, Melbourne S.C.3, Victoria, reports that normally ANARE Reports are not for sale, but genuinely interested organisations or individuals may apply to him for a "gratis" copy, stating the purpose for which the Report is required.

A.N.A.R.E. Reports. Series B, Vol. 1, Zoology. **THE INSECTS OF HEARD ISLAND**, by K. G. Brown, 39 pp., map, diagrams and illustrations.

A.N.A.R.E. Interim Reports. Series A (IV), Glaciology Publication No. 79. **THE PHOTOELECTRIC METERING OF WIND-BLOWN SNOW**, by I. H. Landon Smith and B. Woodberry; and **A NEW PHOTOELECTRIC DRIFT SNOW GAUGE**, by E. R. Wishart, 26 pp. Charts, illustrations and diagrams. Series A. Publication No. 76 **LIST OF PUBLICATIONS RESULTING FROM THE WORK OF A.N.A.R.E.** (to December 1964). Compiled by M. R. O. Millett. 48 pp.

A.N.A.R.E. Scientific Reports. Series B (II) Botany. Publication No. 78. **OBSERVATIONS OF THE FUNGI OF MACQUARIE ISLAND**, by J. S. Bunt. 22 pp. Maps.

## ANTARCTIC FIRST AID MANUAL.

Compiled for the Antarctic Division N.Z.D.S.I.R. by A. J. Heine. 70 pp. cyclostyled. Not for sale.

This latest edition of the manual compiled for the use of expeditions of the New Zealand Antarctic Research Programme is a fine production notable for the clear and practical instructions which are so essential for a first-aid guide to men with little knowledge of injury-treatment. Symptoms and methods of treatment are set out clearly, concisely, and in simple language, with priorities stressed by underlining and emphatic wording which is sometimes colloquial and "down to earth", e.g.

**"If you don't want to kill your patient treat him for shock at the scene of the accident. Don't walk him back to camp even if he says he is O.K."**

The practical emphasis is evident throughout. You are not advised to use medicaments which are not likely to be available in the field: and special attention is given to those injuries which are most likely to occur where the doctor and the hospital room are miles — and hours — away. Frostbite, exposure and snow blindness are fully dealt with, and so is carbon monoxide poisoning — a hazard of this mechanical age replacing the dog-bites of an earlier day. It is not forgotten that prevention is better than cure: there is a valuable Guide to Dental Health.

Altogether a volume invaluable to the man in the field but of great value also to anybody who is not always within phone-call of the doctor. One could wish it a wider circulation.—L.B.Q.

## TERRE ADELIE 1961-1963

**RAPPORT d'ACTIVITES.** Publication No. 251 of Expéditions Polaires Françaises. 125 pp. Maps, 11 illustrations, 24 charts and diagrams. This well illustrated Report tells the story of the 12th French Antarctic Expedition, covering all aspects of expedition life and work, including sections on each of the scientific disciplines, and on logistics and the field journeys.

## British Antarctic Survey

### BULLETIN

A warm welcome will be extended to this now firmly established B.A.S. publication, intended to be a medium for the diffusion of "preliminary reports or short notes and papers" including reports which are not specifically scientific, as contrasted with the full-scale "B.A.S. Scientific Reports" each of which consists of one 20- to 50-page monograph costing up to 20/-.

Each Bulletin contains half a dozen or so papers, of varied length, the Bulletins themselves varying in size from 50 to 100 pages but each priced at 10/-. No. 5 (January 1965), for example, contains papers on Glaciological Observations at Admiralty Bay, 1957-58 (11 pp.), Morphology and Regime of the Brunt Ice Shelf and the adjacent Inland Ice (30 pp., British Naval Hydrographic Surveys in the Antarctic, 1948-64 (4 pp.), Additions to the Alien Flora of South Georgia (3 pp.), Analysis of Visual Auroral Observations at Halley Bay, 1963 (12 pp.), and correspondence. Examples of "not specifically scientific" papers are Sir Vivian Fuch's "The Human Element in Exploration" (6 pp.) in No. 1, and J. P. Morley's "Polar Ships and Navigation in the Antarctic" (25 pp.) in No. 2.

