ANTARCTIC

A NEWS BULLETIN

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NEW ZEALAND ANTARCTIC SOCIETY

GUARDIAN OF THE LAKES

T. R. Haskell of VUWAE 6 stands on grotesque rock, probably formed by wind-blown sand and salt erosion, in the Taylor Valley east of Lake Bonney.

Photo: W. Prebble.

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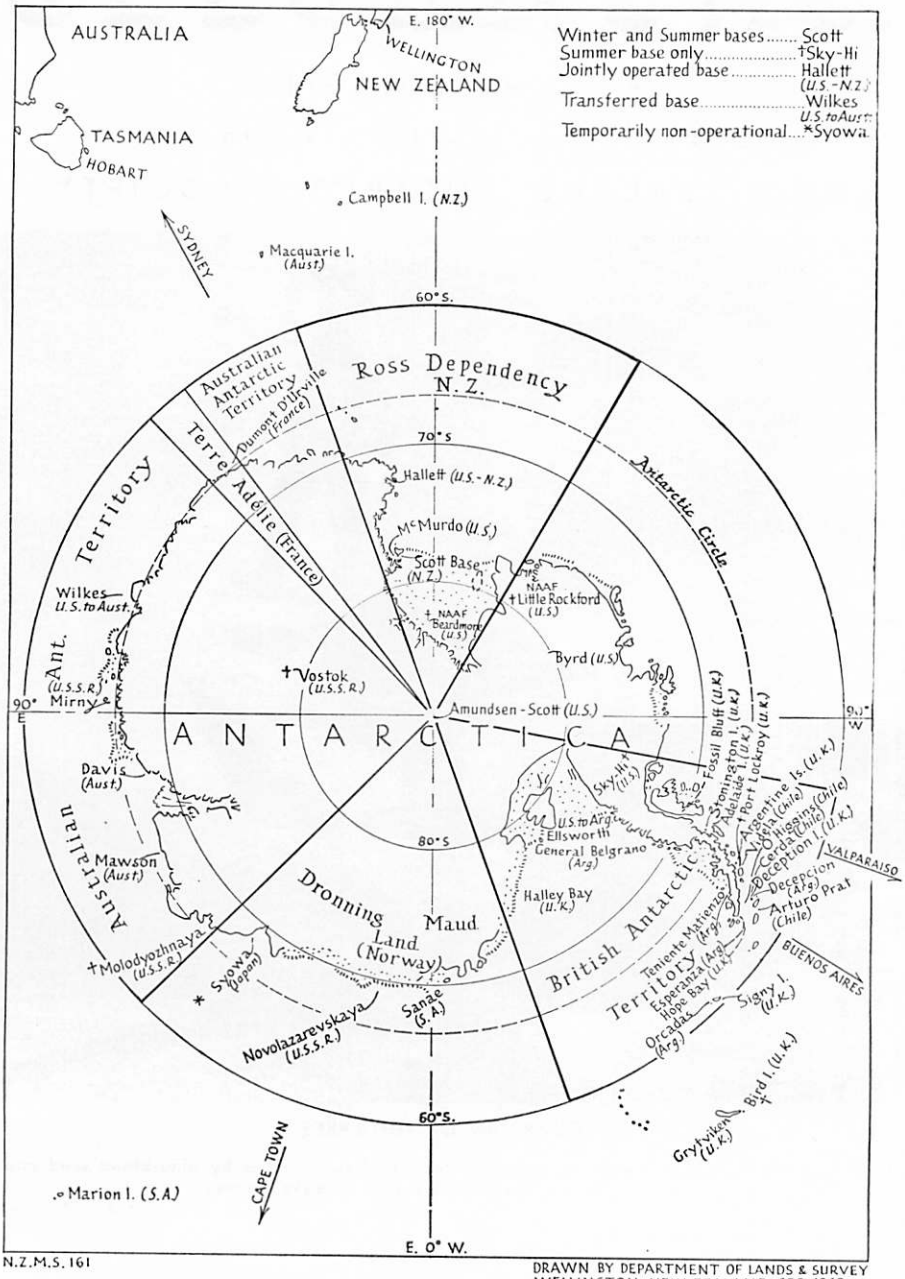

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"ANTARCTIC"

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HONOURED

The following Antarctic veterans resident in New Zealand have been elected Honorary Life Members of the New Zealand Antarctic Society.

C. R. Ford, Auckland, 1902-04.
F. Rooney, Lower Hutt, "Nimrod".
M. McCarthy, Lyttelton, A.B., "Terra Nova".
W. Burton, Christchurch, Engineer, "Terra Nova".
W. McDonald, Christchurch, A.B., "Terra Nova".

Honorary Life Membership has also been conferred on another "Discovery" man,

C. H. Hare, Queensland, 1902-03, who was New Zealand born and was living in New Zealand when he joined "Discovery" for Scott's first expedition. He wintered in the Antarctic during 1902.

Mr. Ford and Mr. Hare are, we believe, the only "Discovery" men still living.

PILOT SCHEME

"Man has shown in the Antarctic, on an extremely small scale, what he could do if he acted as an intelligent being. He could do as much on a world-wide scale. But, for that, the most important requirement is that human beings should understand their calling as men; that man should cease behaving as a predating wolf in his relations with other men, and that he should so organise his affairs as to make it possible to live in peace on his own planet before reaching out for others".

Paul-Emile Victor in his "Man and the Conquest of the Poles."

140 DAYS AT THE BOTTOM OF THE WORLD

This is the title of the National Film Unit's forthcoming Antarctic film (see June issue, page 429). The film opens with a Hercules plane coming in to a landing on the ice runway in McMurdo Sound. "The long night has gone, and the white continent again tilts into the dawn of summer".

The wide-screen colour film was shot by camera-men Kel. Fowler and Sam Grau during a 4½ month assignment in which all aspects of New Zealand's 1963-64 Antarctic programme were covered, from the scientific work and the communal life at Scott Base to the arduous dog-sledging journeys in previously untraversed mountain regions.

He will be a dull New Zealander who will not follow with absorbed interest this half-hour raising of the curtain on the life our men are leading in the far South.

"VOSTOK 900"

Viewers in Wellington are to have the privilege of seeing the outstanding Australian documentary **Vostok 900** on Channel 1 at 8.33 p.m. on Friday, September 11. The Dunedin (DNTV 2) telecast is scheduled for Sunday, September 27, at 10.35 p.m. This record of the notable Wilkes-Vostok trek led by New Zealander Bob Thomson has been acclaimed in Australia as an exceptionally fine telecast.

NEW ZEALAND FIELD WORK HAS AN ALTERED PATTERN

As forecast, the coming summer will see a departure from the customary New Zealand pattern of one or two long dog-sledging journeys. Instead, the emphasis will be on small parties air-lifted to their operational area, where they will each devote a few weeks to the intensive study of a limited locality with certain specific objectives.

Dog-teams, motor toboggans and man-hauling will all be used, and no party will contain more than four men. A feature of the manning is the solid core of men experienced in Antarctic field work.

LITTLE KNOWN RANGES

One group will study the geology of the Holyoake, Cobham and Swithinbank mountain ranges of Victoria Land. These ranges are comparatively newly-named features lying inland from the portion of the Ross Ice Shelf which extends from 81°30′S. to 82°27′S., north of the Nimrod Glacier.

The **Holyoake Range,** named after the New Zealand Prime Minister, extends for 35 miles parallel with the coast-line in approximately 159° 30′E. about 40 miles west of the coastal Nash Range, named after a former Prime Minister. Its southern end. 82°27′S., is about 30 miles west of Cape Wilson.

The **Cobham Range** is named after an ex-Governor-General of New Zealand. It is roughly parallel with the Holyoake Range but some eight miles further west, i.e. further inland. At its southernmost point the range is some 40 miles west of Cape Wilson. About 20 miles long, it extends from 82°10′S. to 82°27′S.

The **Swithinbank Range** is named after a well-known American geologist, Charles Swithinbank, with a notable record of Antarctic field work. It runs at right angles to the other two ranges and lies north of them between 158°E. and 159° 30′E. in approximately 81°40′S. The range is about 25 miles long.

None of these ranges has so far been studied intensively by a group of competent geologists. The New Zealand team for 1964-65 will be led by **Malcolm Laird** of the Geological Survey, Greymouth, who was geologist of the Southern Field Party under Captain P. Hunt which worked north of the Nimrod Glacier nearer the coast in 1960-61. With Laird will be two young geologists, **G. D. Mansergh** and **J. M. C. Chappell,** and a field assistant **D. Massam,** who has wintered at Scott Base this year after extensive field work last summer.

The party will be flown in to the ranges early in November, and will be set down at a point to be selected by earlier air reconnaissance. They will work in the area for about six and a half weeks.

The air reconnaissance will be carried out late in October if conditions permit, when the Scott Base Leader will accompany the team leader to select suitable sites.

On or about December 20 Laird's team will be air-lifted south across the Nimrod Glacier to the area of Mt Markham (82°50′S., 160°30′E.) in the Queen Elizabeth Range, where they will work for about two and a half weeks until January 8, 1965.

GEOLOGISTS' RANGE

A second four-man team will be led by **P. C. Le Couteur,** a geologist who was a member of V. R. McGregor's geological team which worked south of the Ross Ice Shelf last summer. Le Couteur was evacuated after falling 60 feet into a crevasse. His companions will be **M. R. Gregory** and **R. G. Adamson,** geologists and **W. R. Lucy,** surveyor, who has wintered this year at Scott Base.

This team will be flown to the Geologists' Range about the beginning of December. Working with two dog-teams for approximately six weeks, they will be air-lifted back to McMurdo about mid-January.

The Geologists' Range is unknown country. The mountains were seen at a distance by Captain Hunt's team in 1960-61. The line of peaks lies about 40 miles south-west of the Cobham Range.

NORTHERN PARTY

The Northern Party, a geological and survey team, will be led by **Guyon Warren,** an experienced field geologist who was a member of Sir Edmund Hillary's original Scott Base team in 1956-57, and was one of the first party to climb Mt Harmsworth, west of the Skelton Glacier. In the following summer he was a member of the T.A.E. Northern Party which explored the length of the Mawson, Fry, Mackay, Debenham and Taylor Glaciers of Victoria Land.

With Warren will be two other geologists, **P. F. Ballance** and **W. A. Watters** and a paleobotanist, **J. A. Townrow.**

This team will be working in the high country at the head of the Mackay Glacier (77°S.) in northern Victoria Land, in country traversed by Warren in December 1957–January 1958. In the initial phase of their project, they will be studying the Allan and Carapace Nunataks primarily to examine thoroughly the Mawson "Tillite" exposed there, in order to establish with certainty its true nature, and also to examine the Beacon sediments on which the Tillite lies and the lavas embedded in it. They will then undertake detailed measurement and correlation of this Beacon Group section and search for any regional disconformities and evidence as to the age of the oldest beds. These nunataks are "just across the border" in Australian Antarctic Territory in 159°30′E.: Allan Nunatak in lat. 76°40′S., Carapace Nunatak in lat. 76°50′S.

The team will be flown to the Carapace Nunatak on November 19 and will also establish their main stores dump at Allan nunatak. Later they will manhaul and backpack to the Allan Nunatak and in mid-December will be transferred to the Mt Fleming-Mistake Peak area. Mt Fleming (77°33′S., 160°08′E.) lies at the head of the Wright Valley, and was named by the T.A.E. Northern Party in 1957-58, of which Warren was a member. Mistake Peak is about 8 miles north of Mt Fleming. From here they will be flown back to McMurdo about December 22.

VOLCANICS

A two-man team, probably **A. Ewart,** leader, and **R. G. Adamson,** both geologists, will work in the Black Island, Cape Bird, Cape Royds, Hut Point and Scott Base areas between November 1 and December 1, in order to study the petrology and mineralogy of the Ross Island volcanic rocks for comparison with those of New Zealand.

VUWAE 9

The ninth Victoria University of Wellington Expedition will be led by **Warwick M. Prebble,** geologist and experienced Antarctic research man. Overall, the party will comprise 11 men, but not all will participate in the same projects. In addition to Prebble they are **R. Hoare** (deputy leader), physicist; **Dr P. Vella,** geologist and scientific leader for the first phase of the expedition; **Prof. J. Bradley,** geologist and scientific leader, second phase; **A. Baker,** biologist; **R. Bell,** physicist; **J. Cole,** geologist; **D. Palmer,** geologist (an American Fullbright scholar); **B. de Campana,** geologist(an Australian); **F. Schafer** and **A. Frame,** technicians in the University's geology department.

The principal activities of the expedition will be (1) geological studies in the Black Island, Brown Peninsula, Koettlitz Glacier and Taylor Valley areas (volcanics, moraine and fossiliferous deposits), (2) geochemical research at Lake Vanda and at the ponds and lakes on Brown Peninsula, and (3) geological, geophysical and algalogical studies in the Koettlitz Glacier and Taylor Valley areas.

Helicopters will be the main form of transport to and from these several areas.

BIOLOGY

Two separate parties will also be engaged in biological research: one comprising staff and students from the University of Canterbury, the other organised by the Dominion Museum, Wellington.

UNIVERSITY OF CANTERBURY

A seven-man team from the University of Canterbury under **Dr Bernard Stonehouse** will be working at Cape Royds and Scott Base, with inspection visits to Beaufort Island, Cape Bird, Cape Crozier and Inexpressible Island, continuing the studies on Weddell seals, Adélie penguins and McCormick Skuas. In addition to the leader, the team will comprise zoologists **M. R. Smith, G. W. Yeates** and **I. F. Spellerberger,** geographer **J. Hay,** photographer **G. Mannering** and technician **I. Harkess.**

DOMINION MUSEUM

Dr E. C. Young, already well-known for his studies of skua behaviour at Cape Royds in 1959-60—and for his defence of the skua—will again be in skua country, but this time at Cape Crozier, the western tip of Ross Island. He will have **B. Cope** as his technician-assistant. Dr Young wants to assess the validity of his earlier conclusions by a more detailed scrutiny of skua feeding patterns in a less disturbed area than Cape Royds. He and Cope will be flown to Cape Crozier on November 16 and will remain there for over three months.

ICE SHELF STUDIES

A. J. Heine was a member of the Geological and Survey expeditions of 1957-58 and 1958-59, and wintered over at Scott Base in 1959 before accompanying the United States Victoria Land Traverse led by Van der Hoeven. He became interested in the character and movement of the Ross Ice Shelf and the McMurdo Ice Shelf, and has already spent several summers investigating the problems involved. This summer he will again be prosecuting his study of the ice shelves. Working with him will be **D. G. Lowe, I. B. McDonald** and **A. O. Parton.**

SOIL FORMATION

Two two-man teams will be carrying out research into soil-forming processes in the Ross Dependency, one team from the Soil Survey, D.S.I.R., the other from Lincoln College, Canterbury.

The **Soil Survey** team **(Dr G. C. Claridge,** Leader, and **I. B. Campbell)** will work in a large number of widely-scattered areas, stretching from Hallett Station in 72°S., through Inexpressible Island, the Darwin Glacier and Victoria Valley to Plunket Point (the junction of the Mill and Beardmore Glaciers) in 85°S.

The party's movements have been planned to tie in with the air-movements of other parties. At all the points mentioned soil-forming processes and the influence of climate thereon will be studied. Dr Claridge took part with J. D. McCraw in a less widespread investigation in 1959-60, and has been working on samples collected then, and later by various field parties not specifically concerned with soil science.

The other Soil Survey party will consist of two men from **Lincoln College: P. R. Stevens** (Leader) and **J. D. H. Williams** (soil-chemist). They will work in three localities, transport being by helicopter.

The first locality will be Cape Chocolate, the end of a chocolate-coloured moraine bordering the western wall of the Koettlitz Glacier at 77°58′S. Here the men will work from November 18 till December 1 (approximately). They will then be flown to Lake Alph about 20 miles south of Cape Chocolate and will return to Scott Base on December 11. On the 15th they will move to the Taylor Valley and work there till December 22.

OCEANOGRAPHY

During January a party of oceanographers will travel on board the "Endeavour" to carry out oceanographic surveys of the Campbell Submarine plateau.

TO WINTER OVER

TEAM FOR SCOTT BASE

ADRIAN G. HAYTER: Leader (see June issue).

A. L. BURROWS: Senior Scientist. Mr Burrows is Technical Officer with the Magnetic Survey, Geophysics Division, D.S.I.R. at Christchurch. He wintered at Scott Base in 1958, and was again in the Antarctic during two subsequent summers.

J. E. GAWN: Radio Officer. This will be Mr Gawn's third winter in the Antarctic. He was second radio-officer of the New Zealand component of the Trans-Antarctic Expedition 1956-58, and has been the radio-operator at the Base this year.

B. M. JUDD: Base Engineer. He has wintered over at Scott Base this year as Senior Maintenance Officer and is an employee of the Ministry of Works.

T. E. SANSON: Scientific Officer. A post-primary school science master who also holds a B.E. degree (electrical), he will be employed on ionospheric analysis.

G. JONES: Scientific Officer. He is employed at the Physics and Engineering Laboratory, Gracefield.

D. L. FOSTER-LYNAM: Technician. He is an R.N.Z.A.F. man with experience in the maintenance of electrical equipment and in radio direction finding.

J. CALVERT: Photo-Lab. Technician. Mr Calvert is employed by a photographic firm in Christchurch.

D. R. C. LOWE: Field Assistant. Born in England, he came to New Zealand 15 years ago, and is employed at Mt Ruapehu.

I. B. McDONALD: Field assistant. An experienced mountaineer, at present a sales-driver with Mobil Oil Ltd.

C. E. HOUGH: Fitter Mechanic. A fitter employed by the Ministry of Works, Mr Hough has had a year on Campbell Island.

B. B. DORRINGTON: Fitter Electrician. A technical assistant at NEECO, he was previously employed at H.M. Dockyard, Devonport.

