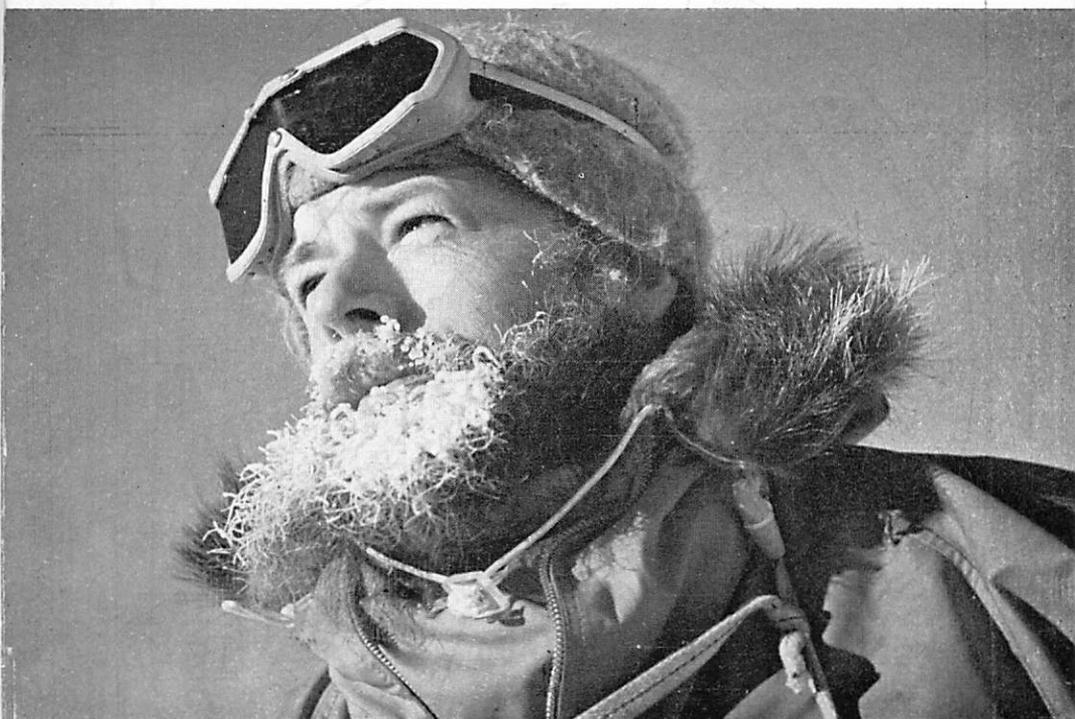


# ANTARCTIC

A NEWS BULLETIN

published quarterly by the  
NEW ZEALAND ANTARCTIC SOCIETY



NEW ZEALAND IN THE ANTARCTIC

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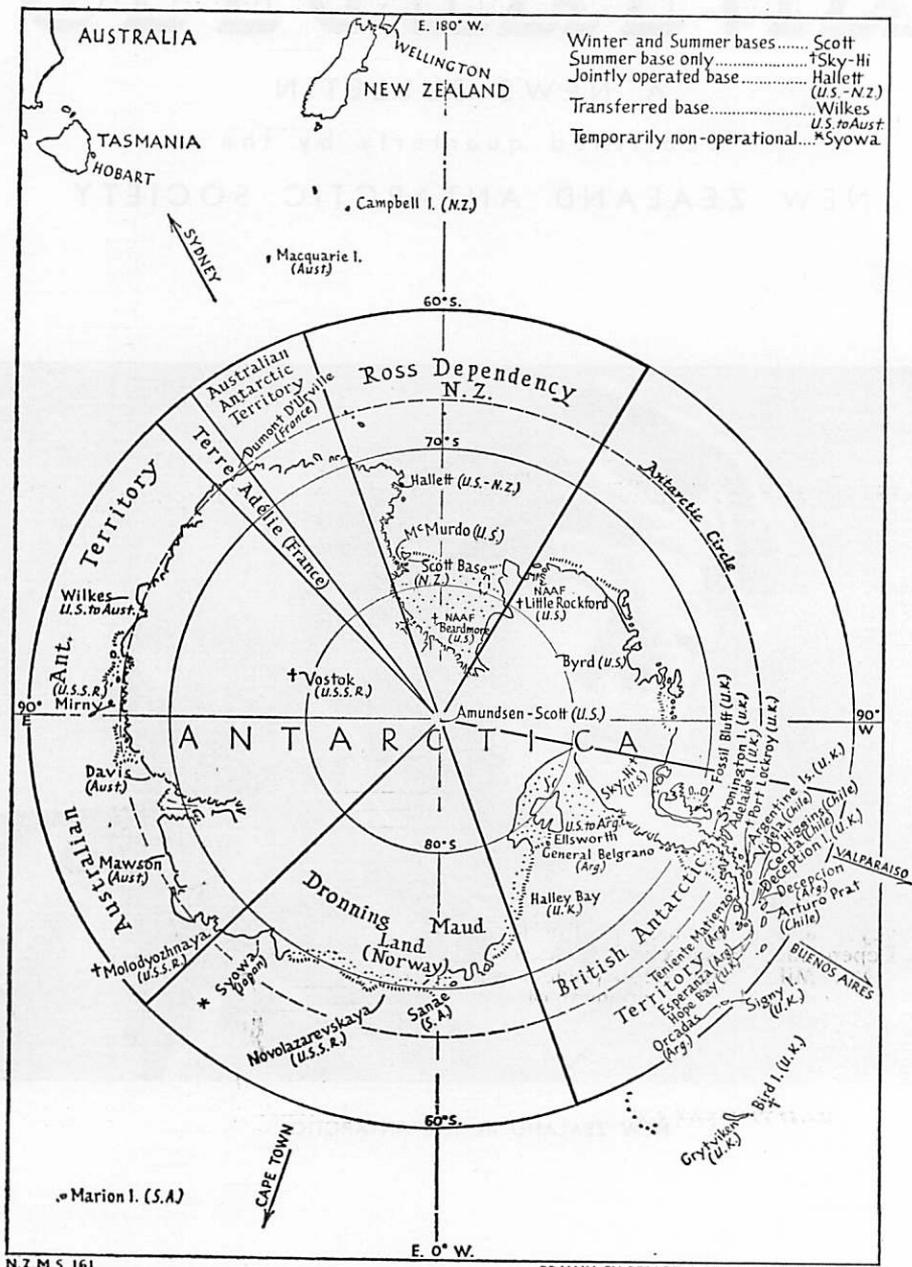
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JUNE, 1964

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# "ANTARCTIC"

(Successor to "Antarctic News Bulletin")

Vol. 3, No. 10

JUNE, 1964

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## ANTARCTIC MEETINGS

The third Antarctic Treaty Consultative Meeting will be held this year in Brussels from June 2 to June 13. At this meeting the delegation representing New Zealand will comprise: Mr. M. J. C. Templeton, Counsellor N.Z. High Commissioner's Office, London.

Dr. E. I. Robertson, Assistant Director-General, D.S.I.R., Wellington.

Mr. E. Farnon, First Secretary, N.Z. Mission to E.E.C., Brussels.

Previous Consultative Meetings have been held at Canberra in 1961 and at Buenos Aires in 1962. There was no meeting last year.

### S.C.A.R.

The eighth meeting of S.C.A.R. (the Scientific Committee on Antarctic Research) will be held in Paris from August 24 to 28. New Zealand's representative will be Mr. J. Holmes ("Bob") Miller, the Wellington surveyor and a member of the Ross Dependency Research Committee.

Mr. Miller was deputy-leader of the New Zealand component of the Trans-Antarctic Expedition, 1957-58, and was leader of the Northern Field Party in Victoria Land last summer.

### SARTORIALLY, YES!

When Chicago businessman Ward C. Rogers was flown to the Pole as a guest of Admiral Reedy, he became so excited donning his "really-cold-weather" clothing before the touch-down that he put on the trousers back to front. When Mr. Rogers walked round the Pole, can he claim to have walked round the earth backwards?

## "SOMETHING OLD"

Not many brides could beat the "something old" at the wedding of Jennie Vance, of Brighton, Victoria, and New Zealander David Dodd, on May 7.