One regrets that inevitably there is in each issue such a wide variety of topics that very few readers will be seriously interested in more than two or three of the papers comprising it. Perhaps it will be possible as material accumulates to devote an occasional issue more specifically to one discipline. Meanwhile most would-be readers will be content to refer to the files of the Bulletin in some convenient library.

### SOVIET BULLETIN

In previous issues we have referred to the English translations of the **Soviet Antarctic Expedition Information Bulletin** now being produced by the American Geophysical Union, 1145 19th Street N.W., Washington, D.C. 20036, U.S.A., with the aid of a grant from the National Science Foundation.

The Bulletin provides short, readable reports in many branches of Soviet Antarctic work, not exclusively scientific.

Volume 5, now being published, includes numbers 43 to 46 of the original Bulletin for the years 1961-64. It contains six issues, each issue comprising two numbers of the Russian publication. Volume 4 may be ordered from the American Geophysical Union at a cost of \$36. Volume 5, covering numbers 43-54, is in course of translation, and may be ordered on subscription at the same price.

### U.S. PUBLICATIONS

**The Distribution of Foraminifera off parts of the Antarctic Coast.** W. M. McKnight Jr. 118 pp. plates. Published as No. 201, *Bulletins of American Paleontology*, Vol. XLIV, by Paleontological Research Institution, Ithaca, New York.

**The Distribution of Foraminifera in the Eastern Ross Sea, Amundsen Sea and Bellinghousen Sea, Antarctica.** Charles E. Pflum, 106 pp., diagrams. Dept. of Geology, Florida State University, U.S.A.

Both the above are theses submitted to the Graduate School of Florida State University. Copies in library of Antarctic Division, D.S.I.R.

U.S.N.S. Eltanin Marine Geology Cruises 1 to 8. **Marine Geology of the Drake Passage, Scotia Sea and South Sandwich Trench.** H. G. Goodell, 263 pp., plates and maps.

### WHY BIOLOGISTS?

"What scientific gain could a biologist find in the Antarctic? What replies to the problems of life could be found in the very spot where life is most limited, where life is at its poorest?"

"Now it is just because of the exceptional peculiarities of the Antarctic that an astonishing crop of new facts is to be reaped there. Here you find yourself at the extreme limit of the possibility of life which hangs on and adapts itself to the severest climate in the world."

from "La Vie en Antarctique"  
by Nicholas Skrotzky in  
"Science et Nature."

# "MAGNETIC POLAR JOURNEY 1912"

## HISTORIC SPOT RE-VISITED

by R. B. Thomson\*

I have recently read a copy of "Magnetic Polar Journey 1912" by Eric Webb, the only remaining member of the historic trio Bage, Hurley, Webb, who made that early epic journey.

Apart from its great historic value, this story was of great personal interest to me owing to the fact that together with fellow ANARE member S. Kirkby, we were the first to revisit and camp in the Mertz Glacier region since the days of Mawson and his various sledging parties some 50 years earlier.

Our visit during early March of 1963 was certainly made easier by modern transport but did prove that even with present day equipment Antarctica and particularly the Commonwealth Bay-Mertz Glacier area can be more than a formidable foe.

The "Thala Dan" had managed to get close inshore at Buchanan Bay on the western side of the Mertz Glacier Tongue. Kirkby and I were then flown in by helicopter but aerial reconnaissance failed to find any formation resembling Mt. Hunt where we had hoped to set up camp. Therefore we changed plans and were deposited on Mt. Murchison, where we set up camp and our tellurometer station. This camp was very near the resting spot of Mawson's Party whose photo appears on page 224 of "The Home of the Blizzard" under the caption "A Distant View of Aurora Peak from the West". I took a similar photo from this spot and Aurora Peak appears exactly the same today as it did over 50 years ago.