R. C. WRIGHT: Storekeeper. He will winter over to complete a base inventory and stores system.

D. J. HAYCOCK: Cook. He was a chef with the R.N.Z.A.F. from 1958 to 1964.

SUMMER PARTY

In addition to these listed above as members of the various field parties, the following men will serve as members of the summer support staff at Scott Base.

M. Prebble: Deputy Leader (from November 23). Mr Prebble was a member of the Huts Restoration party in 1960-61, and served again as dog-handler at Scott Base in the summer of 1961-62. He is a post-primary school-teacher.

M. J. R. Ford will act as Field Officer. He was deputy leader and take over. He was deputy leader and led one section of the northern field party in Victoria Land last summer after field work the summer before and wintering over throughout 1963.

J. T. Murphy: Public Relations Officer. He is a journalist employed by the N.Z.B.C. at Invercargill.

L. A. Wood: Cooks' Assistant.

B. R. Ahern: Carpenter. He served at Scott Base for six months 1963-64.

G. S. Carr: Carpenter.

G. H. Nitz: Motor mechanic.

M. Gray: Postmaster.

BOY SCOUTS

As in the past three years, a group of three Queen's Scout will be quartered at Scott Base for the summer months, taking a full part in the life and work of the station. The scouts selected for the coming summer are:

David Crerar, Christchurch.

Wilfred Jannsen, Benhar.

Brian Service, Auckland.

WINTER AT BASE

An increase in cloud cover, as against 1963, has resulted in a warmer winter than usual, but at the price of more snow and wind. This has made travelling in the dark, especially to the outpost at Arrival Heights, more difficult. Temperatures up to the end of June varied from 18 to 81 degrees of frost. The highest wind recorded (a few weeks before mid-winter) reached 88 miles an hour and damaged telephone communications with the American base two miles away.

MIDWINTER

Midwinter Day was celebrated at the base with the customary festivities. Goodwill messages began coming in on June 19 from French, Russian and Belgian Antarctic stations and from many distant parts of the world. One from President Lyndon Johnson concluded:

> "The knowledge you gain during these lonely months will one day enable the rest of us to conquer those elements you battle today. As a result of your efforts now, tomorrow men may not know cold or privation, fear or ignorance. The hardships you face shall not have been in vain."

Commander Reilly and others from McMurdo were guests at the Scott Base evening celebrations on June 21, when the bill of fare included lobster thermidor, stuffed green peppers, roast seasoned chicken and baked Virginia ham. Commander Reilly and the Scott Base Leader, Russell Rawle, cut the Midwinter Cake.

Following a pyrotechnic display over the dog-lines arranged by base engineer Mills and others more American guests joined the gathering, which listened to an American-Kiwi string band until the small hours of June 22.

The temperature was —13°F., 45 degrees of frost.

SATELLITE SEEN

A satellite was observed from Scott Base a few minutes before midday on Juy 12. It was first seen passing in front of the Southern Cross and reappeared overhead approximately 110 minutes later, shining as brightly as any star then visible in the heavens. The satellite disappeared over the horizon.

LOOKING AHEAD

July activities mainly centred round stocktaking, with an eye to the forthcoming re-supply. Preparing stock-sheets is a boring "activity" to men who would much sooner, come snow come wind, be roaming Hut Point Peninsula.

The sun re-appeared for a moment or two on August 18. Before then, however, the twilight at midday was making it easier for the dog-handlers to see drifts and declivities on the ice-shelf when running the dogs. The pups are healthy and boisterous. The unexpected heavy accumulation of snow made it difficult to keep the dog spans above the surface. Unfortunately two of the dogs were lost during July; one who was ailing had to be shot and another was found dead on the line.

SUNRISE

A gleeful message from Scott Base on August 19 said: "From the summit of Second Crater the sun was seen to rise over Cape Royds at approximately 1.45 p.m. local time today. This was the signal for raising the New Zealand ensign at Scott Base. The thermometer read —51°F. This was not cold enough to chill the sunrise celebrations.

"In the brightening twilight of the past few days the huskies have been exercised on the new sea ice in preparation for field activities during the coming summer."

UNEXPECTED MAIL

There was great delight at the arrival, by the historic "mercy flight", of an unprecedented mid-winter mail. At Scott Base itself the postmaster was extremely busy just before the Hercules arrived dealing with the letters hurriedly written in time for the return flight. Dave Mills prepared a metal cachet-stamp and no doubt the receivers of envelopes so stamped will long treasure them—unless they are tempted by high monetary offers by the collectors of special "covers."

U.S. HONOUR FOR N.Z. RADIO MAN

An unusual honour has been bestowed upon Mr J. E. (Ted) Gawn, the New Zealand radio operator at Scott Base. On August 1 he was invested at McMurdo Station with the honorary rank of chief petty officer, United States Navy.

The ceremony, a U.S. Navy tradition, took the form of a good-natured mock trial for Mr Gawn. A certificate received by the New Zealander was the genuine form of notification of promotion endorsed "honorary".

Some of the New Zealanders assisted in the ceremony that concluded with the presentation by Commander J. L. Reilly, U.S.N., commander McMurdo Station, of the Groper certificate endorsed under his hand.

The New Zealanders were the guests for the evening of Master Chief Petty Officer Walter E. Lenning, representing the McMurdo C.P.O.'s.

There must be few precedents for such an award in the annals of the United States Navy. Admission to this very select band is jealously guarded.

Calls to families in the United States from McMurdo personnel are normally conducted through amateur channels, but the outlet failed this winter due to adverse radio conditions. It was found that good-quality calls could be made from Scott Base using the Compac cable link from Auckland to Vancouver and thence to Oakland, California.

NUCLEAR SCIENCE

C. B. Taylor, who was scientific leader at Hallett Station in 1962, will be sampling snow, both on the surface and at depth in snow mines, to determine its tritium content, as part of his study of radio-active fallout. Mr Taylor is on the staff of the Institute of Nuclear Sciences at Lower Hutt. He will be working in the Antarctic, particularly on Mount Erebus and at the South Pole, during the latter part of this year.

HALLETT NEWS

Stormy weather damaged the V.L.F. antenna, the responsibility of a New Zealand observer, on June 10, and made repairs impossible for several days. By the 28th the instrument was ready for testing but the wideband oscillator turned out to be faulty and required recalibration.

Recovery from the March fire has of course affected life and scientific operations. Only an all-sky camera dome, an unmodified K-100 camera, some electrical supplies, chemicals and film were saved from the blaze which destroyed all operable equipment. Modifications and repairs took up most of the early winter months, but some readings and records were taken, though gale-force winds wrought further damage.

SUN RETURNS

On July 31 the men at Hallett Station raised the flags of the United States and New Zealand for the first time since May. Although the sun had brightened the sky for some time it was the first time it was visible.

As the New Zealand ensign had been reduced to half-length by the autumn gales, a substitute was provided by joining the union flag portion of the old standard to a fly of bunting.

Temperatures at the base dropped to 20 degrees below zero for several days, and this is expected to speed up the thickening of the ice in preparation for a new runway at the base.

The base's first visitors this year came at the week-end—snow petrels and seals.

At all other American stations on the continent the situation was reported normal.

July brought such heavy snow drifts about the station buildings that clearance was temporarily dropped for the first time this year.

News that the first aircraft is scheduled to fly in on October 2 increased the tempo of airstrip preparation with the painting of distance markers and the familiarisation with theodolites. Ice thickness surveys

UNITED STATES AIRMEN BREAK ANTARCTIC WINTER BARRIER

The heart of New Zealand beat in tune with that of Antarctic-minded Americans as an aircraft on mercy-mission bound flew south from Christchurch airport, until a safe landing was reported from McMurdo eight and a half hours later.

The plane, a C-130 ski-equipped Hercules of the U.S. Navy VX-6 Squadron was making the first flight ever made into the Antarctic in winter. Its mission was to bring out to New Zealand the McMurdo fire-chief, 39-year-old U.S. serviceman, Bethel Lee McMullen, critically ill at McMurdo as the result of a fall on Sunday, June 21. As McMullen himself tells the story:

"I was in the fire-house at night. I remember reaching for a pole to go down to the lower shelf. I missed it and I guess I fell about 20 feet. I hit some steel aircraft-runway matting and was knocked unconscious. They told me they put 70 stitches in my head. I came to when they were sewing up my head."

Although McMullen made light of his injuries, he had suffered a fractured spine with paralysis of his legs, and cerebral concussion, as well as the scalp lacerations.

Following a radio conference between Rear Admiral J. R. Reedy's staff medical officer and the McMurdo medical officer, it was agreed that urgent specialised medical assistance and evacuation to New Zealand were demanded. Admiral Reedy announced on June 23 that the Navy would at once send two ski-equipped Hercules from Quonset Point, Rhode Island, to Christchurch, New Zealand. From here they would attempt the hitherto unheard of winter penetration of the Antarctic, to land at Williams Field, McMurdo Sound, 2,100 miles away. The planes left Rhode Island at 4.15 a.m. on Wednesday, June 24, only 18 hours after Admiral Reedy issued his call.

While the aircraft were in flight, the New Zealand Naval Board diverted the frigate H.M.N.Z.S. "Otago" for weather reporting and search and rescue duties near 60°S. and also H.M.N.Z.S. "Pukaki" to relieve "Otago" when the latter was required to leave her position for refuelling. Weather analyses were prepared at Operation Deep Freeze Advance Headquarters in Christchurch.

PREPARATIONS AT McMURDO

Meanwhile at McMurdo McMullen was still reported to be in a critical condition. The weather was not promising: scattered clouds with three miles visibility and blowing snow, winds of 23 knots and gusts up to 32 knots in a temperature of —17°F. Upper wind soundings were being obtained from every station in the area. Every available man was at work compacting a ski-way, and setting out flares and lights at 500-ft intervals on both sides. Potentially, the flight was the most hazardous in Antarctic history. Only a few days past mid-winter, the Antarctic continent was buried in complete darkness for the full 24 hours. The latest flight ever previously undertaken was for the evacuation of a Russian scientist from Byrd Station on April 9-11, 1961.

AIRCRAFT AT CHRISTCHURCH

The two Hercules carrying in all 44 men touched down at Christchurch Airport at 12.50 a.m. and 1.10 a.m. on Friday, June 26, and were met by cheering news. McMullen was "doing well" with his tempera-

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(See foot previous column)

indicate that the strip can be much closer to the station than in previous years, especially as the large icebergs around Seabee Hook are mainly dispensed.

MAY GOD GO WITH YOU, GALLANT GENTLEMEN

THE HERCULES CREW AT CHRISTCHURCH AIRPORT
The medical team of four is not included.

Minutes before the flight left, a telegram was received from the children of the Tawhiti School, Hawera. It read "May God Go With You, Gallant Gentlemen".

ture down to 101.2 degrees. The weather at McMurdo had been improving; by the 25th the temperatures had risen 25° to +8°F., and visibility was now 15 miles. Work on the ski runway was going well and preparations were expected to be complete by midnight on the 26th.

It was decided that one aircraft should make the flight without delay. By 10 a.m. the flight-crew of 15 including a medical team of four had been fitted out with cold-weather clothing and briefed by the commander of the operation, Cdr. F. S. Gallup. Meteorological conditions were expected to improve still further and the plane left Christchurch at 11.52 a.m.

The aircraft-commander, Lt.-Cdr. R. V. Mayer, was taking in his stride the most hazardous operation undertaken by the U.S. Navy in all its years of Antarctic support. "No fears", he said. "I'll just be talking to the Man upstairs and let Him guide me".

Weight had been reduced to a minimum. Mail was carried, but had been carefully screened to eliminate circular letters and anything not essential. But room was made for 80lb. of fresh apples and a basket of mixed fruit which the Salvation Army asked to be allowed to send south. An extra 3,000 gal. internal fuel tank had been installed on the aircraft and this left little margin for extras. Surgical kits were the

last things loaded aboard: they had been brought by the second aircraft.

For half an hour Deep Freeze headquarters in Christchurch lost contact both with the Hercules and with McMurdo Sound. During that time a message was received from Washington reporting that messages from Christchurch, McMurdo and the aircraft were being received loud and clear at a receiving station at Cedar Rapids in Iowa.

If required Christchurch could re-establish contact through Washington and Iowa. Shortly after, however, Deep Freeze managed to pick up McMurdo again.

A rescue team of four of New Zealand's best mountaineers had been standing by at Christchurch ready if necessary to fly in the second Hercules if the rescue plane got into trouble.

HAPPY LANDING

Meanwhile, all was ready at the 10,000 ft McMurdo runway. At Scott Base every possible light was switched on and McMurdo itself was a blaze of lights: and the weather had come right. As Russell Rawle, Scott Base Leader, put it, "The Antarctic was friendly." After the howling icy winds and driven snow of the previous "night" the wind dropped away to a ten-knots breeze and a full moon smiled sublimely. Lt-Cdr. Moreton (VX-6 Detachment Commander) and Cdr. W. G. Hunter agreed that if they had planned for weeks they could not have found a better day. The temperature at the airstrip was zero Fahrenheit.

At 8.25 p.m. the Hercules, aided by a tail wind, landed on the 10,000 ft, 20 ft wide emergency runway.

Lt. Mayer described the strip as "the best lit strip I've ever seen in my Navy career"—and that goes back some 22 years.

The drums of burning fuel along the runway and the lights of McMurdo Station and Scott Base were clearly visible 72 miles away. The scene was, Lt. Mayer said, "like a gigantic Christmas tree all lit up."

The two surgeons, Lt. Cdr. G. S. McClard and Lt. H. P. Dixon, were flown by helicopter from the runway to the station, and saw the patient at once. His condition had improved from "critical" to "seriously ill". Lt. Mayer reported that the aircraft could leave on its return flight in two hours' time.

McMullen was taken to the airstrip by helicopter and carefully carried to the already prepared hospital bed on the plane.

At 10.30 p.m. the aircraft was ready to leave on the return flight, and after an uneventful journey the Hercules touched down at Christchurch at 5.54 a.m. on June 28, seven and a half hours after leaving McMurdo Sound.

FLIGHT TO RECOVERY

McMullen was described as "not out of the woods yet", but, said Lt. Cdr. R. E. Millington, staff medical officer of Operation Deep Freeze, he "travelled very well". He was given 5 per cent glucose on a dripfeed on flight. Besides the fractures he had "tremendous scalp wounds that almost scalped the man".

Lt. Mayer persisted that his history-making flight was "just a routine first fly-in". But on arrival at Christchurch he wrote off as "minor difficulties":

That the starboard gear "hesitated" to go down before landing at McMurdo Sound.

That the return flight was made with the nose gear held on hydraulic because the lock wouldn't catch.

That one fuel tank refused to feed to the engines.

That a landing light jammed in a down position for the trip back.

The Hercules landed at Christchurch with about 3,000 gallons of fuel.

The injured man was soon in the Christchurch Hospital. The medical superintendent-in-chief (Dr L. M. Berry) said that although Mr McMullen's injuries were serious his condition was satisfactory.

The injured man is carried from the helicopter which flew him from McMurdo Station to Williams Field for the flight to New Zealand.

—U.S. Navy Photo.

After a little under a month in Christchurch Hospital, McMullen was flown to San Francisco on July 24 aboard a U.S. Navy Super Constellation.

N.Z. NURSE'S PART

With Mr McMullen when he left Christchurch was Sister Virginia Averill, the sister in charge of his ward, who had been personally responsible for him for the past 24 days.

Miss Averill has done a course on spinal injury work at the Royal Perth Hospital. She spent six months in its paraplegic unit in late 1962.

When told she was coming with him Mr McMullen was in high spirits. "She sure knows how to look after me", he said.

He paid tribute to the wonderful treatment which he had received while at Christchurch Hospital. In the room books were stacked on one side, a television set was installed on the other. There were fruit and flowers and a packet of cigars on a nearby table.

Also on the flight were two Navy hospital corpsmen, F. J. Algeo and T. Amato. McMullen travelled in a hospital bed.

Next day Mr McMullen "smiling and cheerful" was resting comfortably at Oak Knoll Naval Hospital, California. He was visited by his wife. He will be in hospital for some time.

N.Z. FRIGATES HELP

The U.S. Navy's rush to Antarctica created problems for the New Zealand Navy, whose two frigates "Otago" and "Pukaki" acted as weather reporting stations and potential search and rescue centres during the flight.

"PUKAKI"

An American-supplied radio which the frigate "Pukaki" carries in summer—the Antarctic season—was in the United States being overhauled. A frantic search uncovered a set owned by the New Zealand agent for the radio company—in his front room.

Cold-weather clothing was air-freighted at high speed from Auckland to Dunedin. Sets of ice-clothing, for use on the exposed bridge of the "Pukaki", were supplied by Deepfreeze Headquarters in Christchurch.

Mr T. J. Smith, of the Meteorological Service in Wellington, was flown to Dunedin with his equipment at great haste.

All were loaded aboard the "Pukaki" in time for its departure from Dunedin.

"OTAGO"

The "Otago" meanwhile, was about 400 miles south of New Zealand, carrying a ship's company that should have been on leave. "Otago" was in the Hauraki Gulf when at 5 a.m. on June 24 she received the call to head south at best speed.