Guests drank champagne cooled by ice 1000 years old at the reception. David brought the ice—two huge blocks—back from the Antarctic in April after a year as meteorological officer-in-charge at Davis Base.

The ice is unusually clear, almost like heavy glass.

Jennie's mother, who stored one block in her deep freeze, said: "It looks as if it's been around a long time."

David is the 25-year-old son of Mr. and Mrs. W. E. G. Dodd of Christchurch. His gift to his bride was a necklace of six deep ruby garnets which he mined himself in the rocky area round Davis Base. It took him a year of "days off" to find six garnets big enough to make the necklace.

## VOLCANO AHOY!

During last season's work by H.M.S. "Protector" for the British Antarctic Survey, Able Seaman Ronald Winmill of Cardiff stared in amazement at the echo sounder trace. From the average depth of more than 1,000 ft. (305 metres) off the South Sandwich Islands the recording pencil suddenly showed no more than 90 feet (27 metres). At his shouted alarm the "Protector" went quickly astern. Winmill's alertness had discovered an uncharted underwater volcano. The rim of the crater was later charted with care.

# NEW ZEALAND FIELD PROGRAMME HAS CHANGE OF EMPHASIS

"Last season", said the New Zealand Minister of Science, Mr Tallboys, in a Press statement, "saw the completion of the major geological and topographical reconnaissance survey programme when 40,000 square miles in North Victoria Land was explored by Mr J. Holmes Miller and his party. Next season will see the commencement of a new phase of geological investigations to resolve anomalies and fill in gaps of the reconnaissance surveys."

The trend therefore will be to more specialised parties, generally smaller in number, and entering the field for shorter periods. To inaugurate this new pattern of field work, two teams operating next summer will each be led by a geologist with considerable previous experience in Antarctic geological work under arduous conditions.

## MAWSON GLACIER

Guy Warren, who was one of the geologists with the New Zealand component of the Trans-Antarctic Expedition in 1957-58, will head a four-man team operating on foot which will be placed at strategic points in the general area south of the Mawson Glacier, which descends from the Prince Albert Mountains of Victoria Land to the Ross Sea in latitude 76° 12'S, and extends for 20 miles as the Nordenskjold Ice Tongue. Warren was one of Brookes' Northern Party which explored this area in October, 1957-January, 1958. Special attention will be given to the Lashly Mountains (77° 53'S, 160° 10'E), the Boomerang Range (78° 36'S, 159°E) and Allan Nunatak (76° 45'S, 159° 40'E).

## HOLYOAKE RANGE

An eight-man party using dog teams and motor toboggans will operate as two four-man units some 280 miles south of Scott Base. This party will be led by Malcolm Laird, geologist for the New Zealand southern field party in 1960-61. He too will be going back to country he knows, the Holyoake Range (82° 10'S, 160°E) which extends for 40 miles parallel with the Shackleton coast about 30 miles inland from the

Ross Ice Shelf. The team will study geological anomalies and fill in gaps in the geological and topographical surveys of the region.

Two men operating from Scott Base will study the occurrence and geological sequence of volcanic rocks on Ross Island.

## UNIVERSITY TEAMS

The Victoria University of Wellington will again have a team in the field, VUWAE 9, led by Warwick Prebble, who will be spending his third consecutive summer in the Antarctic. This six-man party will be studying Quaternary Geology and Geochemistry of White and Black Islands, the Brown Peninsula, and in the Koeltlitz Glacier and Taylor Valley regions.

A University of Canterbury three-man team again led by Dr. Bernard Stonehouse will continue the study of Adélie penguins, skuas and seals, using as their base the biological laboratory built in 1963 at Cape Royds.

Two men from Lincoln College, Canterbury, will carry out an intensive study in two or three localities in the McMurdo area in order to identify the sequences of soil formation on morainic terraces, and so obtain some understanding of the processes and courses of soil formation in such localities.