Kirkby and I then attended to our tellurometer work which involved making contact with another party over 50 miles away across the Mertz Glacier to measure accurately its

width. Incidentally, final results of a distance of over 50 miles were only a few yards different from the figures given by Mawson's people using far inferior instruments.

Our work was just near completion when the wind struck with increasing force and blowing snow brought visibility to zero.

There followed many long hours huddled in our sleeping bags in the small tent, with little food or warmth, and failure of the radio to make contact with the ship.

The following evening brought great joy when we heard the familiar noise of a helicopter from close overhead, then suddenly the dark shape of the machine itself as it hovered lower and allowed us and some of our equipment to be hauled on board.

Then back out to the ship, "Thala Dan", which was now some 20 miles out to sea, having been forced out into clearer water remote from the hazards of bergs and floes being driven by the storm.

Safely back on board, we agreed that Commonwealth Bay is a really tough area of Antarctica. We have all the respect possible for Mawson and his men of the tough earlier days, so well described in "The Home of the Blizzard" and in this recent account by Eric Webb—"Magnetic Polar Journey 1912".

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### N.Z. PROJECT CLOSES

Dr. J. B. Gregory who as a member of the staff of the University of Canterbury has been responsible for the D-Region project at Scott Base over some years, has accepted a post in Canada. In consequence, the project will not be continued this year.

\* Superintendent, Antarctic Division, D.S.I.R., New Zealand.

# GLACIOLOGICAL SURVEY OF THE AMERY ICESHELF

by W. Budd

\* Glaciologist, Antarctic Division, Department of External Affairs, Australia.

A comprehensive 3 years glaciological survey of the Amery ice shelf has now been completed by ANARE field parties. The first exploratory work on the surface and glaciological observations were carried out in 1962. A vehicle route was established from Mawson to the iceshelf and a dog team party travelled as far south as the Manning Nunataks, carrying out glaciological observations en route. A series of 9 pits was dug roughly on a N.S. line and generally 2 m. deep primarily to investigate the change in rate of snow accumulation with distance from the ice front. A 4 m. deep pit at depot E cf. Fig. (1) showed the past accumulation and its metamorphosis for the previous 7 years. Stakes were left here for remeasurement in 1963.

A strain grid was established at depot E and remeasurement over a period of 4 weeks provided the first deformation results for the iceshelf. On the return voyage to Australia the front of the iceshelf was re-charted and a feature of it re-astroficed to obtain the rate of forward motion since 1957 and the subsequent change in position of the ice front.

For 1963 a plan was proposed for a comprehensive coverage of observations on the ice-shelf with the primary aim of setting out stake systems for remeasurement after one year, in 1964. This plan was carried out quite successfully using two dog teams supported by tractors.

Stakes were placed 2 miles (3.2 Km) apart on the iceshelf to determine the accumulation rates along its central flow line  $G_1$ ,  $G_2$ ,  $G_3$ ,  $T_4$ , as shown in Fig. (1) and across the iceshelf at front and back  $E$ ,  $G_1$ ,  $T_1$ ,  $T_3$ ,  $G_3$

$T_2$  respectively. At three positions down the central flow line,  $G_1$ ,  $G_2$ ,  $G_3$ , strain grids were established to measure primarily the longitudinal and transverse strain rates. Sun azimuth determinations and sunfixes were also carried out to measure absolute rotation and velocity.

Pits 2 m deep were dug at  $E$ ,  $T_1$ ,  $T_2$ ,  $T_3$ ,  $T_4$  and  $G_1$ ,  $G_2$ ,  $G_3$  and several intermediate points along the longitudinal line. Cores were also taken at these points to the depth of 10 m and the boreholes were used to measure the temperature profile with depth to establish the annual mean air temperature at the surface.

In 1964 the previous year's route was followed, using two weasels with cargo sleds, and a skidoo (motor toboggan) with dog sled.