After two and a half hours at Dunedin for refuelling and provisioning the "Otago" headed south again at 4.30 p.m. on Thursday, June 25. South of Campbell Island she ran into snowstorms, but conditions were generally good. Speed had to be reduced at night for fear of ice, and ice was located about 2.30 a.m. on Saturday the 27th, when the ship was 510 miles south of Bluff.

The mercy flight aircraft was radar-tracked for about 20 minutes on its trip south and passed within 20 miles of the ship. It was also picked up on the return trip, but at greater range.

About six shells were fired during the mission, and tracked by radar to provide wind speed data required for meteorological reports.

BACK TO NORMAL

"Pukaki" returned to Bluff on June 26 and "Otago" to Wellington two days later, for 48 hours. The main reason for the visit to Wellington was to enable the crew to get some rest.

The vessel was engaged on night exercises on the night of June 23-24 and she had to prepare and sail for visiting Americans on the recause of the conditions little sleep was possible during the voyage.

N.Z. Antarctic Society Gives Plaque

A bronze plaque commemorating the "mercy flight" was presented by the New Zealand Antarctic Society to Commander M. Winton, U.S. Naval Attache, at a cocktail party at the residence of the American Ambassador to New Zealand given for visiting Americans on the research ship "Eltanin". The presentation was made by the President of the New Zealand Antarctic Society, Dr R. A. Falla.

The plaque, mounted on English oak, is to be forwarded to the home base of the Hercules rescue aircraft's VX6 squadron, Quonset Point, Rhode Island.

ROUND UP OF UNITED STATES ACTIVITIES

With the winter darkness unbroken save for the occasional clear moonlit night, activities at the United States bases have been confined to indoors, although some reports of earlier ventures are still coming in.

296 Americans have been wintering over in the Antarctic this year: 27 at Byrd Station, 10 at Eights, 11 at Hallett (plus two New Zealand scientists), 225 at McMurdo and 22 at the South Pole, as well as one at the Soviet station, Vostok.

Of the 296, 34 are civilian scientists and the remainder are U.S. Navy support personnel.

The U.S. Navy Support Force intends to relieve the wintering over personnel and start Operation Deep Freeze 65 on October 1.

FINE AT THE POLE

Of the United States bases in Antarctica the Amundsen-Scott Station at the South Pole enjoyed the best weather during the week May 17-23. It had seven days of clear conditions although it had a low temperature of —91°F. on one day. By comparison the highest temperature was —74°.

At McMurdo Station six days of blowing snow were experienced with average winds of 25 knots. The highest gust was 74 miles an hour. On the warmest day the temperature fell to —30°.

The lowest temperature at Byrd Station was —38°. There were only two clear days at Hallett Station. Visibility on the other four varied from zero to one-eighth of a mile. On May 19 there was a peak gust of 82 miles an hour. The average wind was 44 knots.

STATION NOTES

Nightmares of the —59° (F.) are fading from the minds of the 225 men wintering over at McMurdo Station as signs of spring appear in their vegetable garden. Within 48 hours of planting some seed in a box of New Zealand garden soil, the fluorescent lighting substituting for the sun had coaxed radish and tomato plants above the surface and, when last reported, these plants had soared to a height of some 2in. 60 years ago, Dr E. Koettlitz, aboard Scott's iced-in "Discovery" in Winter Quarters Bay, persuaded both mustard and cress to venture into the Antarctic air, but he must have been earlier (or later) with his horticultural hobby as he encouraged his plants to grow by putting them under a ship's skylight, which practice would serve little purpose in the darkness of midwinter.

Late July brought the South Pole Station its lowest winter temperature, of —93°, which made McMurdo's lowest degree, —59°, seem positively balmy.

1535 miles away at Eights Station at the same time transportable trailers were covered by five ft. of snow.

FOSSIL FINDS

The University of Minnesota geological team's third expedition into the Ellsworth mountains, having been able to accomplish some 10 times as much as previously thanks to the assistance of U.S. Army turbine helicopters, returned to the United States in March last with a wealth of findings which could invalidate some long-held geological theories as well as provide new evidence on the age and origin of the Antarctic continent.

Abundant fossil-bearing areas surrendered data from pre-ice age Antarctica, when the climate was warm enough to support plant and insect life and the continent itself may have been joined to Africa, India and Australia. These fossil discoveries, assessed as "about the

finest accomplishment the group could have made" were made possible by the helicopters which took the geologists to all levels on the mountains and to otherwise inaccessible areas. In previous expeditions, only the lower portions of the mountains, and those which could be reached on foot, were available to the geologists, who reached their destinations cold and tired; with the helicopters a far wider range of sites could be reached and the men reached them warm and rested and therefore able to complete far more comprehensive work.

A camp made on the Minnesota glacier, named Camp Gould after the veteran Antarctic geologist Laurence M. Gould, at one time housed 36 people and five aircraft. Geology, glaciology, astronomy and survey-mapping were included in the expedition's work.

INFORMATION WANTED

The Antarctic Map Folio Series, reported in "Antarctic," June, as being prepared by the American Geographical Society, is available for any accumulated data not being used in published reports. A recent inquiry from a geologist on the possible use of notes on birds he had taken during an Antarctic field trip brought about an appeal by Vivian C. Bushnell of the Society (Broadway at 156th Street, New York 10032) for any material so accumulated which could be used in the Series. A list of topics to be treated by the Series covers aerial photography and mapping coverage; history of antarctic voyages, traverses and stations; studies of the continent and islands—ice sheet and sub-ice topography, ice sheet thickness, studies in deep pits and bore holes in the ice sheet and ice shelves, firn temperatures at 10m. depth, firn density at 0-2m. and at 10m., average annual snow accumulation, mountain glaciers of Antarctica, gravity anomalies, magnetic declination and components of the magnetic field; ocean and ocean bottom studies, south of latitude 35°—bathymetry, earthquake epicentres, marine sediments, physical oceanography and primary productivity; atmospheric studies—temperatures, winds, etc., (usual meteorological-type observations), solar radiation and albedo, ionospheric parameters, magnetic B and L values, isoaurora; and Life Sciences—distribution of terrestrial plants, insects, seaweeds, bird rookeries and seal rookeries, whaling grounds, distribution of benthic fishes and of some of the marine invertebrates.

"ELTANIN"

Half-way house for the ocean research vessel "Eltanin's" twelfth cruise was Wellington, New Zealand, where she arrived in July after two months' storm-ridden sea-days.

Her traverse of the seas between Valparaiso and New Zealand, via the Antarctic Ocean, had included the collecting of samples of marine life, the discovery of a previously uncharted mountain rising some 10,500ft. from the ocean bed and the 'mining' of the sea floor for metal ores. Manganese had been taken from large areas of manganese dioxide precipitated from salt water and a seabed core, 86.4 ft. long, will give a permanent record of the strata, many millions of years old, of shells, mud from the continents, volcanic mud, clay and sand, which present a record of the earth's history.

Six nations were represented in the 33-man scientific team aboard "Eltanin"—Chile, Argentina, France, Israel, Britain and the United States, while the commander of the vessel added yet another nationality —Dalmatian. Disciplines studied during the cruise had included oceanography, biology, atmospherics and meteorology, radio and electronics.

After ten days in Wellington, "Eltanin" left for her return research voyage, across the Pacific back to Valparaiso.

FUTURE PLANS

Deep Freeze 64-65 is not so far away. Major U.S. plans have already been outlined (Antarctic, March and June, 1964) for the establishment of a permanent biological station on the Antarctic Peninsula and the

start of the four-year, six-leg traverse from the Pole to Queen Maud Land. The latest announcement is for the continuation of the topographic mapping of Antarctica, begun in 1959-60, with the completion of TOPOs SOUTH, NORTH, EAST and WEST by the end of the 1963 season.

There now remains the mapping of the area of West Antarctica, with priority for areas for which neither adequate photography nor maps exist, or for which existing maps' adequacy is questioned. These include coastal areas inaccessible to ships and therefore dependent for accurate delineation on the UH-1B helicopters operating mapping-quality aerial photographic units.

Six sheets comprising the McMurdo project are expected to be published this year, and further compilation of the Britannia, Queen Alexandra, Queen Maud, Heritage and Pensacola Ranges and of Victoria Land will be completed.

Topographic engineers will conduct control operations in a survey of the group of peaks west of David Glacier, and a helicopter-supported party a horizontal tie between the TOPO WEST survey line and Hallett Station, while aerial photography will cover the Pensacola Mountains and Heritage Range of the Ellsworth Mountains. 55° of the mountain and coastal areas of Marie Byrd Land are needed for helicopter support of geologic, biologic and geodetic operations in 1965-66.

Plans are afoot for more mapping up to the 1967-68 season, with the possibiiity of satellite assistance.

The Antarctic Support Force for the coming season is expected to be about the same size as in previous years in men, aircraft, and ships, delivering an estimated 22,000 tons of cargo to McMurdo by sea, and 400 short tons by air. Last year 22,280 tons were ferried south.

Some 35 different research projects are planned, involving 150 transient scientists and wintering group members.

The first of 11 ships in the task force is due at Lyttelton in September, as well as the first of 29 Boeing military transports, with 74 staff members. By the end of the month, Boeings should be landing at Christchurch airport two or three times a week.

INSPECTION VISITS

Following the announcement by the United States in September last year of its intention to exercise its Antarctic Treaty rights to inspect Antarctic stations, the reports of the Observer teams now transmitted to the governments concerned support the assertion that the U.S. was concerned not with any anticipated violation of Treaty provisions but with the desire to promote the objectives thereof and to insure observance of their provisions.

Two teams were sent south to observe foreign stations in January this year; one, containing representatives of the Departments of State and the Interior and of the Arms Control and Disarmament Agency, and travelling aboard USCGS "Eastwind", inspected United Kingdom, Chilean and Argentine bases on outlying islands; the other, representing the Department of State, the Massachusetts Institute of Technology and the Department of the Interior, visited Scott Base (New Zealand), Dumont d'Urville (France), Vostok and Mirny (Russia). Obervers inspected buildings, facilities, equipment, scientific instruments and their reports were compared with the submissions made by each country under the Treaty's article VII, paragraph 5. Observers reported on the helpful courtesy of personnel at all stations, the assistance given them and the innocence of everything observed.

Observers from Australia, New Zealand and the United Kingdom had visited McMurdo, Byrd, Pole and Eights Stations some months in advance of the U.S. inspections.

ELTANIN VISITS NEW ZEALAND

Considerable interest was aroused in New Zealand by the arrival of USNS "Eltanin" in Wellington on July 14 for the ship's first visit to the Dominion.

A cocktail party at the U.S. Embassy was followed on 15 July by an official welcome by the New Zealand National Committee for Antarctic Research in association with the Victoria University of Wellington in whose Easterfield Building the welcome was extended. The large gathering was chaired by Mr R. W. Willett, Director of the Geological Survey and Vice-Chairman of the National Committee, in the unavoidable absence through illness of the Chairman, Dr E. I. Robertson.

Chief speaker at the welcome was the New Zealand Minister of Science, the Hon. B. E. Talboys. Speaking of the use by United States planes of New Zealand airport facilities, Mr Talboys described New Zealand as "a rather unique modern aircraft carrier". In Antarctica, he said, "man seems to shed something of his national pride and finds something of the spirit of cooperation." He welcomed the "Eltanin's" visit as forging yet another link between the United States and New Zealand.

Dr T. O. Jones in a witty reply assured the gathering that opportunity would gladly be offered to New Zealand scientists to participate in subsequent cruises either (1) as a New Zealand group in cooperation with a U.S. group or (2) as a New Zealand group engaged on a project of its own choosing within the general **Eltanin** programme, or (3) as individuals working for an American project.

Also present at the welcome were the United States Ambassador in New Zealand, His Excellency Herbert B. Powell, and Dr W. M. Hamilton, Director General of the N.Z. Department of Scientific and Industrial Research.

SCIENCE SEMINAR

Following the Official Welcome, most of those present, scientists and others interested in Antarctic matters, joined in a Science Seminar. Seven papers were presented by **Eltanin** scientists, each, with the resultant questions and discussion, occupying half an hour. Most of the speakers made use of colour slides to illustrate their papers.

Keith Blessum, U.S. Weather Bureau, outlined the meteorological observations and described some of the devices used.

Arno J. Kosko, Stanford University, described various facets of Upper Atmosphere Physics and played tape recordings of whistlers and other interesting noises.

Edwin M. C. B. Williams, Lamont Geological Observatory, used a series of charts to illustrate the results of "Eltanin's" 30 crossings of the Antarctic Convergence.

Michel Boeuf, Florida State University, illustrated the nature and use of the various suspended instruments and sampling devices used on "Eltanin" and the significance of the findings.

Pedro G. Centino, Lamont, demonstrated the equipment used for microbiological sampling.

James R. Hubbard, Lamont, dealt with the micropaleontological programme and described and illustrated the equipment used.

Delton W. Shirley, University of Southern California, described the methods used to study the distribution and ecological relation of Antarctic marine beata, especially in the mid-water and deep-water regions.

PUBLIC INTEREST

A cocktail party the same evening tendered by the New Zealand Antarctic Society was followed by a public lecture by Dr R. A. Falla, Director of the Dominion Museum and President of the Society, who spoke on "Ships of the Southern Ocean".

ELTANIN IN THE AMUNDSEN SEA

80 miles north of the Thurston Peninsula. Here on January 21 Eltanin reached 70°S., her most southerly penetration.

—N.S.F. photo.

"Eltanin" was thrown open to the public for several hours on most days of the fortnight's visit. Large numbers took advantage of the opportunity to inspect the vessel and were obviously impressed by the research facilities available as well as by the courtesy and helpfulness of the scientists and other personnel of the ship.

ABOUT ELTANIN

The 3,900-ton ship, a floating research station, is a part of the U.S. Antarctic Research Program (USARP) which annually conducts staging operations for its work on the Antarctic Continent from Christchurch. The USARP is planned, funded and co-ordinated by the National Science Foundation, an independent agency of the U.S. Government. The **"Eltanin"** is operated for the Foundation by civilian personnel of the Military Sea Transportation Service. Master of the ship is Captain Philip Stanich, a veteran of polar service.

The "Eltanin" has been making extended cruises in Antarctic waters for two years. During the past two months her scientists have been conducting research operations in the deep South Pacific waters north of the Bellingshausen and Amundsen Seas.

At times hampered by storms with seas running as high as 40 feet, scientists have collected data in upper atmosphere physics, meteorology, geomagnetics, and biological, chemical and physical oceanography. In their work they have taken biological samples at bottom and mid-water levels, obtained pictures of the ocean floor, retrieved samples of ocean bottom sediments, made recordings of the strength of

the earth's magnetic field, monitored the cosmic ray influx, conducted continuous precision depth recording, and carried out other scientific work.

Originally constructed as an ice-strengthened cargo vessel for northern operations, the "Eltanin" was substantially rebuilt for its scientific mission. The ship contains wet and dry biology laboratories and laboratory space for hydrography, gravimetry, meteorology, and upper atmosphere physics.

To date 157 scientific personnel have participated in cruises, including scientists and technicians from Argentina, Brazil, Britain, Canada, Chile, France, Germany, Iran, Israel, and the Soviet Union. The ship normally carries a scientific complement of 34 and a crew of 48 officers and men.

The "Eltanin" is the only ocean-going research ship operating in Antarctic waters on a year-round basis. The ship left the United States in May, 1962, on its initial cruise to the Antarctic and has not returned to the U.S. since. Using Valparaiso as her base of operations, the ship has made 10 cruises in Antarctic waters beginning in July, 1962. During that period, scientists have conducted extensive research activities in the waters of the Drake Passage, Scotia Sea, Weddell Sea, South Atlantic, and South Pacific. Present plans call for the ship to continue its Antarctic operations for a number of years.

Because the research track of the vessel is moving generally westward, tentative plans indicate that Wellington will be the western terminus of many forthcoming cruises. Valparaiso will be the eastern terminus.

The "Eltanin" remained in Wellington for nearly a fortnight before its return to Antarctic waters for continued research.

NEW U.S. STATION PLANNED

Early next year the United States will establish a station at the southern end of Anvers Island, 25 miles off the west coast of the Antarctic Peninsula in 64°30′S., 63° 30′W., about 700 miles due south of Cape Horn.

The site was selected after a survey of 32 possible locations two years ago. A detailed survey of Anvers Island was carried out from the ice-breaker "Eastwind" last year. The station will enable American scientists to investigate the Antarctic Peninsula, which has long been the site of British, Argentine and Chilean stations. The peninsula is relatively rich in plant and animal life and contains much of Antarctica's exposed rock.

The station will be constructed by United States Seabees, using U.S.S. "Edisto" as temporary living quarters, in January and February, 1965. A hut on the site, erected by the British in 1955 and used for three years, is being made available to the Americans, who will modify it into a laboratory. During the summer season U.S.A.R.P. scientists and 16 Navy men will occupy the base. Five scientists and four sailors will winter over.

The new station will be named **PALMER STATION** in honour of Nathaniel Palmer, the sealer who carried out much exploratory work in the area in 1820-1821. Anvers Island is the largest of a group of islands called the Palmer Archipelago.

U.S. MEN LEAVE

U.S. Weather Bureau men who had wintered-over at Wilkes during 1963 ended their observations there in late December and left the station in "Nella Dan" on January 23. This ends United States participation in the scientific programme at Wilkes, which was built as a United States station in 1957 and turned over to Australia for administration at the conclusion of the I.G.Y.

WINTER PASSES AT AUSTRALIAN BASES

The monthly newsletters from Base leaders issued by the Antarctic Division in Melbourne add human interest to the more formal situation reports.