## "ENDEAVOUR"

H.M.N.Z.S. "Endeavour" will again make two voyages to McMurdo Sound to re-supply Scott Base and transport fuel for the United States Naval Support Force. For about three weeks in January a party of four oceanographers will travel on

"Endeavour" to continue oceanographic surveys of the Campbell submarine plateau in sub-Antarctic waters near Campbell Island. Hydrological and magnetic measurements will be taken during the two re-supply voyages between New Zealand and McMurdo Sound.

### THE BASES

Scott Base will again be manned by a wintering-over party of 12-15 men. A summer support party of seven men will again assist at the base during the busy operational season. Including the field parties and other special groups (e.g. men carrying out ice-shelf studies, hut restoration and nuclear fall-out analysis) over 50 New Zealanders will take part in next season's programme. Applications are now being called for.

The future status of Hallett Station has not yet been finally decided, and it is possible that Hallett may not be operative throughout the 1965 winter. However, arrangements are being made provisionally for the customary New Zealand component of three members of the scientific staff.

### BALLENY ISLANDS

Since the reconnaissance carried out in March showed the Balleny Islands to be too rugged to justify an attempt to establish an expedition on shore for any length of time, it is proposed, subject to United States Naval support being available, to carry out further biological and oceanographic work from shipboard on and around the islands for a period of two to three weeks. Opportunity will also be taken to obtain astro-fixes at various points which, with aerial photography, will enable accurate maps of the islands to be compiled. A party of six biologists and oceanographers will be involved.

### CLUB VENTURES "UNLIKELY"

According to the New Zealand Federated Mountain Clubs, it is unlikely that there will be further Antarctic expeditions like the 1961 New Zealand Alpine Club's survey party and the recent Tararua Tramping Club expedition.

The F.M.C. says this is because of the change of emphasis on geological work and the virtual completion of major topographical survey. However, the F.M.C. has been asked to nominate field men to assist in areas where the access and terrain are difficult.

As a high standard of competence will be required, only members with an advanced knowledge of snow, ice and glacier travel will qualify.

### AT SCOTT BASE

The last physical link with New Zealand was snapped on March 5 when "Glacier" sailed, with the Balleny Islands reconnaissance party on board. Scott Base men attended a farewell barbecue at McMurdo the day before.

The scientific team completed the installation of equipment at the Second Crater wannigan in readiness for tests with the Beacon Satellite when it is in orbit.

Ice began to form on open water on March 5. March was an exceptionally warm month, with a mean temperature of  $-20.8^{\circ}$ , a maximum of  $-8.4^{\circ}$  and a minimum of  $-34.1^{\circ}$ . April also was unusually mild: mean  $-21.5^{\circ}\text{C}$ , minimum  $-43.7^{\circ}\text{C}$ .

There was considerable cloud coverage and much wind.

In anticipation of the winter night and blizzards, the routes to the snow-collection area and to Arrival Heights were marked by placing red and white reflectors on posts at short intervals.

The monthly "News from the South" produced by the Antarctic Division for circulation to next of kin and other friends of the men wintering at New Zealand bases, says that health is good and that all are eating hearty meals, apparently continuous! All except three of the thirteen men at Scott Base are bearded. Three men have been constructing an igloo to "Eskimo specifications" and claim that it is to be used for "contemplation of the Antarctic Silence": but it is anticipated that they will have visitors and possibly week-end boarders for chess — and no doubt there will be inspections by the dogs.

Careful watch is being kept on the bay ice in front of the base, where the dog lines are, and cracks are carefully measured for movement, in case the dogs should move seaward to the open water, which is now at Hut Point.

### AUTUMN SLEDGING

Lucy, Massam and Fabian took two dog teams out across the ice-shelf to Survey Station 218, which lies off White Island about 20 miles S.S.E. of Scott Base. The purpose was to gain practice in the use of field radios and to give the dogs a practice run under colder conditions. They returned to the Base on April 19 after a four-day exercise, all with varying degrees of "frost-nip" but with no serious effects.

### SCOTT BASE LEADER

Mr. Adrian Hayter, M.B.E., M.C., is to be leader at Scott Base from October, 1964 to November, 1965.

Born at Timaru in 1914, Mr. Hayter was educated at Nelson College and the Royal Military College, Sandhurst, before being posted to a British regiment and then to the Second Gurkhas for service in India.