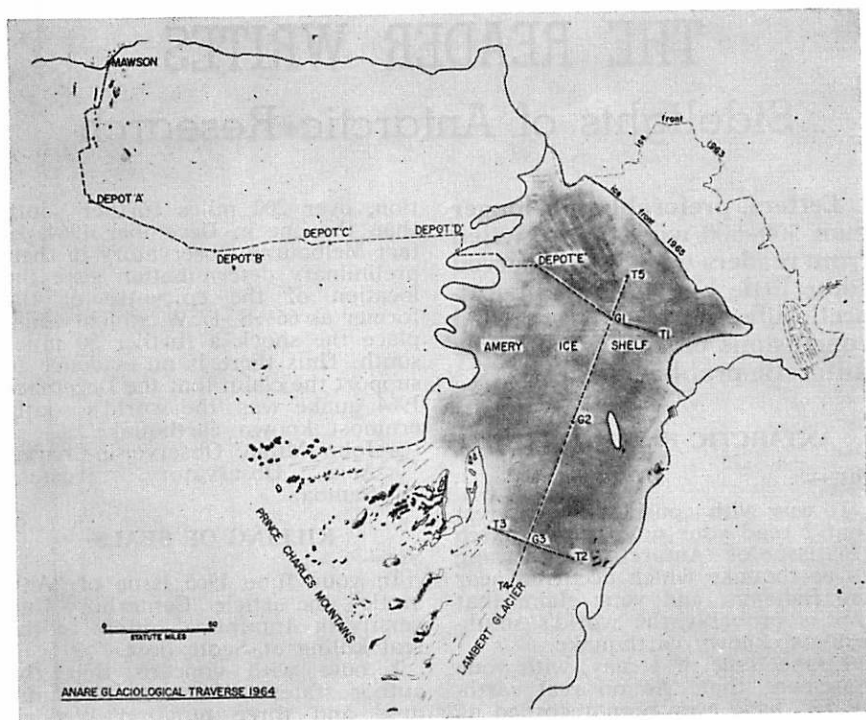
The accumulation stakes were located and remeasured, the strain grids resurveyed, and astrofixes and azimuths were repeated. At two positions resection to rock features provided a check on the absolute velocity results of the astrofixes. Two further strain grids were established at  $T_4$  and a new point  $T_6$  (cf. map) to be remeasured at a later date. Pits 3 m deep were dug along the central flow line. Cores were examined to 6 m depth and the temperatures in the boreholes were measured.

A set of three precision digital aneroid barometers were used to determine the relative elevation profile over the route by a modified leap-frog technique. At numerous points along the central flow line the slopes were checked by theodolite.

An attempt to measure the iceshelf thickness by a radio altimeter device, successfully tested to 300 m depth near Mawson, was thwarted by irreparable damage to the power supply during a calibration run. It is hoped that thickness measurements

\* Attached to Meteorology Department, University of Melbourne.





will be made by this method in the future. Other plans include a visit to the iceshelf in 1967 to remeasure the strain grids and redetermine the movement and the velocity profile, establish a thickness profile with radio gauge, and commence a drilling programme to obtain the vertical distributions of temperature, density and crystal structure.

### EDITOR'S NOTE

(The above relatively non-technical account of an important glaciological research-project will, we feel, be of interest to the ordinary reader as well as to Mr. Budd's fellow-scientists. The author's more technical "preliminary results and conclusions" may be summarised as follows.)

The Amery Ice Shelf is very flat. Its thickness is estimated to range from 190 m at the front to 400 m at

the mouth of the Lambert Glacier.

The annual mean surface temperature decreases from 19.1 C at T5 to 23.3 C at G3.

The ice shelf is not in a state of continual balance. On the contrary, the loss from a large break-out in 1963 (see "Antarctic" March 1965, pp. 24 and 31) was about one-fifth of the ice shelf area, estimated to be 40 years' growth. Prior to this event, from 1936 to January 1963, the ice shelf front showed a general forward movement and outward spreading.

Astrophixes carried out on the same feature in 1957 (Russian) and 1963 (Australian) gave a forward velocity of about 1500 metres per year at the ice front. Away from the front the velocity decreases at first very rapidly and then more gradually until it reaches about 300 m per year on the Lambert Glacier.