MAWSON

The notable event in May was the overturning of "Castleberg", the apparently timeless iceberg near Mawson featured on Antarctic postage stamps. After the sea-ice around it re-froze, intrepid motorcycle teams, Seedsman with Francey, and Trajer with Stalker, set out to inspect the berg, although the latter team did not make it owing to engine trouble.

The Volkswagen complement of Brocklehurst, Cardell, Lawson and Allport became the second party to attain the summit of Welch Island. Field trips were limited by fast-decreasing daylight. On the 3rd, after several delayed starts, a party of four reached the Fischer Nunatak, 15 miles inland, with the intention of installing aerials on Mount Henderson and a trig. marker on the nearby Goldsworthy Ridge. Adverse weather confined them to a caravan for most of the trip and the outstanding achievement was the consumption of an incredible quantity of ice cream.

Dwyer and O'Keefe, who were anticipating a spell away from camp, weer disappointed when a later field trip, plagued by vehicle trouble, had to return. The snow-tracs as well as the larger vehicles have been fully occupying the mechanics in preparation for spring work.

With the sun rising later and later, the O.I.C. was having occasional trouble preventing the staff from doing the same. An exceptionally long run of cold calm days culminated in a minimum temperature of minus 30.1°F., lowering the previous May record by 8.4°. The maximum temperature was 20.4° and the mean temperature was minus 1.1°. The average wind was 19 knots with a maximum gust of 64 knots. The number of days of drift was 15 and there were gales on 10 days.

Midwinter was accompanied by a long drawn-out blizzard and Met. figures show 23 days of drift, 24 days of gales and a mean wind speed of 33 m.p.h. for the month. The maximum gust was 104 m.p.h. and the mean temperature was 7°F., with a minimum of minus 22°F. It seems that Mawsonites thrive well under these conditions, including the absence of sun—as witness the gay spirits on a number of festive occasions, writes Peter Martin.

"The highlight of the month was the gay midwinter celebration on the 22nd when we enjoyed a lavish feast of fine food and wines in an atmosphere of lively frivolity. Our thanks go out to our popular chef, John O'Keefe, and his assistant, John Beck, for their grand performance."

The Mawson General Hospital has undergone a shift to new, modern premises at the east end of Gash Alley. Doctor Jack is concerned about the high standard of health and lack of customers.

LOOKING AHEAD

The engineering section is busily preparing equipment for the spring trip to the Amery Ice Shelf. O'Shea and apprentice engineer Allport are building a new-model weasel with a highly distinctive and original appearance. Brocklehurst maintains a cool temperament while wiring the vehicle, in spite of the constant friendly abuse from the mechanics and Lawson has the powerhouse well tamed.

Physical fitness campaigns are being conducted in some circles. Dwyer and Stalker are often seen

throwing weights about in the gymnasium which has been constructed in the old mess. Stapleton and Williams are maintaining their condition by frequent and often intrepid journeys—to the transmitter hut.

Dog training is progressing well and Budd is often seen in deep conversation with "Flash Harry", our leading dog.

With the days now (June) perceptibly longer and the return of the sun expected soon, our thoughts turn to increased outdoor activity.

SUN RETURNS

July brought the return of sunshine to Mawson and also milder weather than in previous months, enabling an increase in outdoor activity. Early season fieldmen were Budd, Miller and Jacquemin who went with the dogs to Robinson Islands. More recently, Farley, Bradley, Lawson and Williams took the dogs and a vehicle on a survey trip to Rumdoodle. The engineers were busy getting the vehicles in top condition.

Lawson altered the Mawson landscape by driving a bulldozer through a huge snow drift between the new and the old surgeries. The latter building was converted into auroral and general darkrooms.

Recreational activities were many and varied and a new sport enjoyed by many was tobogganing.

Late July saw the return of the Russian aircraft overhead in a flight between Mirny and Molodezhnaya. "It seems that we will soon have Russian neighbours", reports Martin, "as they propose shortly to construct an aircraft maintenance hut at our airfield which they use at Mawson, and they plan it to be manned by three of their team over the summer months."

The July maximum temperature was 25°F., the minimum —11°F. and the mean +7°F. The 25 days of strong winds included 15 days of gales, with a monthly mean velocity of 25 m.p.h.

WILKES

The seal-hunting dog sledge trips on the sea ice had the occasional patronage of "shutterbug tourists" during the brief daylight hours. The last trip with Doc. Murray saw a dog fight in which Doc. was twice bitten but refused to reciprocate, much to the dogs' amazement.

After an uncomfortable false start, Woods and Morgan reached Haupt Nunatak for one week's glaciology work near Vanderford Glacier. Budnick unfortunately broke a small bone in his foot. It was not serious but it required Freeman to replace him on the Vanderford trip.

Naturally, midwinter was the highlight of the month. Cross put on a feast of gargantuan proportions. A fine souvenir menu carried a photo of local inmates.

Fox has gained a local prominence in the Wilkes sewing circle making new harnesses for dogs. Bonnici constructed a masterpiece of tunnel engineering at the entrance to the buildings to save digging the door out after every blizzard. Now he has to dig the tunnel out, too. Brophy, apart from minor duties observing the weather and playing Kingston trio records, gave a lecture with slides on the attractions of Europe. The engineers Hulcombe and Jones have been hard at it overhauling vehicles. O'Leary completed an insulated box for a water haulage tank which he claims is far superior to ANARE huts in design, insulation and comfort.

Three men, Morgan, glaciologist, Budnick, surveyor, and Woods, radio operator, were carrying out glaciological investigations about 30 miles from Wilkes when on June 9 a blizazrd struck, which raged for 48 hours and reached 130 m.p.h. The party spent two days huddled in a small plywood caravan. Fierce winds, laden with rock fragments, blasted their shelter until it began to disintegrate. Not until the door had been blown from its hinges and the interior of the caravan was filled with snow did the blizzard abate.

DAVIS

Goodall, Griffin and Trott set off for the Plateau, via Platcha, with the snowtrac and dogs. Unfortunately, due to the short days and unkind weather, the trip was cut short. However, some supplies were depoted twenty miles in on the Plateau, ready for an early start for further afield next spring.

The middle of the month brought falling temperatures, so that each day Kotterer would announce that a new station record low for May had again been reached. Then, on the twenty-third, he was satisfied when he was able to announce that a new all-time station low had been reached at minus 36.9°F. A blizzard followed, bringing an increase in temperature of 58 degrees and also sufficient snow to build drifts up to the roof-tops of most buildings, which meant plenty of shovel work digging out buried doors.

Low temperatures caused many peeling noses, some from minor frostbite and others from too much exposure to the ultraviolet lamp, the prize going to Mayman who was demonstrating the correct use of the lamp, but ended up overcooking. Attending to the wants of Rho, Lucifer, Pompey and Caesar has given Mike the opportunity to prepare some strange mixtures, but the pups eagerly await each meal and quickly show their appreciation.

The hours of daylight are very limited now, with sun above the horizon for less than two hours each day. However, in spite of all we heard before leaving of the long winter evenings when time hangs heavily, nobody has yet managed to track any down. The most common complaint is the lack of sufficient hours each day in which to get everything done.

Most of the elaborate aerials and feeder lines used for radio communication between Wilkes, other Antarctic stations, and Australia were blown down. The main food store was severely damaged and cased food was buried under tons of snow.

The maximum temperature for the month was 20.0°F., the highest temperature since the team's arrival. The highest observed wind was 67 m.p.h.

Trott writes "Our month of no sunshine is now passed, and we are all eagerly awaiting the return of the sun within the next few days. Even though the sun has been below the horizon, there have been some striking displays of colour in every imaginable shade during the few hours of twilight each day.

"By now everyone has had the opportunity to show his culinary skill. The fact that we are still a 10-man station means that none has been a complete failure. The most ambitious Sunday cook has been Svensson who, in addition to meals, tried his hand at pastry-cooking and bread-making, with most acceptable results.

Changes in appearance since leaving civilisation have to be seen to be appreciated. Haircuts range from the shortest crewcuts to hair untouched by scissors. Beards are being grown by all with varying degrees of success. Of course, some prefer to trim and shape, while others advocate the nature look."

On the 21st, the day before midwinter celebrations were due Kotterer broke his upper dentures, and this called for immediate action by Mayman, who had them successfuly repaired in time for the festivities.

The pups are growing and roaming around the camp area. Their favourite resting place is near the exit doors, so that when anyone goes outside the pups are off in pursuit. Stopping for even short times means bootlaces will be untied as this is one of their main accomplishments. Due to weather and darkness there have been few outings this month.

At the end of the month high winds, with a maximum gust of 113 m.p.h., once again brought open water to within two miles of the camp. The midwinter month saw

the temperature climb to the highest since our arrival, 29.6°F., while the minimum was minus 26.0°F.

JULY REPORT

Tratt's July newsletter reports:

"Once again the sun is back with us. Since it reappeared on the 14th the hours of daylight have greatly increased, so that it is now possible to visit some of the more distant parts of the Vestfold Hills, or to make a close-up tour of "Iceberg Alley" and marvel at the variety of the size, colour and shape of many 'bergs which have become a familiar sight from the camp.

"The husky pups have reached a stage when it is no longer safe to leave anything outside. Since they found the food storage outside the kitchen window, other arrangements have had to be made for icecream-making, and now they wait at the window for any scraps to come their way. They are daily taken for a run on the sea ice, harnessed to a small sledge. Another of their regular outings is accompanying Trott and some other volunteer on the fortnightly lakes-sampling trip of eight miles.

"One of the achievements of the month has been the switching on of the all-sky camera. Up till early this month, Bakker had been working on it with little success, but finally he was able to get it operational, so that we are now making a photographic record of auroral activity as seen from Davis.

"Preparations for spring field work are going ahead; making up a new dog sledge, preparing the field rations and sewing harnesses and training dogs. The latest move in this regard has been to use a large Nansen cargo sledge on the training runs.

"Goodall is keeping the engines running and, towards this end, he has us all out regularly digging in snow drifts for drums of diesel fuel to be rolled to the power house when temperatures drop too low. Drums have to be taken into the power house to thaw before fuel can be pumped.

The Met. boys were kept busy providing hourly weather reports when the Russians had their first flight of the season near the end of the month. Weather-wise, it has been a very quiet month with no blizzards: Highest wind, 60 m.p.h., temperature, 21.0°F.; minimum temperature, minus 21.6°F. Our one claim to fame is the highest monthly average for station level pressure since the station was established—1005.1 mbs.

LEADERS APPOINTED

The leaders of three parties who will serve with Australian National Antarctic Research Expeditions during 1965 have been appointed.

MAWSON

Brian C. Z. Woinarski (34), Victoria. Mr Woinarski holds the Diploma of Physical Education. He is sports master at Mordialloc High School, Victoria, and won a blue for boxing at Melbourne University. Formerly well-known as an Australian-rules footballer, he is now actively interested in yachting.

WILKES

John H. Lanyon (52), Victoria. Serving with the R.A.A.F. from 1936 until 1961, Mr Lanyon rose to the rank of Squadron Leader and was decorated with the D.F.C. He holds the Diploma of Electrical Engineering and is an associate member of the Institute of Radio Engineers. Mr Lanyon is at present a teacher of mathematics and science at Noble Park High School. In addition to being a competent skier he has experience in water-skiing and ocean yachting.

MACQUARIE ISLAND

C. Bruce Ellwood (37), Victoria. Mr Ellwood previously served with ANARE as leader at Macquarie Island in 1963. He served with the Merchant Navy from 1943 to 1952, was a platoon commander and fort commander with the Malayan Police Force from 1952 to 1957, and later became an assistant superintendent in the Victorian Social Welfare Department.

BIG CHANGES CONTEMPLATED AT SOVIET BASES?

News published in the Press suggesting that "the Soviet scientific centre" in the Antarctic is to be moved from Mirny to Molodezhnaya in Enderby Land during the 10th Soviet Antarctic Expedition commencing its work in the 1964-65 summer must be read in the light of a statement from the Soviet Committee on Antarctic Research which reads, "Observatory Mirny remains to be the main station of the Soviet Antarctic Expedition." Presumably, therefore, while the emphasis in scientific research is to be transferred fom Mirny to Molodezhnaya, with consequential transfer of much scientific equipment, Mirny will continue to be the main supply base.

Tass said the Mirny observatory, which had been in use for nine years, was in an area where drifting snow interfered with its work, and conditions would be better at Molodezhnaya. Coastal ice is also a great deal stronger than at Mirny and this will allow easier unloading of supply ships.

THE RETURN

On May 15 the "Ob" returned home with members of the 8th wintering and 9th summer expeditions on board. In a harbour decorated with flags the inhabitants of Vassiliev Island staged an enthusiastic welcome.

WINTER FLIGHT

Late in July a disturbing message was received at Mirny from Molodezh station: **"Urgent transport required for a sick man. Surgical treatment necessary".** It was the middle of the polar winter, and it is 4000 km from Mirny to Molodezh and back. But on the morning of July 26 a plane set out. The course lay along the Antarctic coast. The flight was made in darkness, in bad weather. After seven hours of flying a series of bonfires below indicated the landing strip.

There was very little delay on the ground. The plane was refuelled and checked. The patient was brought aboard. A doctor took his place beside him. A green sky-rocket went off and the aircraft was air-borne again, with gusty cold winds beating against it. Hours later the radio operator suddenly announced: "Receiving Mirny. Wishing us a good landing".

And so for the first time in polar history a long-distance winter flight Mirny–Molodezh–Mirny was successfully accomplished. The patient received the necessary treatment and is progressing well.

VOSTOK

A press report from the Soviet News Agency Tass, says: The expedition, which will leave Stalingrad by sea in the middle of November, will trek by tractor and sled about 930 miles from Mirny to Vostok station.

The Soviet Committee on Antarctic Research confirms that next year Vostok Station will continue its work. This statement gives topical relevance to the interesting first hand description of this inland station which follows.

A LOOK AT VOSTOK

(Summarised from an article by K. G. Sandved in "Antarctic Report", April 1964, itself based upon the observations of John D. Jacobs, of Alaska, the first U.S. scientist to winter at Vostok Station.—Ed.)

Vostok ("East") Station was established in December 1957, near the south Geomagnetic Pole (78° 27′S., 106°52′E.). It is in one of the least accessible areas of the Antarctic, 1410 km (870 miles) from Mirny and 11,200 ft above sea level, in a region where surface temperatures have been recorded as low as —127°F. Yet its very location makes Vostok ideally suited for particular

types of research, notably in physiology and upper atmosphere physics.

THE BEGINNING

The tractor train that established the station arrived from Komsomolskaya on December 16, 1957. Led by A. F. Treshnikov, the train comprised nine tractors and nine cargo sledges. Another train arrived on January 26, 1958, bringing materials for additional living quarters. Undersnow laboratories have since been added, joined to the station proper by tunnels. Simultaneously with the building of the station, a 2,500 x 70 m landing strip was constructed, and the first L-2's landed here on December 22.

The original station, which housed about a dozen scientists and support personnel, comprised six mobile units each about 12 sq. metres in area. Five of them were arranged in a cluster interconnected by roofed, heated vestibules. The sixth unit housed a radar unit for auroral observation.

The station is centrally heated, using the cooling water from the diesel generators.

The first heavy aircraft to land at Vostok was a ski-equipped twin-engine IL-12 on December 8, 1959. Aircraft from Mirny have parachuted supplies to Vostok as early in the year as September 15 (IL-12) and have landed as early as November 5 (LI-2). Flights have continued into early March and on one occasion (in 1960) an IL-14 parachuted supplies on March 22.

Leaders at the station have been V. G. Averianov, V. S. Siderov (1958, 1960 and the 1961-62 summer), V. S. Ignatov (1959) and L. N. Zhigalov (1961). The station was unoccupied during the 1962 winter. This was the time when the Australian team led by New Zealander Bob Thomson visited the station. It was re-activated in January 1963 under Sidorov again. The 1964 leader is V. A. Ananev.

TOUGH CLIMATE

During Vostok's first winter the temperature dropped on May 1, 1958, to —104.8°F. On August 25 it fell to —125.3°F. The record low (a world record) of —127°F. was on August 24, 1960. These extremely low temperatures have been recorded just as the sun is beginning to appear above the horizon after the winter. They have invariably been accompanied by low atmospheric pressure. Fortunately, the area is not very windy: on only two occasions during 1957-1961 did the wind exceed 15 m./sec. Total darkness prevails from April 24 to August 18.

The station offers unique opportunities for medical research. Dr I. I. Tikhomirov in 1959 found that dyspnea accompanied by coughs and head colds was frequent, nausea and headache even more so. Some of the men showed signs of mental depression and neurasthenia. Cardio-vascular studies at rest and following exercise showed heart-murmur, dilation of the heart, and drop in the systolic, diastolic and pulse pressure occurring in nearly all the wintering personnel. Although the blood pressure remained sub-normal during the entire year, there was no indication that working ability was seriously impaired. A gradual stabilisation of the cardio-vascular system took place during the first 6-7 months; however complete acclimation could not be said to have taken place even after one year.

In addition to medical research, the programme at Vostok includes meteorology, aerology, actinometry, glaciology, magnetism and studies of the ionosphere, aurora, cosmic radiation and VLF transmissions.

KEEPING WARM

Clothing has been devised which permits work outside for short periods even under extremely unfavourable conditions. The standard insulated suit has a 40–W electrical heating system for hands, chest and feet. Heating of the inhaled air and protection of the face are accomplished by means of a protective mask. Efficient even at temperatures below —103°F., the mask is made of compressed, foamed polystyrene and

has a double heated shield. The inhaled air is heated by an electrical heater in the forward section of the mask. A silver-zinc storage battery provides power for six hours at temperatures to —112°F.

Even at —60°F. diesel oil and kerosene become as thick as syrup, engines baulk at starting, and moving mechanisms such as rotating antennas and auroral cameras become difficult to operate. Rubber hoses and cables break at the slightest bend and iron becomes brittle. At Vostok's atmospheric pressure the boiling point of water is reduced to 83-84°C. as compared with 100°C. at sea level. Hence it takes 5-6 hours to cook a chunk of beef and 6-7 hours to boil peas and beans. This necessitates the use of special autoclaves for preparing meals.

Adequate recreation facilities are available: twice-a-week movies, chess, dominoes, English-language studies, and the ham radio station UAIKAE6. In 1958 624 two-way contacts were established; in 1959, 1637. The contacts included Siberia, Spitzbergen, Greenland, Alaska and drifting Arctic stations. For the reading enthusiast there is a 230 volume library, and a weekly newsletter is prepared on the basis of newscasts from Moscow and other information relayed from Mirny.

WE SALUTE THEM

Mr W. F. Williams, who served as a seaman in the "Nimrod", Shackleton's expedition ship in 1907-09, died in Melbourne on July 25. He was 77.

Mr A. J. Hodgeman, of Mawson's 1911-14 expedition (including the second year) died in England recently, aged 78.

Prof. R. W. James, of Shackleton's "Endurance" expedition in 1914-16, died in Cape Town on July 8.

CHILEAN PROGRAMME

Permanent bases are being operated by Chilean scientists at four localities in the South Shetland-Antarctic Peninsula area. The Chilean stations are

Arturo Prat
Bernado O'Higgins
Gabriel Videla
Pedro Cerda

Sub-stations are also continuing in operation at Avian and Doumer Islands. The Arturo Prat and Pedro Cerda bases are maintained primarily for meteorological observations.

Operation of the bases and sub-stations is supported by four vessels, the ice-breaker "Pilato Pardo", the oceanographic vessel "Yelcho", and the two patrol boats "Lautaro" and "Lientur".

The Chilean scientific programme is organised by the National Committee for Antarctic Investigations in Santiago, which includes representatives from scientific organisations, the armed forces and Government departments. The programme for 1964 includes investigations in meteorology, cartography and geodesy, marine biology, glaciology, geology, seismology, and oceanography. These activities represent a continuation of the programme of previous years at approximately the same level. A considerable proportion of the oceanographical programme has been drawn up in co-operation with the Lamont Geological Observatory, Columbia University and aboard the U.S.N.S. "Eltanin".

NEW INSTITUTE

Chile has established the **Chilean Antarctic Institute** to plan, direct and co-ordinate Chile's scientific and technical efforts in Antarctica. The Institute will be directed by a Council of representatives from private and public organisations. It will have autonomy in research matters, while remaining legally and adminis-

tratively under the Ministry of Foreign Affairs. Its President is the Chief of the Office of Frontiers of the Ministry, and the Secretary-General is Vice-Admiral Jorge Araos Salinas. The General Secretariat has three departments, Science, Technology and Information.

Relying primarily on University organisations the Institute is to carry out research in the Antarctic Peninsula in accordance with a 25-year plan and a series of 5-year plans. During the first of these 5-year plans, 1965-69, it is proposed to establish a new station south of 65°S.

TREATY POWERS

3rd CONSULTATIVE MEETING

Representatives from the nations which signed the Antarctic Treaty in 1959 met at Brussels from June 2 to June 13 for the third Consultative meeting as laid down in Article IX of the treaty. New Zealand's representatives were Mr M. J. C. Templeton, N.Z. High Commissioner's Office, London, Dr E. I. Robertson, Assistant Director-General D.S.I.R., and Mr E. Farnon, 1st Secretary, N.Z. Mission to E.E.C., Brussels.

Recommendations were unanimously adopted urging (1) the mutual provision of information on aircraft landing facilities, and (2) notification of the location, age, condition and stocking of unoccupied buildings, huts or caches; on the desirability of further consultations on logistics and telecommunications, and the inclusion of meetings of specialists in conjunction with the Fourth Consultative meeting.

The major interest of the meeting centred on the subject of the conservation of Antarctic fauna and flora. The concern of S.C.A.R. in this question was commended and a comprehensive list of **"Agreed Measures for the Conservation of Antarctic Flora and Fauna"** was drawn up and recommended to the contracting nations for adoption, with the suggestion that the "measures" be considered as guide lines until they have become effective following their approval by all the contracting parties.

NEXT MEETING IN CHILE

The representatives agreed to recommend to their Governments the acceptance of the offer of the Chilean Delegation to hold the Fourth Consultative Meeting in Santiago at a date to be agreed upon.

FAUNA AND FLORA

The participating Governments preface the "Agreed Measures" by recognising "the scientific importance of the study of Antarctic fauna and flora, their adaptation to their rigorous environment" and their inter-relationship with that environment; and by drawing attention to "the unique nature of these fauna and flora, their circumpolar range, and particularly their defencelessness and susceptibility to extermination".

The measures comprise:

(1) the prohibition of the "killing, wounding, capturing or molesting of any native animal or native bird . . . except in accordance with a permit" the terms of which are carefully defined.

(2) the taking of "appropriate measures to minimise harmful interference with the normal living conditions of any native mammal or bird". Such acts as "allowing dogs to run free, flying helicopters or other aircraft in a manner which would unnecessarily disturb bird and seal concentrations, or landing close to such concentrations (e.g. within 200 metres)", the driving of vehicles, the use of explosives or the discharge of firearms unnecessarily close to such concentrations, and "any disturbance of bird and seal colonies during the breeding period by persistent attention from persons on foot", are prohibited.

Even more stringent regulations are enjoined for "specially protected areas".

(3) the prohibition of the bringing in of any species of animal or plant not indigenous to the area except in accordance with a permit.

The provisions of the agreed measures will not apply in cases of extreme emergency involving possible loss of human life or involving the safety of ships or aircraft.

WINTER AT SOUTH AFRICAN BASE

Number 2 of "Antarktiese Bulletin" gives some additional information to fill out earlier reports already published in "Antarctic."

When the "R.S.A." reached Polarsirkelbukta on January 24 the bearded SANAE IV team were in such high spirits that they had a muskeg race with the ship to reach the shore first. "The weather was beautiful and the cargo was discharged in record time by working 12-hour shifts round the clock."

The Public Works Department team and the two American seismograph experts immediately set out for SANAE (15 miles from the ice front) where the wooden huts for the seismograph were erected in record time. The "neutron hut" was erected on a complex structure of pipes. Fifty-four blocks of lead, weighing 200 lb. each, were hoisted up this structure.

The homeward voyage was completed in the record time of 10 days.

SETTLING IN

On March 9 the new Leader, van Zyl, reported that his men soon became very interested in every bit of news from South Africa. The garage was changed into emergency quarters. Meanwhile, every team member had already mastered the tricks of the cooking profession: no professional cook has ever set foot at SANAE.

The sun should have set for the winter on May 19 but owing to refraction it was still seen five days later. Most of the men had not wintered in Antarctica before and the polar night was a new experience but they soon got used to the indoor life. Everyone has a hobby like photography, amateur art, music, singing and wrestling. The singers are not always encouraged but the wrestling club provides healthy exercise for the competitors and good fun for the spectators.

A new air glow photometer developed at the University of Stellenbosch was installed by Trevor Robertson, the geomagnetist. A new all sky camera, made in New Zealand, was erected in a specially-made hut and is giving better results than the old one. (See (Antarctic", March 1964, p. 384).

A new record low temperature of —51°C. (59.8°F.) was recorded in May. At such low temperatures a rasping sound is clearly heard when one is breathing out, owing to the instantaneous freezing of water vapour in one's breath.

Midwinter's day was the culmination to a month of preparations. The living quarters were completely redecorated. Good wishes were received from home and other Antarctic bases and all men felt on top of the world. The festivities started with a grand dinner and toasts to all the well-wishers. After dinner presents were exchanged and there were also gifts from home.

The average pressure during June was the highest for any June at the station, being 13 mb above the mean for June. The sun made a welcome reappearance on July 21 after two months of darkness. During these months all possible indoor work was done in anticipation of the coming summer. The indoor supply of diesoline was running short which will mean some back-breaking work after the winter inactivity.

Various problems have been experienced with the experimental motorised toboggan but it is hoped to use it soon for a short trip to the sub-station which is only 3 km. from the edge of the major ice shelf, and it should be possible to see the frozen buktas while in the vicinity.

The base doctor Tollie Traut is keeping a close check on the men's health. Blood samples are taken and analysed regularly. These tests show that they are all in good health.

From time to time the men undergo exposure tests during which the doctor takes numerous body and skin temperatures. The doctor also tends to the health of the huskies.

ANTARCTIC MEDAL

We record with pleasure the initial award of the South African Antarctic Medal to

JOHANNES J. LA GRANGE

'Hannes' has rendered splendid service to South African Antarctic and sub-Antarctic research. He served on Marion Island from October 1950 till April 1952: and wintered over on the island in 1954. He was a member of the crossing party of the Trans-Antarctic Expedition, 1955-58, and was Leader of the first South African Antarctic Expedition 1959-61.

He has written 25 aricles on Antarctic, sub-Antarctic and Southern Ocean topics, including the Meteorological Report (no. 13) of the Trans-Antarctic Expedition, and ranging from "Notes on the Birds and Mammals of Marion Island and Antarctica" to "The requirements and nature of the logistic support for a small national Antarctic expedition." For his Antarctic work he has previously been awarded the Polar Medal and the medals of the Royal Geographical Society and the New York Explorers' Club.

The medal, donated by B.P. (South Africa) Ltd., is awarded annually by the South African Antarctic Association to the person who in the judgment of the Award Committee has made the most outstanding contribution towards the South African effort in Antarctica and/or the sub-Antarctic Islands on which South African stations are maintained.

OF COURSE

Who was the Antarctic man who said this to a not-too-intelligent V.I.P.? It had been explained to the visitor that the rock formation he was looking at had been piled up by a glacier.

"But where is the glacier?" asked the V.I.P.

"Gone back to get some more rocks", was the reply.

ADELIE LAND

Preparations are well advanced for the next French expedition to Adélie Land, T.A. (Terre Adélie) 15. The only report we have of the 14th expedition, following their winter at Dumont d'Urville Base, is "All goes well".

VUWAE EXHIBITION

During May Warwick and Mike Prebble staged an Antarctic Display in a Wellington store for nine days. About 4,000 visited the display including the Rt. Hon. Walter Nash, and the Hon. Herbert B. Powell, the American Ambassador.

The display featured the work of VUWAE in the ice-free areas of McMurdo Sound, and the polished ventifacts and photographs on the "un-Antarctic like" scenery evoked much interest. On loan from the Dominion Museum were an Adélie and Emperor penguin and from the Canterbury University a 2,000 year old Crabeater seal. Antarctic clothing and camping gear, a Nansen sledge, and many large photographs from Antarctic Division gave people an impression of the field work done by N.Z. parties in the Ross Dependency. Much interest was also shown in some relics from the huts at Cape Evans, Cape Royds, and Hut Point, lent by Antarctic Division. In fact, many people upon seeing these relics, were convinced that there should be some permanent Antarctic museum to house these relics.

THE COLDEST

Tass reported on March 24 that according to Soviet scientists, the coldest point on earth, with an average annual temperature of 76 degrees below zero, is about 26 miles from the South Pole in the direction of India. They have drawn this conclusion after measuring borings on the ice cap there.

BELGIAN-DUTCH EXPEDITION PLANS FOR COMING YEAR

Intensive preparations are now in train at the Brussels headquarters for the relief of the Belgian-Dutch Antarctic Expedition which a year ago re-occupied the Roi Baudouin Base on the Princess Ragnhild Coast, which had been closed down in February, 1961.

The wintering party at present numbers 14, 10 Belgians and 4 Dutch. The emphasis in the scientific programme has been on Upper Atmosphere Physics related to the I.Q.S.Y. The re-construction of the Base ruled out a summer programme during 1963-64, but the new team will take up and extend the summer programmes undertaken in 1960 and 1961.

The summer programme will necessarily be of only a few weeks' duration so as to enable specialists seconded from scientific institutions in Europe to take part. Most of these scientists will be flown out to join the "Magga Dan" at Capetown.

NEWS FROM THE BASE

Midwinter Day was celebrated "joyously" at Roi Baudouin Base, but, says the Newsletter issued to friends home in Belgium, the festivities "didn't upset the neighbours". Towards the end of July the first refracted light of the sun was seen and during succeeding days the sun appeared gradually above the horizon. Health and morale are reported to be excellent, in spite of the fact that telephonic communication with Belgium, customary in former years, cannot be established in this Year of the Quiet Sun!

In addition to the intense scientific and technical activity—of which proof is provided in the monthly "sit-reps" forwarded to Brussels—the explorers will be from now on preparing the lists of scientific and technical supplies which must be replaced by the medium of the new expedition. This sixth expedition (sixth counting the expedition of Adrien de Gerlache in 1897-9) will be like its predecessors, planned and organised in Belgium. Holland will again be supplying approximately a third of the personnel and of the finance.

CHANGE-OVER PLANS

The new expedition will leave Antwerp about December 5. Its programme is somewhat more intensive than that of the present expedition. In meteorology, for example, radiosondes will be carried out by launching out-size balloons. A new discipline will be introduced, the measurement of the ozone in the atmosphere, while the geomagnetic programmes will be completed by the installation of a proton magnetometer. Cosmic sounds will also be noted.

This winter programme will be carried out by a team of 17 or 18 men, while 16 or 17 others will be engaged on a summer programme, covering the outward and return voyages and a fortnight at the base. The oceanographic programme will be organised by the Institute of Natural Sciences. Several University professors will be participating in the geological programmes. A programme of photogrametry (air photographs) will make possible a relief map of the coast from the Japanese Soya base to the Russian base Novolazarev, and one of the Sor Rondane mountains 200 km. from the base. The mapping programme will be carried out by the Belgian Military Geographic Institute and the Belgian Air Force.

DOGS ARE OUT

The new party will travel to the Antarctic on the vessel "Magga Dan". Dogs will not be taken. They will be replaced by "Polaris" tobog-

gans, small tracked vehicles which will be placed in the field with their crews by two aircraft.

The 1964 team, headed by Luc Cabes, is expected back in Belgium about mid-March.

BELGIAN SCIENTIST FOR U.S. TRAVERSE

A co-operative programme with the United States is planned for the coming summer. At the end of this year a Belgian scientific expert will participate in an over-snow traverse which will leave from the American South Pole station and make for the coast where the Belgian Roi Baudouin Base is built. This traverse will extend over several years and will be undertaken in 1,500 km. stages following a zig-zag course. There will be a series of summer journeys occupying the November and December in each of the years. At the conclusion of each stage, the vehicles will be left where they are while the men are air-lifted back to base. In the following year, they will be taken back by air to recommence the journey where it was left off.

YANKIWIS CHECKED

We regret some errors in the list of 1963-64 YANKIWIS on page 432, June issue.

Added to the list should be

Roger Buchanan, an honours student from Lincoln College, who was "ship-trapping" on "Chattahoochee" and "Burton Island". In 1964-65 he expects to join Keith Wise's team and to work in the Whitmore Mountains for a month.

Kelvin Rennell was working with the University of Minnesota geological team mostly on the Ellsworth Mountains. He accepted an offer to assist Graeme Johnstone at McMurdo and has wintered over there.

A. G. H. (Tony) Parker, a farmer from Havelock North, was assisting Dr W. Sladen on the bird programme at Cape Crozier.

John Mather was unable to go south as expected last summer.

HOMING PENGUINS

We have from time to time referred to the long-term studies of American biologist Richard Penney, who has ringed thousands of penguins in order to track their winter migrations, and to discover if possible the explanation of their extraordinary sense of direction. In one experiment Penney ringed some 20 Adélie penguins which were flown by helicopter 200 to 300 kilometres into the interior of the Antarctic. Then they were released on the ice, one by one, at different spots. Quickly, after a short period of hesitating, they set off in directions which were determined by theodolite. "It was moving" writes M. Nicolas Skrotzky, who assisted Mr Penney, "to see these little fellows se out, on foot, across the immense Antarctic ice cap". Some weeks later a number of them were discovered back at their rookery.

The big problem, says M. Skrotzky, is to find out how they oriented themselves. "Different theories have been advanced to explain the sense of orientation of birds: the influence of terrestrial magnetism, aerial navigation using the position of the stars, high altitude flights over vast areas the "memory" of which is engraved hereditarily in the individual memory, etc. Now in the case of Antarctic penguins all that is inapplicable. The penguin cannot fly, he cannot see his country from on high, he cannot guide himself by the stars because there is continuous daylight and the sun moves in a circle above the horizon. Magnetic orientation is ruled out because of the proximity of the magnetic pole."

What then? Nobody knows. All that is known so far is that the penguins do not start off in the direction of their nests but in a direct line towards the nearest sea. No doubt they then find their way by swimming along the coast.

JAPANESE SYOWA BASE TO RE-OPEN IN JANUARY 1966

Japanese Antarctic enthusiasts have won their long battle to ensure the re-activation of the base on the Prince Olav Coast which was evacuated in February 1962.

Mr M. Murayama of the Polar Section, National Science Museum, Tokyo, has kindly provided us with the following details.

Syowa Base, the location of which is 60°0′22″S., 39°35′24″E. was established on East Ongul Island on the Prince Olav Coast at Luzow-Holm Bay in 1957, and was occupied by Japanese Antarctic Research Expeditions, except for the 1958 winter, until it was temporarily evacuated in February, 1962. However the station is expected to be kept almost perfectly for at least five years.