# THE READER WRITES

## Sidelights of Antarctic Research

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

### ANTARCTIC EARTHQUAKES

Sir,—

It was with considerable interest that I read your note in the March 1965 issue of "Antarctic" concerning an earthquake which occurred near the Ballenys, and your claim that this is probably the world's southernmost known earthquake.

I take issue, if I may, with your statement that, 'As no real earthquakes have ever been recorded as occurring on the Antarctic continent, this is probably the world's southernmost known quake.'

According to information supplied by the United States Coast and Geodetic Survey (USCGS) on their preliminary determination of epicentre cards, at least three earthquakes occurred during 1962-63 which were further south:—

(i) 15 October 1962, at 65.0S, 178.2E, 800 km northeast of the Balleny Islands, origin time 21 26 20.7 GMT.

(ii) 17 June 1963, at 65.8S, 179.5W, Scott Island, origin time 18 30 54 GMT.

(iii) 17 August 1963, at 63.4S, 169.5E, Balleny Islands, origin time 11 33 28 GMT.

For a comparison, the corresponding information for the earthquake recorded at Scott Base at 1.23 a.m. on 31 December 1964 is:—

(iv) 30 December 1964, at 62.6S, 165.8E, Balleny Islands region, origin time 13 19 47.4 GMT.

The earthquake in June 1963 is, according to the USCGS determina-

tion, over 200 miles further south than the one in December 1964. In fact Melbourne Observatory in their preliminary determination gave the location of the epicentre of the former as 66½S, 175W, which would place the shock a further 50 miles south. Thus there is no evidence to support the claim that the December 1964 quake was 'the world's southernmost known earthquake'.

—John Milne, Observer-in-Charge, Apia Observatory, Western Samoa.

### KILLING OF SEALS

Sir,—

In your June 1965 issue of "Antarctic", the article "Canterbury University in Antarctica" refers to the seal killing at Scott Base.

I note with concern that the author states—"Between one hundred and three hundred Weddell Seals, possibly more, have been killed annually for dog food at Scott Base during the past nine years."

The wide range of figures quoted, apart from being grossly exaggerated, is very misleading, and I am sure that many of your readers would welcome more precise and conclusive information.

Set out below are the official figures on the number of seals killed annually by personnel at Scott Base since the formation of this Division in 1959.

1959-60	.....	110
1960-61	.....	60
1961-62	.....	100
1962-63	.....	109
1963-64	.....	80
1964-65	.....	72

In the seasons 1960-61 and 1961-62, a considerable supply of mutton was added to the dogs' diet in an attempt to decrease the seal kill. This mutton proved a very poor substitute, hence in 1962-63 extra pemmican, additional to the already high pemmican ration, was added. This also proved a poor substitute for seal meat, but

not to be outdone in our honest attempt to satisfy our dogs and keep seal killing at a bare minimum, 1963-64 season saw the addition of beef chunks to the diet. These proved quite good but took most of the available freezing space aboard "Endeavour".

In future, with our smaller dog population and as full use as possible of substitute dog food, seal kill will decrease considerably.

—R. B. Thomson, Superintendent,  
Antarctic Division, D.S.I.R.,  
Wellington.

### SEALS ON THE McMURDO ICE SHELF

Sir,—

In the course of our work on the McMurdo Ice Shelf this last summer, we visited White Island on a number of occasions. On 15 December, Alex Parton, Dave Lowe and myself walked along to the northern extremity of the island and examined the crevasse and pressure ridge patterns in this area. We discovered a number of seals in the vicinity of the tide crack along the shore of the island. The actual ice shelf at this point is only several feet above water level, and it is not difficult for the seals to climb out. We found two old females, each with a one year old pup, one being male and one female. Further along the shoreline, we found another half grown female, perhaps two years old. No brands or tags were seen on the animals.

Dr. Jack Littlepage, whom some readers will have met at McMurdo, has done some research on the diving behaviour of the Weddell seal (*Ecology*, Vol. 44, No. 4, August 1963) and came to the conclusion that a reasonable maximum under-ice swimming distance was  $2\frac{1}{2}$  miles. As the distance from the ice edge south of Scott Base to White Island is about 13 miles, it seems unlikely that the seals could have swum the distance non-stop, i.e., without stopping somewhere for a breath of fresh air.