Japanese scientists have represented to the Japanese Government that it is most important and necessary to continue scientific research in the Antarctic permanently, especially in the routine observation of aeronomy and meteorology and in project research on glaciology and biology. It has been emphasised that Japanese Antarctic research has to be reopened in a region of the world in which scientists of many countries are working in close co-operation and harmony in accordance with the intent of the Antarctic Treaty, thus promoting the establishment of a firm foundation for the continuation and development of co-operation on the basis of freedom of scientific investigation in Antarctica.

Consequently, the Japanese Government finally decided to re-open Antarctic activity on a permanent basis, and the budget for building a new ice-breaker, powerful S-61 helicopters, and a snow-car passed the Diet in December, 1963.

Syowa Base will be re-opened by JARE VII which is to establish a wintering team consisting of 16, if possible 18 men to continue the scientific programme, starting from January, 1966. There are five buildings including one power hut, in prefabricated wood panels and it is proposed to erect additional buildings; a power hut of prefabricated metal panels in which will be installed two 45 KVA output diesel-electric generators, a radio hut, a transmitter hut and an ionosphere hut, also of prefabric wood panels.

In preparation for the re-opening of Japanese Antarctic activity, the construction of an ice-breaker and a snow-car have begun. The vessel will be ready for use in September 1965 and the details are as under.

displacement	abt. 5,000 tons
length	100 m
breadth	22 m
depth	11.8 m
draft	8.1 m
speed	abt. 17 knt.
range	15,000 sm at 15 knt.
propulsion	diesel electric
hp	12,000
no. of shafts	2
complement	235

The model KD-60 JARE snow car is designed to provide a more self-sufficient means of oversnow traverse at high altitudes and low temperatures than was used by JARE previously. To achieve this purpose, pulling capacity, economy, personnel comfort and reliability are all increased.

KD 60 is 5,470 mm long, 2,500 mm wide, 2,680 mm high and 7.5 tons when ready to operate with fuel and 3 men. It is capable of a maximum speed of 30 kmh, and of speeds of 15 kmh over Antarctic terrain when towing 8.0 ton loads.

An Isuzu DA 120T, 140 ps/2,400 rpm, turbo-charged, diesel engine powers the vehicle. The vehicle is fitted with mounted scientific equipment, seismograph instruments, a

gravity meter, a SSB 50 watt transmitter, a C-4 Gyrosun compass and a newly designed navigation beacon system.

One 10,000 Kcal/h forced air heater can be used to supply sufficient heat for passenger comfort or for engine preheating when the vehicle is parked. Four 4,500 Kcal/h heat-exchangers are installed. Two are located in the front and used mainly for defrosting. Two are in the centre and are used in connection with the heater for space heating.

The vehicle has three bunks and seats in the front for the driver and passengers. A kitchen, located in the rear, is equipped with cooking table, stove and a cabinet for food storage.

HOME WORK

Although JARE has not been engaged in activities in the Antarctic over the past two years, there has been considerable activity back in Japan, where the Polar Section of the National Science Museum has been publishing the results of the earlier Japanese Expeditions.

The excellently produced **"ANTARCTIC RECORD: Reports of the Japanese Antarctic Research Expedition"** has reached no. 22. Number 20 is a splendidly illustrated, 96 page, quarto publication. One of several reports written in English is "Ecological observation on the breeding behaviour of Adélie penguins" on Ongulkalven Island (three or four miles from Syowa Base) by Tatsuro Matsuda.

Published also with no. 19 is a two-sheet bathymetric chart of the area between 46°10′S. lat. and 72°S. lat., Plate 1 from 0° to 90°W., Plate 2 from 0° to 90°E.

(The Antarctic Division, D.S.I.R., holds copies of these Japanese publications.)

Visibility in all locations was good, giving ideal photographic conditions. Diving in the Antarctic, says Mr. Thompson, "is not only possible and practical . . . but may well develop into a valuable tool for direct marine biological study and collection." But he warns, **"There are old divers and bold divers; but NO old bold divers."**

ANTARCTIC DIVING

In the April issue of "Aurora", the official journal of the Australian A.N.A.R.E. Club, Russ Thompson of the U.S. Weather Bureau, describes his experiences while investigating marine life off McMurdo and at Wilkes Station, the latter during the summer change-over; using "scuba" diving equipment. He prefers wet suits to dry suits and says, "Immersion times of up to over an hour were achieved without undue discomfort to the diver. Water temperatures were in the 24 to 30° F. range. . . . The "scuba" equipment used consisted of twin 70 cubic foot tanks and a two-stage aquamaster regulator.

"Marine life at both Wilkes and McMurdo proved to be rather prolific. At McMurdo a preponderance of sea urchins, sponges, medusae and starfish seemed to dominate the local area. At Wilkes, however, more flora was observed. To the southward of the station a rocky bottom is hardly discernible through a veritable jungle of red fachur type of weed. On the bottom at about thirty feet a large, bright, green bulbous type of kelp sends out four to five long non-floating leaves which wind their way along for up to 100 ft. Hiding in this mass of colourful vegetation are numerous fish of a sculpin type and crustaceans, unidentified and difficult to observe.

"South of the Station between Shirley Island and the peninsula at 3 fathoms, a sandy, rock-strewn floor predominated. Throughout the area sponges, molluscs, anemones and a large worm of ½ inch or larger and up to three or four feet in length seem to be the prominent life forms."

At a depth of 75 ft at McMurdo Thompson met a seal, a Weddell, which came at him out of the distance at an alarming rate of speed, made a U turn about him approximately 15 ft away, and without slackening speed disappeared in the same direction from which he had come.

(See foot previous column)

ARGENTINE ANTARCTIC PROGRAMME

Except for special activities in connection with the International Quiet Sun Year, the Argentine programme for 1964-65 is essentially in line with that of previous years.

Vessels engaged in the Antarctic programme for 1964 are the ice breaker "General San Martin" the transport "Bahia Aguirre", the oil-tanker "Punta Medanos" and the oceanographic ships "Comandante General Zapiola" and "Capitan Canepa". In addition, the Argentinians are employing several Beaver airplanes and two Sikorsky helicopters.

The Argentine meteorological programme is particularly extensive both at the permanent bases and on the surface vessels. In addition, substantial programmes in oceanography are being continued, especially in the Drake Passage and the Weddell Sea. Following the transfer of equipment from the discontinued Ellsworth Station it was anticipated that the programme at General Belgrano base would be augmented. The other bases, Teniente Matienzo, Orcadas del Sur, Decepcion, Almirante Brown and Esperanza, are continuing programmes in aurora, ionosphere, geomagnetism, seismology, biology, etc. except that Esperanza and Matienzo are maintained primarily for meteorological observations.

SIXTY YEARS AGO

To commemorate the taking over by Argentina of the meteorological station established by Dr W. S. Bruce's "Scotia" Expedition on the South Orkney Islands, the Argentine Government decreed on February 21 that February 22 is to be celebrated as Argentine Antarctic Day. Special postage stamps were issued to mark the occasion.

Dr Bruce's Scottish Expedition left the Clyde on November 2, 1902, and sighted the South Orkneys on February 3, 1903, before pushing south to 70°25′S. Returning, the "Scotia" again made for the South Orkneys and a landing was made on Laurie Island on March 26. A solid stone house was built, a magnetic observatory erected, and meteorological observations begun. Scientific work was continued throughout the winter and journeys of considerable extent were made over the sea-ice. The Chief Engineer died. When the ship left for the Falkland Islands on November 27, the Scottish meteorologist R. C. Mossman remained with five others at Scotia Bay. In February 1904 "Scotia" returned, bearing a team of Argentine meteorologists who relieved Mossman's companions, but Mossman himself remained in charge of the station for another year. He was relieved in February, 1905, by an Argentine vessel after an unbroken two years of meteorological observations on Laurie Island. Argentina has maintained observers on the island ever since.

During the change-over in February, 1904, the Argentine Government established a Post Office on the "Orcadas del Sud" and appointed a 19-year-old Argentinian, Rugo A. Acuna, as Postmaster. He travelled on the "Scotia" and on February 22 the Scottish flag was lowered, the Argentine flag raised, and the Post Office opened for business. In an article by Eduardo Premoli in "Ice Cap News", March-April, 1964, it is stated that this first Argentine party on the South Orkneys comprised, in addition to Acuna (Argentina) and Mossman (Scotland), L. H. Valette (Argentina), E. C. Szmula (Germany) and William Smith (England).

The commemorative stamps comprise the following denominations: 2 pesos (sky-blue), S. Orkney and S. Sandwich Islands and South Georgia; 4 pesos (blue), map of

Argentina and the sector claimed by Argentina; 18 pesos (ochre), Falkland Islands.

ANTARCTIC DISPLAY

During the week February 15-22 an Antarctic exhibit "Army Activity in the Argentine Antarctic" was on display in Mar del Plata, Province of Buenos Aires. A temporary post office was set up with a pictorial stamp canceller and commemorative covers.

HISTORIC STONES

The United States observers appointed under Article VII of the Antarctic Treaty report that at Esperanza Base (Hope Bay on the eastern coast of the Antarctic Peninsula) Argentina has taken steps to "memorialize" the stones which are said to be the remains of Nordenskjold's shelter on his 1903 expedition.

LIFE IN THE FIELD ON AN ARGENTINE EXPEDITION

[We are indebted to the Argentine Consulate in New Zealand for permission to publish this extract from an article in **Revista Defensa Nacional**, 1963.

—Ed.].

The most utilised mode of transport in the Antarctic is the sledge and the dogs who pull it. Although caterpillar vehicles are used (Weasel, Sno-Cat and Muskeg) the sledge continues to be the most secure mode of transport in this zone. With the sledge, our Continent has been traversed from sea to sea and on them have been transported all the refuge huts that form a chain of auxiliary points for those who are actually working and those who will form part of future patrols.

With these sledges a patrol from Esperanza Base accomplished the task of uniting this base by land for the first time with General San Martin, after two months and six days of hard and exhausting travel.

Without the dogs and the sledges it would not have been possible to effect the extraordinary journeys that from year to year have been made by the Army from their respective bases.

Before embarking on patrolling, there is a great deal of preparation work necessary for men and dogs, on material and equipment. One detail forgotten could well cost a life. The route is studied, the work to be done and the estimated time necessary are assessed, equipment and materials are tested, especially any new equipment, and the estimated weight that each sledge will be carrying is worked out. A patrol party generally comprises more than one sledge and four or five men, and each sledge is drawn by nine, eleven or thirteen dogs. The basic food to be consumed is specially prepared for Antarctic use. The "charquican" (a mixture of meat and vegetables powdered, vitamins, calcium, minerals, fat) is transported in patrol boxes. These generally contain: caramels, sugar, charquican, chocolate, biscuits whole, meat extract, raisins, glucose, cereals, powdered soup, instant coffee, fine salt, butter, cheese, powdered milk, powdered potatoes, jelly powder, vitamins in powder, matches. The contents of the patrol box have been calculated to satisfy the necessary calories of a man working outside for 20 days, giving each man approximately 4,950 calories per day.

Patrol life requires of a man the total of his physical capacity at all times. The journeys which can take up to four months are made in stages of 12 hours a day, the rest of the time being taken up with attending the dogs, reconditioning vehicles, setting up camp and the kitchen, meals and rest. When the days are exceptionally good, the march is prolonged to the maximum resistance of personnel and dogs. Actually with the use of modern tractors it has been possible to travel without rest up to fifty hours. This is done when pos-

sible to make good use of a good spell of weather. Normally in every three days' march one encounters a blizzard, the characteristic polar wind, which detains the patrols in their tents. This wind reaches a velocity up to 300 km per hour.

During these marches a man suffers the normal exhaustion of intense work aggravated by his physical exhaustion, which is itself aggravated by the low temperatures and the nervous tension which results from the very difficult and arduous conditions, such as crossing fragile bridges of snow which cover crevasses or over the very insecure ice of the sea. This nervous tension, even if difficult to detect on the surface, is always present with all the members of the patrol.

All that needs to be said to sum up this picture of the life in our Antarctic territory is that always the men are brought to tears when leaving the Base to return to Buenos Aires. It feels like leaving something belonging to oneself, and that is so, generally one year, sometimes two or three consecutively, of constant battle with nature, in this unique region of the world which still brings adventure. And one returns with an unforgettable memory and great eagerness to return and renew this battle to disentangle the mysteries that are still kept under the ice after all these centuries.

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studied. Collections of flora will be made for the first time. A photographic record will continue the evidence already assembled on glacier retreat, and mapping of the island will be completed.

There are no safe anchorages at Heard Island. Stores and men must be landed by raft through the surf, a hazardous operation. The "Patanela" will sail to the nearby McDonald Islands, where it is hoped to make a landing. Investigations into marine biology will then be made before the ship anchors at Kerguelen Island, 300 miles to the north, until she returns to pick up the men on Heard Island.

TO CLIMB BIG BEN

Three New Zealand mountaineers are to be included in the "South Indian Ocean Expedition" to be led by Major Warwick Deacock, which plans to make the first ascent of Heard Island's 9,000 ft. Big Ben. The expedition is scheduled to leave Sydney on November 1 on the 63 ft. steel schooner "Patanela", The vessel will call at Fremantle before heading south for Heard Island to begin a two month scientific and mountaineering programme.

The New Zealanders are Philip Temple (25), of Christchurch, experienced climber and entomologist, Colin Putt (37), the surveyor and marine engineer who led a 1961 mountaineering expedition in New Guinea, and John Crick (22), glaciologist, a Wellington student. Putt is the expedition secretary.

Financial support has been afforded by the New Zealand Alpine Club, the Mount Everest Foundation and the Trans-Antarctic Fund. Sir Edmund Hillary is patron of the expedition.

Heard Island, boasting one of the worst climates in the world (rain or snow falls on 300 days in the average year and 50 m.p.h. winds are common), was the site of an Australian base from 1947 till 1954. In 1963 an attempt on Big Ben failed: the climbers were imprisoned in a snow cave for a week and barely escaped with their lives.

Weather has swept off two attacks on the still unconquered peak. This time three men will establish camp at 4000 feet and are prepared to wait for 25 days. In this time the weather should relent long enough for them to ascend the peak and explore the crater of the still active volcano.

Other parties will make a circuit of the island, a challenge in itself. There are glaciers to be crossed and streams between glacier snouts and the coast which can sweep a man out to sea. Penguin, petrel and albatross colonies encircle the island. The recolonisation of the island by king penguins and fur seals will be

RE-SUPPLY OF BRITISH BASES MAY BE DIFFICULT

Because the British Antarctic Survey foresees that adverse ice conditions will make the relief and re-supply of its bases, mostly in the Antarctic Peninsula area, a harder task than usual, the planned field programme for 1964-65 is comparatively modest.

On some previous occasions it has proved practically impossible for the ships at the Survey's disposal to force their way through the heavy ice to reach the southernmost bases, as for example, Marguerite Bay. No doubt the Survey is keenly awaiting the construction of the promised ice-breaker to which reference was made in the last issue of "Antarctic" (vol. 3, no. 10, page 453). It is unlikely, however, that any of the base teams will have to stay on for another winter, as happened in 1948 and 1949 to the team led by Dr V. E. Fuchs—now, as Sir Vivian Fuchs, Director of the Survey.

WINTER WORK

All ships were withdrawn from Antarctic waters before the end of April and the bases settled down to their winter programmes.

Progress on the new hut at Signy Island was smooth and the men have now settled in to their new quarters with which they are reported to be pleased.

At Deception Island, both the Otter aircraft were given a thorough overhaul before being housed in the hangar for the winter.

The surveyors and geologists in the Marguerite Bay area lost no time in getting into the field. On Adelaide Island they filled some gaps in the Survey scheme and a party working from Stonington succeeded in reaching and working on the east coast before mid-winter which was quite a creditable achievement.

Plans for 1964/65 include:

LOGISTICS

A new living hut will be built at Deception Island. It will be of the moulded plastic section type similar to that built at Signy Island last season. A fuel tank will be installed at Signy Island to cater for the large quantities of fuel now required for lighting and heating the new living quarters and laboratories.

FIELD WORK

Two geologists will work in the coastal regions south of the Goodenough Glacier in the south-west of Graham Land. Others will continue the studies of the east coast of Alexander Island and the mountain areas north of the Goodenough Glacier. Completion of the topographical surveys of George VI Sound will take priority in 1965.

In the 1964/65 summer season a team of hydrographic surveyors will work first in the South Orkney Islands and later in the Argentine Islands area. A reconnaissance of the survey gap in the region of Cape Kater will be carried out by H.M.S. "Protector's" helicopter in order to determine the feasibility of a determined effort in the following season to close it. If ice conditions permit, an attempt will be made to close the gap across the Pendleton Strait.

The studies of the Tottan Mountains will continue and will extend to other mountain groups in the area as progress allows.

If the incidence of sea ice follows the pattern of the past, the ships are expected to encounter difficult conditions off the west coast of Graham Land. For this reason no ambitious summer field programme has been planned for Marguerite Bay. The "John Biscoe" will concentrate on relieving and re-supplying Adelaide and Stonington Bases

WINTER IN THE SUB-ANTARCTIC

MACQUARIE ISLAND (Australia)

STORM DAMAGE

A storm which began on Friday, May 15, intensified over the weekend with wind gusts reaching 103 miles per hour. On the Sunday there was a wind run of 942 miles (representing an average wind velocity of almost 40 miles per hour over 24 hours) as the gale raged throughout the day. The barometer fell to a near record low of 28.2 inches. A 100-foot radio mast was destroyed, and a 2,000-gallon water tank blown out to sea. In addition, the southern end of a new nissen hut and the ceiling of the auroral observation hut were blown in. The power cables attached to it prevented it from being lost. The water supply to the station was interrupted by a landslide. An indication of the wind's savagery is the fact that flying sand stripped paint from all the buildings down to the bare metal.

The Macquarie Island team worked around the clock to handle this situation. Some huts had to be held in position by attaching them to cement-filled oil drums buried in the ground. Temporary masts were erected and men risked serious injury during the gale to climb radio masts and repair fittings and equipment. Despite the adverse conditions only two of the usual radio schedules were missed.

At a working-bee for the storm-damage clean up the fire pump with the hose was used to wash down all buildings.

OPERATING ON THE DOCTOR

Dr Geoffrey Middleton had to call on three ANARE men to set his right wrist, fractured while ski-ing on June 18.

The operation was carried out without anaesthetic, the patient displaying great courage during a painful ordeal lasting for three-quarters of an hour. The Officer-in-Charge, Robert Nunn, acted as radiologist and set the arm in plaster. Purchase, biologist, and Allan, carpenter, acted as surgical assistants.

On the 19th Dr Middleton was reported to be in good spirits and grateful for the fine effort by his medical attendants.

STATION NOTES

Maximum and minimum temperatures were: May, max. 45.9°F., min. 27.2°F.; June, 45.2°F., 25.1°F.; July, 41.2°F., 23.7°F.

In May there were 21.2 hours of sunshine, with rain on 23 days and snow on 13. In June there was rain and snow on 14 days. July brought rain (417 points) on 21 days, snow on 5.

During May (till Purchase sprained his ankle) he and Taylor were most active carrying telephone cable across the plateau in preparation for the telephone service to Bauer Bay. After high seas which swept across the isthmus on the 13th, a large sea wall was built, with the help of the TDG.

On May 19 Calwell was trying to turn a seal over to read his brand when the seal grabbed him by the boot and threw him to the ground. Calwell was unhurt, and the only damage was one torn boot: he got his brand.

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either direct, or by establishing one of the emergency overland supply routes reconnoitred last season.

NEW TERRA NOVA

The Royal Navy's first ice-breaker is to be called the "Terra Nova" after Captain Scott's famous ship. There wil, however, be little in common beween Captain Scott's 764-ton sail and steam propelled ship and her planned successor. The new "Terra Nova" which will combine the tasks of patrol, survey and scientific support, is to have four diesel electric engines developing some 15,000 horse power. She will be equipped with two helicopters.

Midwinter Day brought the midwinter magazine and the midwinter box was opened, consumed and appreciated.

The met. section undertook additional sonde flights for the U.S. mercy flight to McMurdo Sound.

The first leopard seal was sighted on July 13. Despite climatic conditions, many were by now participating in field work and welcoming the change from routine station life. Trips were made to Bauer Bay laying phone cables, to Green Gorge for rabbit-skin collection, to Hurd Point to band wandering albatross chicks.

The scouring of the eastern beaches by the heaviest seas yet experienced not only exposed carefully laid pipe-lines but exposed also the remains of a sailing vessel on the camp doorstep.

CAMPBELL ISLAND (New Zealand)

The tempo of station work has been such that the passing of Winter has scarcely been noticed. A number of social occasions have enlivened the dull routine—the most significant and elaborate being the celebration of Mid-Winter's day; the boys literally let their hair down, some of the more hardy notwithstanding the brass monkey conditions took to the waters of Perseverance Harbour: all were eventually retrieved unharmed.

The U.S.S. "Mills", the first picket ship of the coming Antarctic season, is due at the island on September 27 and will carry on board four new expedition members plus a party of three electricians from Ministry of Works, who during the next two months will endeavour to completely rewire the station.

The team for the 1964-65 expedition is as follows:

Colin Clark, Officer in Charge.
Ron Craig, Senior Met. Observer.
Mike Criglington, Met. Observer.
David Paull, Met. Observer.
Dale Carron, Senior Ionosphere Observer.
Kip Kibblewhite, Ionosphere Observer.
Neil McDonald, Electronic Technician.
Warick Fergusson, Radio Technician.
Gordon Surrey, Cook.
Alan Guard, Mechanic Handyman.

Colin Clark (third term), Ron Craig and Neil McDonald are all old island hands. The remainder of the party will be newcomers to the deep South.

The M.V. "Holmburn" will once again be undertaking the annual servicing which is scheduled for the end of October. Among the various distinguished visitors to the island will be Dr R. G. Simmers, the Director of the New Zealand Meteorological Service; Dr Simmers who is retiring shortly will be paying a farewell visit to this most isolated of weather stations.

KERGUELEN FATALITY

On December 23 during the unloading operations at Port-aux-Francais, an accident resulted in the death of Jean-Marie Stoll, who was to have taken charge of the seismological station at the French base there.

MARION ISLAND (South Africa)

During June, Marion House became a "drought stricken" area. The water supply was cut off owing to the water pipes freezing up. Carrying water to the kitchen became a daily chore and for other purposes there was hardly any water at all.

Up to Midwinter's day very pleasant weather was enjoyed at the base and the Marionites gloated over reports of cold and snow in South Africa. After June 21, however, winter caught up with them and snow fell almost daily. Inevitably snowfights ensued which were enjoyed by all.

In connection with the IQSY, high altitude balloons (800 gm) are released twice weekly. The maximum heights reached so far have been 0.6 mb, 2 mb and 4 mb.

ANTARCTIC WHALES THOUGHT TO FACE EXTINCTION

Unusual interest was shown in the recent meeting in Sandefjord, Norway, of the International Whaling Commission, because of the growing concern regarding the rapid depletion of Antarctic whale stocks. Fears are being expressed that unless drastic conservation methods are speedily put into force the largest species, the blue whale, may be threatened with total extinction.

The blue whale, the world's largest mammal, is now commercially extinct, and further whaling may result in the disappearance of all species.

The blue whale, hunted for its oil and, by the Japanese, for its meat, would not be the first species to have become extinct. The right and bowhead whales, targets of the early whalers because they moved slowly and floated when dead, were virtually exterminated years ago.

The Food and Agriculture Organisation of the United Nations in Rome, however, is campaigning to save those stocks which are left; not for any romantic reason, but because of their value for food and other industries. Mr B. R. Sen, director general of the organisation, is urging the need for greater limitation than in the past on catches for the next Antarctic season in 1964-65. Food and Agriculture Organisation experts are convinced that some species of whales, to quote Mr Sen, are being "exploited beyond the level of maximum sustainable yield," and are thus in danger of dying out.

There are estimated to be only a few thousand blue whales left in the world.

Data collected by the organisation indicate that the world's whaling nations have been setting too high a limit. In fact the catches of the four countries which sent out expeditions last season—Japan, the Soviet Union, Norway and the Netherlands—did not reach the limit. The whaling nations set themselves, for 1963-64, a reduction of 5,000 units on the total of the previous year, but they caught only 8,413 units, 15 per cent below even the reduced quota.

Dr D. B. Finn, until recently Director of the organisation's fisheries division, said recently that the commercial extinction of the blue whale was "a clear warning of what may happen to other fisheries unless we work out, and soon, a common code of discipline for harvesting the sea.

"The sea is a vast reservoir of the animal protein food which the world needs, ever more desperately, to feed its swelling millions. The sea, along with space, is man's last unexplored frontier, and it must be exploited wisely if it is to be of maximum benefit to all."

JAPANESE VIEW

A Tokyo report dated June 17 said that Japan hoped an agreement would be reached to reduce the present whaling catch limit by 20 per cent from 10,000 to 8,000 blue-whale units. Japan feared that disagreement over quotas might lead to the collapse of the present system and the withdrawal of some nations from the 17-nation Convention.

The chief danger for the international whaling industry and for future supplies of whale oil and by-products is that even the drastic reduction in permissable catch and a new observer scheme to start next December may be too late to prevent extinction of the mammals.

The only prospects for the trade, barring the scant likelihood of a discovery of new reserves, is for values

in whale oil to rise with the shortage. But some authorities think that only complete suspension of fleet operations for periods of one to as much as five consecutive years could prevent the total disappearance of whales and an end to the industry.

DRASTIC CUT?

On June 23 it was reported from London that the four-man Scientific Committee of the International Whaling Commission meeting at Lowestoft, England, on June 8 had recommended an 80 per cent reduction in the catch of Antarctic whales as "necessary to save the whale from extinction." Mr K. R. Allen of New Zealand is a member of the Scientific Committee. This reduction would reduce to five the expeditions working in the Antarctic next summer. Last season there were 16, seven Japanese, four Norwegian, four Russian and one Dutch. In 1961-62 there were 21 expeditions engaged, including two British. The Scientific Committee argued that a drastic reduction now would ultimately ensure a gradual increase in the catch.

DECISIONS

The 17 nation International Conference met in Sandefjord, Norway, June 22-26. New Zealand's representatives were Mr G. L. O'Halloran, Secretary for Marine, and Mr R. B. Atkins of the New Zealand High Commissioner's Office in London. The Conference failed to agree on the question of catch limits.

Further difficulties arose over the question of national quotas. Japan took the position that she was entitled to at least 46 per cent of the limit, her quota under the old agreement which set the limit at 10,000 whales. The Soviet Union, however, had proposed revision of the percentage quotas on the ground that the old agreement had been scrapped and Norway and the Netherlands could not fill their quotas last season.

The Japanese Fisheries Board said on July 1 that Norway, Japan, the Soviet Union and the Netherlands were expected to start negotiations through diplomatic channels on how to share the 8,000 blue whale units to which they had agreed to limit their catches next season.

BOOKSHELF

MAWSON OF THE ANTARCTIC. Paquita Mawson. Longmans. 240 pp, illustrations and map. N.Z. price 36/-.

In this warm-hearted book Lady Mawson does not attempt a detailed account of her husband's work as geologist and Antarctic explorer. What she does do is to give us a portrait of Mawson the man, and her vibrant picture of him goes far to explain his extraordinary success in both fields of endeavour. We meet Mawson at home, on holiday, planning and preparing his expeditions, and we realise something of the human qualities which made him able to accomplish so much: his wide interests, his keen observation, his foresight, his powers of concentration, and his capacity for hard and sustained work. We learn also, of course, of some little known incidents in his crowded life. It is not perhaps generally known that Scott wanted Mawson to join his own last expedition: "Scott wished to include Douglas in the actual party to go over the plateau to the Pole".

Lady Mawson sketches in enough background to enable the reader who is not conversant with the story of the great expeditions of 1907-09 (Shackleton's) 1911-12 and 1929-31, to follow Mawson's movements. But her book will make its strongest appeal to those who are already familiar with the events. To them it will be a moving experience to look at this more intimate side of the modest, unselfish man whose personality does not obtrude in his own writing.

The story is spiecd with humour, sometimes Mawson's own, as in a letter to his wife from Macquarie Island: "Have difficulty in rousing the other tents though did not try till after 5 a.m. Kennedy and I divert a sea-elephant and drive it to one of the tents where its roar soon brings out the occupants in alarm."

The few inaccuracies (a mis-spelling here, a not-quite-right technical term there) serve to emphasise that

this is a human story and not a history of Mawson's expeditions. A more serious defect is the occasional lack of clarity in the background. There is on page 178 a reference to "the great flight of 5 January 1930", which has not even been mentioned in the earlier narrative. Some of the space given to really irrelevant matter such as incidents of travel which throw no light on the personality of Mawson might well have been used to clarify the "expedition" background.

MAN AND THE CONQUEST OF THE POLES. Paul-Emile Victor. Hamish Hamilton Ltd. 306 pp, illustrated. N.Z. price 37/6.

The English translation of this book, first published in France in 1962, will ensure a deservedly wider public for a History of Polar Exploration with a difference. The author, himself one of the best known and most honoured of modern explorers, has been organising and often leading French expeditions to the Polar regions for a quarter of a century. This therefore is no mere re-telling of often told stories. Out of his vast knowledge and experience M. Victor approaches his task as an expert who writes in a way that a layman can understand. His theme is exactly in line with his title. He has not tried to achieve the impossible by telling in detail the story of Arctic and Antarctic exploration from Pytheas in the 4th Century B.C. to the I.G.Y. Rather, he has pictured Man the Seeker striving over centuries to build on the successes and failures of others, to perfect techniques and develop new methods, in order to master the very ends of the earth. A shrewd and incisive assessor of men and methods, his aim is not to pile detail on unimportant detail but to estimate the worth of each explorer's effort and to show why he succeeded or why he failed.

M. Victor has a neat way of summing up a man's achievement: James Cook is the "precursor of logistics", James Weddell "a remarkable navigator", Peary the "master of his techniques", Charcot "represents the qualities of calm, lucidity and balance", "there was something at once poignant, great and childish in Scott's feeling about dogs". He can sum up an expedition with the same masterly economy of words: Finn Ronne's Stonington Island venture "ran into all the difficulties ordinarily caused by the presence of women in such circumstances".

M. Victor's own insatiable curiosity about everything connected with Polar exploration and research leads us, with him, into many intriguing side-tracks, but whether he is summarising, astutely and readably, the massive exploits of a Scott, a Peary or a Bellingshausen, or discussing the virtues and vices of sledge dogs, he is unfailingly knowledgeable, astute and lucid. To the man who wants to know how Man did at last "conquer the Poles" M. Victor is the soundest—and most entertaining—of guides.

THE POLAR WORLD. P. D. Baird. Longmans. 328 pp, 76 illustrations, maps and diagrams. English price 37/6.

One of a modern series "Geographies for Advanced Study"—this authoritative account of the Arctic and Antarctic regions is written by the Director of the Northern Field Study at McGill University. It is remarkably comprehensive, but by his skilful selection of significant factors the author has within the compass of his 320 pages presented a clear and readable account not only of the geography, but of the history and the economic significance of the Polar World. The concluding 70 pages are devoted entirely to the Antarctic: with chapters on the history of exploration (a very good 16 page summary marred by a few minor inaccuracies), the geography proper (an admirably clear and well-balanced account), the climate, the Antarctic seas, and the sub-Antarctic islands. Maps and charts are used skilfully to clarify the text and the illustrations are selected so as to present a general picture of life and landscape. Mr. Baird writes well and can summarise without becoming dull and colourless. "The Polar

World" makes good reading and will serve as a useful book of reference as well.

L.B.Q.

ANTARCTICA. A. S. Helm and J. H. Miller, Government Printer, Wellington. 435 pp, illustrated. N.Z. price 37/6.

This "Antarctica" is the official account of the New Zealand Party of the Trans-Antarctic Expedition, compiled by the Secretary of the Ross Sea Committee and the Deputy-Leader of the New Zealand Party and gives every minutiae of that country's participation in Antarctic activities from the days of the Polynesians to IGY and Sir Edmund Hillary's arrival at the Pole Station in January, 1958.

The volume deals not only with the frozen continent itself, with a historical and geographical summary leading up to the building of Scott Base, the various reconnaissance traverses and Sir Edmund's final accomplishment of the journey from base to Pole, but also with the New Zealand end of the expedition—the formation and membership of the organising committees, the raising of money throughout the length and breadth of the islands, the publicity arrangements, the postal arangements and the correspondence relevant to these matters.

The thirty-one chapters and seven appendices which comprise the body of the book cover every aspect of New Zealand's participation in Sir Vivian Fuch's crossing of the continent. The first third concerns the preliminary organisation, the financing and personnel selection, much of which could be of interest to New Zealand readers only. Raising the final sum of £243,000 which the people and Government of New Zealand contributed to T.A.E. was no small task, as illustrated by these chapters, which also detail the ways in which the money was to be used —£73,000 for the Scott Base buildings and the Beaver aircraft, being the biggest item—and the generous contributions from many firms and organisations towards major and minor items of equipment and personal outfitting.

Detailed descriptions of three advance parties sent south in 1955-56, to the Ross Sea, Weddell Sea and Mawson, and of the training of expedition personnel and collecting and loading of stores lead up to the final departure of H.M.N.Z.S. Endeavour and a day-to-day account of her voyage south. Her arrival in the Ross Sea gave expedition members the opportunity of deciding upon the base-site on Ross Island, which decision was immediately followed by the building of Scott Base, a task greatly facilitated by a rehearsal of the actual erection which had taken place in New Zealand shortly before the expedition sailed. While one part of the expedition made Scott Base, other parts carried on with aircraft, dog-team and tractor reconnaissance of possible routes from the base to the polar plateau before the onset of the Antarctic winter brought all outside activities to a halt. Three main Survey parties covered many thousands of square miles to the north, west and south of Ross Island, and depots for the support of the British team which was to cross the whole continent were laid on the best available route to the South Pole itself.

Hillary's dash to the Pole ahead of Fuchs, the telegrams and other correspondence involved are all given in full detail and the book concludes with chapters on other activities carried out by the New Zealand party in and around the base area—the Dry Valley expedition, Scott Base Post Office, Endeavour's second voyage and New Zealand's future in the Antarctic.

As a record of that country's activities prior to and during the Trans-Antarctic Expedition, this volume is a comprehensive and surely complete reference, but for the reader who has neither been to nor closely studied the area involved it is a somewhat forbidding piece of literature. Just as the Ferguson

tractors became bogged down in the loose snow of Antarctica, so does the casual reader become foundered in the morass of place names, technical and scientific terms and jargon and the presumption that all Antarctic data is common knowledge. The two maps which feature in the end papers of the book are too general to be of any value in tracing routes; there is no glossary of terms and phrases; and the admittedly large selection of photographs is, conversely, too detailed and personal to give any overall impression of the theme of the undertaking.