On 19 February, Laurie Wood and myself went on a day trip through Windless Bight towards the Terror

and Aurora glaciers. On the way home, about 10 miles north east of Scott Base we found a deep groove (10 inches approximately) in the soft new snow, and after looking around with the binoculars, discovered a seal about a mile to our north. It appeared to be still heading for the Aurora Glacier—and perhaps an ascent of Mt. Erebus. At this time, the Ice Shelf was steadily breaking up south of Pram Point, and the seals in this area had moved further north along the pressure ridges to the folds north east of Pram Point itself. It is possible that one of these seals continued north, although the track of our Windless Bight traveller appeared to come from the south-east. Had "he" come from White Island? Perhaps we should have followed the tracks back—we'll know better next time.

Incidentally, we also met a number of Emperor penguins on the McMurdo Ice Shelf this summer, two, south towards Black Island, one about six miles north of White Island, as well as several lines of tracks heading on north-south lines.

Arnold Heine,  
Antarctic Division, D.S.I.R.

### CAPE HALLETT

Sir,—

Now that we have lost part of our quarters at the above station through fire, the past summer was our last there. It appears that the United States, with whom we supplied the leader alternately, have decided not to man the station during the winter but only to visit it sporadically during the summer flying months as a base for field operation. Seeing that this is in our territory and remembering the importance Antarctica is destined to play in our lives, I am convinced that the logical thing to do would be for our Government to take over the U.S. installation and open it as the first Outward Bound School on the last continent. This is a challenging place of fantastic, if savage beauty, which lends itself to many uses. It could possibly be staffed by univer-

sities and different clubs if the Government lent a hand in transport, etc.

Seeing that American quarters are still equipped with instruments, etc., it would be a pity to give up the meteorological and upper air physics work done at Cape Hallett, and science could be combined with the training of our young people in self reliance and the art of leadership.

Women, too, are psychologically ready to face the last frontier. When I was guiding, most of my climbers were of the fair sex, and it was proved to me time and again that a woman can stand more cold and discomfort than the average man and what is more, suffer in silence.

If the international situation should dictate that we are obliged to patrol the Antarctic waters and keep them open as an all-the-year-round route to the continent, we cannot do it without an icebreaker of our own. In any event, a lot of winter scientific work could be done if we had one.

The time is approaching when no country will be able to hold open spaces: use will be the only title to ownership. At present, I believe, we have about a dozen men on a triangular sector covering something like 1,400 miles by 700 miles.

Now that we are no longer there and the Americans are on their way out under the present international set-up "Unlimited travel and scientific investigation will be permitted any nation in any region of the continent".

There is a very real danger that any country could step in and build a station there on the pretext of helping science and I doubt if we could do anything about it.

Let us base our future on 'know how', labour, material and the guts to do it, and not on the mythical figures in the book. That's all money is today.

Frank Alack,  
Nelson.

## 50 YEARS AGO

From the Diary of

E. E. Mills Joyce

The Ross Sea party of Shackleton's abortive Trans-Antarctic Expedition has wintered in Scott's old hut at Cape Evans after the "Aurora", on which they planned to live, had been carried to sea in a field of ice broken away in a blizzard. The 10 marooned men, believing that Shackleton would be depending upon the depots they were to lay, set out in the cold spring weather, ill nourished and ill clad, to carry out their task, a task from which three of them never returned.

October 1st, Friday.