Obviously in a book of this nature, the authors must rely heavily upon diaries kept at the time by those in the field. Little selection has been made, however, which gives an over-detailed account in which no emphasis has been laid on anything, no outlines or summaries of intentions or achievements given, leaving the reader to draw all his own conclusions. The authors seem to have been so determined to give everything and everyone equal credit that no detail has been omitted and no drama left in what was, above all, a highly dramatic, courageous and valuable undertaking.

O.P.A.W.

The special publication "**Antarctic Ice Observations** October 1962–March 1963" of the U.S. Naval Oceanographic Office is of special interest to New Zealanders in that 45 of the 47 ice charts are of the Ross Sea area south of New Zealand. The charts have been constructed from aerial and shipboard observations.

Insect Collecting By New Zealanders In Antarctica

K. A. J. Wise*

During the years since IGY, New Zealand parties have been in the field in Antarctica every summer season. Although field parties have been mainly for surveying and geological purposes they have, from time to time, collected specimens of the flora and fauna. A brief history of their discoveries concerning terrestrial insects and mites is given here.

In the 1957-58 season E. B. Fitzgerald collected mites beside the Edisto Glacier (then called Hallett Glacier) south of Cape Hallett. These mites were later described as a new species (Wallwork, 1962).

A major discovery was made by members of the N.Z. Alpine Club Antarctic Expedition in the 1959-60 season. C. H. Tyndale—Biscoe (1960) has recorded the discovery of both insects and mites near the mouth of the Beardmore Glacier, in the Hood Glacier area, between 83°45′–84°S. and 172°–173°30′E. This was the furthest south record for both fauna and flora, being within 450 miles of the South Pole and about 400 miles south of Ross Island, McMurdo Sound, where insects and mites also occur. Subsequently, Prof. J. T. Salmon (Victoria University, Wellington, N.Z.) has described (1962 a) two new species of insects, from the material collected by Tyndale-Biscoe and B. L. Smith, naming one new genus **Biscoia.**

Mites were also collected by Fitzgerald on Ross Island in 1959, by B. E. Reid, N.Z. Biologist, at Hallett in 1959, and by Dr C. Bailey, Reid's assistant in 1960, at Cape Adare. These belong to several species recorded recently (Womersley & Strandtmann, 1963).

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A member of the Victoria University of Wellington Antarctic Expedition 1960-61, A. I. G. Willis, collected insects on the west coast of McMurdo Sound and reported them at another site (VUWAE 1960-61 Report, cycl.). I have since collected insects and mites at both these places, i.e. near Blackwelder Glacier (also known as Ricky Glacier) and Lake Penny (Gressitt, Leech & Wise, 1963). Willis' specimens were incuded in records by Salmon (1962 b).

J. F. Ricker and D. N. B. Skinner have reported sighting mites, in the 1962-63 season, on a nunatak (since named Mite Nunatak) in the Terra Nova Bay area, while M. R. J. Ford has reported insects sighted near the Rennick Glacier on the northern coast of Antarctica, in the 1963-64 season. Both these reports need confirmation by the collection of specimens.

Last season, 1963-64, the New Zealand Southern Field Party, led by V. R. McGregor, collected moss near the Shackleton Glacier at 84°35'S. 173°50'W. Some of this moss was made available to me, both insects and mites subsequently being extracted from it. The insects belong to one of the species previously collected near the Beardmore further north. McGregor's collection is consequenty the furthest south record known at present and must approach the southern limit of both flora and fauna, being only about 400 miles from the South Pole.

Thus it can be seen that members of the New Zealand Antarctic Research Programme have materially assisted in furthering our knowledge of the terrestrial fauna in Antarctica.

It may be of interest to note here the names of New Zealanders investigating insects for the Bernice P. Bishop Museum under the United States Antarctic Research Program. The writer has been in Antarctica on this project in the seasons 1960-61, 61-62, 62-63, 63-64, and will return for the 1964-65 summer. C. E. Fearon, J. C. L. M. Mather, and O. R. Wilkes were appointed for the 1962-63 season, Wilkes and I then accompanying a New Zealand motor-toboggan expedition in October-November, 1962. R. Buchanan, K. P. Rennell, and A. V. Spain joined the team for the 1963-64 season and Buchanan is re-appointed for the 1964-65 season.

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COMING UP?

The Herrligkoffer German Antarctic Expedition is still in course of preparation. Again delayed for a year owing to "financial circumstances", the organisers are still asking for additional purchasers of the special cachet card. Prospective buyers are warned that they "should not expect receipt of cards prior to Spring 1965".

SCIENCE CONGRESS

The New Zealand Antarctic Society is one of the organisations cooperating in the Eleventh New Zealand Science Congress, to be held in Auckland, February 11-17, 1965. The Society's delegate on the organising Committee is Lt.-Cdr. J. Lennox-King, R.N.Z.N., who visited the Antarctic with U.S. Operation Deepfreeze II in 1957, and was Leader of the New Zealand party at Scott Base 1959-60.

SHIPS OF THE SOUTHERN OCEAN

R. A. FALLA

[One of the series of functions arranged during the visit of "Eltanin" to Wellington was a public lecture by Dr R. A. Falla, Director of the Dominion Museum and President of the N.Z. Antarctic Society. We are privileged to publish in an abbreviated form the substance of Dr Falla's lecture, which was illustrated with slides.—Ed.]

It should not be without interest to trace briefly the emergence of the idea of special requirements in ships for more efficient operation in the Southern Hemisphere and eventually for service in the Antarctic. We may conveniently begin with Captain James Cook and his ships two hundred years ago. When the Royal Society of Great Britain decided to send a group of scientists to the Pacific it was enjoying social prestige and royal patronage and had thus much influence with the Navy. It is not quite clear who was responsible for the stroke of genius whereby they decided not to use a regular naval vessel of the period. In the event they selected a small merchant vessel and a coaster at that. The "Earl of Pembroke" was a three-year-old collier, technically a "cat-built bark"—i.e. she was bluff bowed, beamy, square sterned, and not far short of being flat-bottomed. These features all had some significance for the service for which she was intended. She had maximum stowage capacity for her tonnage and dimensions—368 tons, overall length 106 feet, beam 29 ft. 3 inches. She was likely to suffer minimum damage if accidentally stranded, and for the same reason—her flat bottom could be intentionally grounded for periodic careening and cleaning. Important additions and alterations were needed before she left the Deptford yard in July 1768 as the "Endeavour" under Cook's command. She was ballasted to stabilise some deck armament; she was sheathed for **Teredo** protection not with copper but with wood; and finally was fitted to accommodate an incredibly large complement of 85 plus the twelve members of the scientific party and their specialised equipment.

COOK'S SECOND VOYAGE

When in 1772 Cook's ambitious plan to make a summer voyage in high latitudes was accepted, the plan was to have two ships and to use as a supply and refit base Queen Charlotte Sound in New Zealand. The geographic objective was to discover the legendary southern continent. Once more Whitby-built barks were chosen—the "Marquis of Granby" 462 tons, and the "Marquis of Rockingham" 340 tons. They were eventually renamed "Resolution" and "Adventure". "Resolution" was built up in the waist, given an extra deck, and a raised poop structure described as a "round-house" to accommodate the captain, whose normal spacious quarters were to be occupied by Banks and an even larger entourage than he had taken in the "Endeavour". Our twentieth century scientists of the "Eltanin" era may well feel sometimes that their counterparts of the eighteenth were in some respects more enterprising.

When a Thames pilot took over, he judged that she was likely to capsize and returned her to the yard. The excrescent structures were removed, and the vessel restored to her original trim. When Banks discovered this and announced with picturesque emphasis that he would not sail in her, he was taken at his word and she sailed without him. The epic second voyage was notable for its advancement of navigation and the successful testing of one of the new Harrison chronometers. Geographically the achievements of the voyage were spectacular, not least being the daring penetrations of Antarctic seas and the dispelling of the myth

of a habitable southern continent beyond them. At its conclusion Cook was able to say that "the Resolution was found to answer on all occasions even beyond my expectation and is so little injured by the voyage that she will soon be sent out again." She was, on Cook's third and last voyage. This time there were no scientists, gentlemen or otherwise. From it Cook did not return, but the ship did, and passed into history as one of the notable vessels of all time.

WHALERS AND SEALERS

It was whales and seals which stimulated the ventures of the early 19th century. This seemed at first to call for nothing more than the types of ships and men already tested in the depleted Arctic. Typical of these were the brig "Jane of Leith" (160 tons) and the cutter "Beaufoy" of London (65 tons), "both fitted out", says James Weddell who commanded the Jane, "in the ordinary way, and provisioned for two years". Within that two years, 1822-1824, they had reached their furthest south—74°15′ in the sea that now bears Weddell's name.

Almost exactly similar to Weddell's ships were those of the New England sealers. But the Stonington fleet of 1820 did include as tender a sloop of special design. Exact details of the "Hero" have not been traced but her tonnage is recorded as 44½. She would thus have been just under fifty feet long, with a beam of sixteen and a moulded depth of 6. The shoal draught was designed for work inshore along uncharted coasts. Her rig was two jibs and a mainsail, with a square-sail for running free. It is clear that for success in Antarctic seas in such a cockleshell everything depended on the calibre of the crew and particularly of the man in command. Nathaniel Palmer undoubtedly had all that was required.

NAVAL VESSELS

By 1840 there was revived scientific interest in the fields of magnetism, geology and biology. The first of the officially sponsored expeditions as early as 1820 was that of Bellingshausen but by 1840 there were three in the field; the United States Exploring Expedition under Wilkes, Dumont d'Urville's French Squadron and the British venture in "Erebus" and "Terror" under James Clark Ross. In their local and contemporary context the last of these is important for its first penetration and vital naming in the region that has since become known as the Ross Sea. The ships were of interest too. They were regular naval vessels but of a special kind known as a "Bomb". They were built of heavy construction without regard to fast sailing capacity in order that their armament should consist of the heavy mortars which were used for bombardment of shore fortifications. With this armament removed they remained seaworthy and stoutly built vessels and had already proved their worth among the ice of the Arctic. Ross and Crozier then had very little difficulty in keeping their ships operating in high latitudes and the expedition made some significant landfalls and discoveries.

The French also were using regular vessels and the "Astrolabe" and the "Zelée" were frigates of the fine and graceful lines for which French naval architecture was noted. They were not particularly well adapted nor specially modified for Antarctic work. It is clear from the accounts of the high latitude operations that the strain on human skill and manpower was considerable.

The same observation could be made of the Squadron allotted to Commodore Wilkes. Again these were regular navy vessels, given an overhaul for a long voyage but not substantially altered. Like the Frenchmen they were destined to spend a good deal of the commission in the tropical Pacific and in retrospect it seems to have been somewhat unreasonable to expect the same Squadrons to penetrate the unknown icefields of the south. It is greatly to the credit of officers and men that their achievements in discovery were so outstanding and some special credit should per-

haps go to Hudson, Master of the "Peacock" of the American Squadron, whose vessel was decidedly cranky, inclined to leak dangerously and difficult to handle.

THE STEAM WHALERS

It was not until the end of the century that a new series of expeditions was planned. In the selection of ships the debt to Arctic experience was now more apparent. The opening up of Arctic seaways had been performed in all kinds of vessels suitable and unsuitable, but with the sustained pursuit of whales and seals there had been developed in Europe auxiliary steam vessels built of wood, strongly reinforced and having unlimited endurance for long periods at sea. At the same time they had, while the supply of fuel held out, some ice breaking capacity. It was ships of this kind then that figured so prominently in the new assaults on the far South made between 1893 and 1913. H. J. Bull's "Antarctic", Larsen's "Jason", and Borchgrevinck's "Southern Cross" were all steam whalers as were the "Morning" and the "Terra Nova" sent to relieve Scott's "Discovery" in McMurdo Sound in 1903, the "Scotia" of Bruce's notable expedition in the same year in the Weddell Sea and the "Aurora" which later gave such good service to Mawson and his Australian team in the Antarctic and later still as the Ross Sea Support of Shackleton's Trans-Antarctic attempt. One of these old ships after a notable and varied career in the Antarctic did splendid service as the "Bear of Oakland" with Richard Byrd on his second and third expeditions south. It would be hard to select any one of these historic ships for special comment, but in terms of varied and efficient service the "Bear" and the "Scotia" were outstanding.

"DISCOVERY"

It was because of the successful performance of these steel whalers that the British Government decided when planning the national Antarctic Expedition to build a ship along these lines. The work was entrusted to Dundee builders and the result was the "Discovery". It may be claimed that she was the first vessel actually designed for combined scientific work and exploration in the Antarctic. It is a matter of history how well she stood up to the requirements of 1901-04 and her subsequent career added further distinction. After a period as supply ship for the Hudson Bay Company she was refitted for the purely scientific programme of the Discovery Committee, and continued pioneer work in oceanography until taken over in 1929 by Mawson's B.A.N.Z.A.R. Expedition. Although well-designed for ice, she was inclined to roll sharply in the open sea with some attendant discomfort for those working the collecting gear. On the other hand the laboratory accommodation and working space was remarkably good for that era. Sea-going endurance was ensured by the use of the square sails thus conserving the rather limited coal supply for her auxiliary boilers and engines.

Since the close of the era represented by the special design of "Discovery" and "Fram", expeditions have again sought to adapt existing vessels chosen according to immediate needs and financial resources. For a year or two the tiny Norwegian steam sealers were used and some of them gave remarkably good service. For example, "Quest", "Norvegia", and "Wyatt Earp". Their successors similarly used have been the steel ships "Tottan" and "Norsel". The final decision to employ steel ships in Antarctica was made with caution and some experiment. When Richard Byrd needed large enough vessels to carry aircraft he arranged that they be accompanied by the old-fashioned wooden ice-punching sealers. Thus the "Elinor Bolling" had as consort the "City of New York" and the "Jacob Ruppert" the "Bear of Oakland".

SHIPS OF TODAY

With the great frigate "Challenger" in 1872 all the resources and manpower of a naval vessel were used, but pioneering oceanography

from the Scandinavian countries had North Sea fishing trawlers adapted. Just as the "Eltanin" marks an advance in design and arrangement for oceanography, so the transportation of stores and personnel to Antarctica has shown some interesting trends in ship design. Some expeditions find it convenient to use the self-contained ice-strengthened vessel of the kind so successfully produced in Denmark. Australia, Britain and several other countries regularly charter the fine little ships of the Lauritzen Line. The largest of the self-contained ice-strengthened vessel are often powerful enough to be effective ice-breakers and the Russian Antarctic Fleet since the pioneer work of the "Ob" have mainly been of this class. As is well known, the United States maintains its considerable Antarctic service with the use of modern ice-breakers as a means of gaining access for a varied fleet of steel supply ships, transports and tankers. It is this pattern under which the New Zealand programme is carried out with HMNZS "Endeavour" in association with Operation Deep Freeze, and there seems no doubt that for the foreseeable future ice-breakers will be indispensable for maintaining the now vast programme of Antarctic Research.

SOCIETY NEWS

At the Annual Meeting of the New Zealand Antarctic Society on June 27 officers elected were:

President: Dr. R. A. Falla.
Vice-Presidents: Mr H. F. Griffiths and Mr J. H. Miller.

Immed. Past President: Mr A. H. Robins.

Secretary: Mr V. E. Donnelly.
Treasurer: Mr A. H. Newton.

Mr A. Leigh Hunt was elected an honorary life member of the Society.

WELLINGTON BRANCH

Branch functions since the beginning of this year have been

April: Mr J. H. Miller; the Northern Victoria Land Geological and Survey Party, 1963-64.

May: Mr E. R. Gibbs; Restoring the "Discovery" Hut at Hut Point.

June: Annual Meeting—Dr. T. Hatherton: The Balleny Islands Expedition.

July: Cocktail party for "Eltanin" company and lecture by Dr. R. A. Falla: Ships of the Southern Ocean.

Officers elected at the Annual Meeting were:

Chairman: Dr. T. Hatherton.
Secretary: Mr W. J. P. MacDonald.
Treasurer: Cdr. W. J. L. Smith.

CANTERBURY BRANCH

The Canterbury Branch of the Antarctic Society will again participate in Antarctic Week, the annual celebration organised by a committee set up by the Christchurch City Council. The provisional date is the week commencing on November 7. The United States icebreakers "Glacier" and "Eastwind" are expected to be in port at Lyttelton at that time, and the new film featuring New Zealand's Antarctic activities should be available for its premiere. Relics of Scott and Shackleton will be dispayed in a city store along with modern equipment. A major display will be made at Lyttelton, emphasising the part played by shipping in Antarctic operations.

At the annual meeting of the branch, an increase in membership during the year from 112 to 151 was noted. Mr R. J. Stanley was elected Chairman, Dr. B. Stonehouse and Mr J. H. M. Williams vice-chairman, and Miss H. S. Hill honorary secretary.

The appeal to Christchurch firms for financial backing for a bursary to enable a science student at the University of Canterbury to carry out summer research in the Antarctic was launched on May 25.

The New Zealand Antarctic Society

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

You are invited to become a member.

BRANCH SECRETARIES

Wellington: W. J. P. Macdonald, Box 2110, Wellington.
Canterbury: Miss Helen S. Hill, Box 404, Christchurch, **or** 194 Knowles St., Christchurch 5.

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Meteorology (A. R. Martin).
Aurora Australis (I. L. Thomsen).

These separates are available at a cost of four shillings each from the Secretary, N.Z. Antarctic Society.

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