"Turned out 6.30. Weather very thick to the S. & every indication of a blizzard. Had breakfast. Party consisting of Capt. Mackintosh, Smith, Hayward, Richards, Wild, Jack, Stephens, Cope and Self under way at 10.30 leaving Gaze behind for Meteorological Observations. The load consisted of 3 sledges carrying about 1700 lbs. Surface very fair, doing about 1 mile per hour. Arrived at half-way camp (about 6 $\frac{3}{4}$  miles) about 3.30. After lunch found going very heavy so left 1 sledge (300 lbs.) & proceeded to Hut Pt. (7 miles away). About 7 o'clock came on to drift & blow. Force of wind 30 to 40 direction from SE, so decided to abandon another sledge as we were still 3 miles from our destination, & to make things worse the temperature fell to -20, most of us getting badly frostbitten. All land being obscured, I found it very hard to steer, as facing the wind & heavy drift one wants to turn away. Eventually arrived at Hut Pt. about 10.30. Everyone weary after the hard day's battling."

(From Joyce's own MS transcript of his diary preserved in the Turnbull Library, Wellington.)

On the other side of the Antarctic continent, "Endurance" had already been drifting (like "Aurora") since mid-January, and was now being sub-

jected to pressure. On October 1, Shackleton says, "Two bull crab-eaters climbed on to the floe close to the ship and were shot by Wild. . . Seal-liver made a welcome change in our own menu."

### "GRIF" REMEMBERED

On July 20, Dr. P. G. Law, Director of the Australian Antarctic Research Expedition, gave the first Griffith Taylor memorial lecture at Sydney University. Griffith Taylor, geologist and leader of the Western Parties on Scott's Last Expedition, died at Sydney in 1963.

Dr. Law criticised the lack of geography text books on Antarctica.

"The major features of the continent have now been recognised," he said, "and I am concerned at the lack of up-to-date information about the Antarctic available to students. To my knowledge there is no comprehensive up-to-date text book in English about the geography of Antarctica."

### ANTARCTIC TOURS?

Speaking at an Adult Education Association school on "Australia and the Antarctic" in Victoria recently, Dr P. G. Law, Director of the Australian Antarctic Division, said that Australia could have a tourist resort in the Antarctic within three years. He said that a Sydney company was considering taking tourists there by air and using a ship as a hotel.

But Admiral Streat, Assistant Chief of Naval Operations in Washington, said that while he had no objections to tourists, he had no intention of giving them U.S. Navy logistic support. "We're equipped," he said, "to provide logistical support—food, clothing, shelter and supplies—to our scientists. But we're not in the tourist business." The Navy had advised travel agencies that if they wished to fly tourists to Antarctica they should take ships to McMurdo Sound, tie them to the ice, and use them as hotels. Then the airline can provide its own food, water and other facili-

ties for the tourists it brings down.

Which would be quite an undertaking. Clearly there will be no cheap fares.

### "SOUTH" IN THE SOUTH

Billing and Mannering's "SOUTH", a New Zealand view of man and nature in the Antarctic, has been sold extensively in the Antarctic itself.

Only hours before the part-time salesman (the New Zealand P.R.O. at Scott Base) left Antarctica 200 copies of the book were unloaded from a ship. Once the packing case was opened several copies were sold right at the ship's side on the ice, and the remainder taken a short distance to the United States McMurdo Station where an advertisement was put over the public address system. Unfortunately the only central place at the station is the church, so the books were sold from the church steps with the padre standing by quoting how the Lord drove the traders from His temple with a knotted rope. However, his jocular wrath soon turned to amazement when all the books were sold within twenty minutes. "There wouldn't be that much money about if I produced the church plate!" he said.

Many in the Antarctic post copies of "South" to friends, as a copy of "South" solves the labour of writing letters explaining the type of life led, and the scenery.

A second edition of the book is now being prepared. In addition to publication in Australia and New Zealand by A. H. and A. W. Reed, the book will now be published in London by Hodder and Stoughton, and in North America by the University of Washington Press.

The enterprising publishers have arranged that when the next summer comes round copies of "South" that are purchased in Antarctica will be supplied with a special bookplate confirming that each book was purchased on the southern continent.

## SALUTE TO HEROES

In an article in "The Times", Lt. Cdr. Burley, out of his experiences while re-tracing Shackleton's route, pays a glowing tribute to the "desperate and supremely courageous feat" of Shackleton, Worsley and Crean nearly 50 years before.

"With us," he writes, "we carried ample rations, sturdy tentage and mountaineering equipment and clothing designed to withstand the worst the elements had to offer.

"They, however, were protected by no more than their threadbare rags of clothing and faced the formidable mountain ranges with little more than a length of rope and a carpenter's adze. To grip ice, screws extracted from the boat were inserted through the soles of their boots. Food was meagre and spartan."

After telling of several points in the journey where his own party encountered difficulties which Shackleton avoided—they found themselves, for instance, "a fathom deep inside a crevasse over which Shackleton, by his boldness, had obviously glissaded at high speed"—Lt. Cdr. Burley goes on: "These variances of circumstances are not recounted to provide invidious comparison or detract from the magnitude of the original heroic achievement—nothing could dim its lustre. We were comprehensively equipped and prepared to meet these eventualities; consequently these incidents, being anticipated, were taken in stride without harm. Had any of these incidents or a break in the weather befallen Shackleton's party, however, this might have meant disaster—not only to them but also to the survivors depending on them at Elephant Island.

"There is little doubt that, notwithstanding the first class leadership, providence was with them in their hazardous crossing—so much was plainly apparent to us when review-

ing the many superficially attractive but abortive alternatives on their route and the natural snares liberally strewn in their path. They themselves subsequently referred to the sensed presence of a 'fourth man' who seemingly accompanied them on their route."

### TASK NEAR DONE IN ANTARCTICA?

Dr. Phil Law, speaking to the Canberra branch of the Royal Aeronautical Society, said that Australian exploration in Antarctica was nearly finished.

The last 18 months had seen the completion of mapping of all the broad feature in the territory. Now every part of the Australian coastline was known and almost the whole of it had been photographed from the air.

Australian research in the Antarctic was in a very interesting "half-way stage". Although the basic mapping and surveying had been finished, many finer details had to be completed, such as the height of peaks and the depths of ice.

Just how far these factors needed to be investigated depended on plans for the future development of Antarctica. They definitely would be needed if the search were to be continued for valuable minerals.

"However, so far no one has found anything like an ore body," Dr. Law said "If one were discovered, no doubt the territory would be much more highly developed."

He said Antarctica was a fantastic natural laboratory for research.

The advancement of exploration methods from the old days was overrated. Modern men were doing a very courageous job, often travelling by modern equipment which was far more hazardous than the dog and ski teams.

"They are prepared to fly many miles from the ship and stay for sometimes weeks in isolated little tents in dreadful weather."

# The New Zealand Antarctic Society

is a group of New Zealanders, many of whom have seen Antarctica for themselves, and all of whom are vitally interested in some phase of Antarctic exploration, development, or research.

You are invited to become a member. The membership fee includes subscription to "Antarctic."

## BRANCH SECRETARIES

Wellington: W. J. P. Macdonald, Box 2110, Wellington.

Canterbury: Mrs. E. F. Cross, 34 Clissold St., Christchurch 1.

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## "ANTARCTIC"

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Volume 2, numbers 1, 2, 3, 4, 7, 8, 9

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## SOCIETY TIES

The N.Z. Antarctic Society tie is now available. The design is similar to those used for the ties of kindred organisations in the United Kingdom and Australia. The dark blue background, light blue and white stripes and motif of penguins and kiwis provide a striking pattern, yet a reserved note is retained over all.

Ties are available through N.Z. and Branch Secretaries of the Society at a cost of 17/6.

# The New Zealand Antarctic Society

The Society is a body of young men and women who are interested in the Antarctic and all of whom are vitally interested in the progress of Antarctic exploration, development and research. It is a body of young men and women who are interested in the progress of Antarctic exploration, development and research. It is a body of young men and women who are interested in the progress of Antarctic exploration, development and research.

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The Antarctic Society tie is now available. The design is the same as that of the New Zealand Antarctic Society. The tie is made of 100% cotton and is available in white, blue, and red. The price is 10/- per tie, plus postage.

Available through N.Z. and Branch Secretaries of the Society.