During the Second World War he commanded a battalion in Burma and won the Military Cross.

After the war he saw further service against the terrorists in Malaya where he was administrative commandant of "Ferret Force" and became chief instructor in jungle warfare.

### SOLO VOYAGES

He then set out on the first of his two solo voyages from England to New Zealand via the Suez Canal in the yawl Sheila II. The second was in a Norwegian boat, the 25-foot Valkyr, via Panama.

He has written two books, "Sheila in the Wind" and "The Second Step".

Until recently he was one of the original instructors at the Outward Bound School at Anakiwa.

Mr. Hayter paid a short "familiarisation" visit to the Antarctic at the close of the 1963-64 season.

### LOST PENGUINS

Mr. J. Holmes ("Bob") Miller gave a Christchurch reporter some interesting details about the 101-day topographical and geological survey journey by the six-man dog-sledge team which he led during the past summer in the extreme north of Victoria Land.

"We found a dead Emperor penguin 100 miles inland," said Mr. Miller when he returned to Christchurch in February. "In roughly the same vicinity we found a white bird's egg, which was probably laid by an Adélie penguin.

"Further inland still, about 150 miles from the coast, we saw penguin tracks. They were made by one bird only.

"We concluded that these were all single birds that had got lost. There is nothing for them to eat there. They starved to death."

The six men soon learned how sullen the Antarctic could be in the 50,000 square miles of unexplored territory they had to cover in the Australian Oates Land and North Victoria Land.

"The weather was favourable on only 21 days of the 101-day trip," said Mr. Miller. "Temperatures ranged from minus 51 degrees Fahrenheit to plus 24 degrees. But there was one thing that surprised us, and that was the absence of very high winds. The wind exceeded 50 knots only once."

In addition to the bad weather, the party had the greatest difficulty crossing the Rennick Glacier—200 miles long and 65 miles wide, perhaps the largest glacier in the world.

"Twice our fully laden sledges fell down crevasses," he said. "They went down to 30 feet in one fall and it was a day's work to recover them."

The purpose of the traverse was to make a detailed geological study to complete the reconnaissance of New Zealand's province of interest.

"We knew what the Russians had found in the west and what the English had found in the east, and now we have filled the gap. New Zealand could now shift its interest from the west to the east of the Ross Dependency."

## ANTARCTIC GLACIOLOGY

A. J. HEINE

(This outline of glaciological work in the McMurdo Sound area surveys the work done by the New Zealand expedition during the 1963-64 summer. Mr. Heine began his ice-shelf investigations as a member of Dr. H. J. Harrington's team in 1958-59, and initiated the study of ice breakout in McMurdo Sound in 1962-63.—Ed.)

### ICE BREAKOUT PHOTOGRAPHY

The trimetrogon aerial photography of the Ice breakout in McMurdo Sound was carried out by Super Constellation (C-121J) and Otter (U-1B) aircraft. Flights were made from early November to mid February and gave a good coverage of the bay ice. The photographs have now been plotted up and show the stages of breakout throughout the season.

### SUBSEQUENT ICE BREAKOUT

About February 26, the sea ice east of Cape Armitage started to break up, and within two days, had broken back to the February, 1962, ice edge. Great pieces of the McMurdo Ice Shelf then began to break off. Traffic along the Shelf from Scott Base to Williams Airfield was discontinued, and all movements to the airfield were by helicopter. The limit of the breakout was reached about March 5, by which time a sector, about half a mile in to the north-east, had broken out near the experimental compacted snow runway.

### SNOW SAMPLING

(Institute of Nuclear Sciences)

A further collection of snow samples was made this summer by G. Holdsworth and myself. In order to confirm measurements made last summer, duplicate samples were obtained as well as samples from Pole and Byrd Stations. These latter samples were collected for us by USARP scientists. Dr. G. McNaughton of the Institute of Nuclear Sciences, spent several days at Scott Base, checking our collection techniques and familiarising himself with the conditions of the project in the field.

### McMURDO ICE SHELF PROJECT

The projected grid of movement stations was set out by Bill Lucy, assisted by Dave Massam, Alan

Gough, and at one stage, some of the Boy Scouts. Some difficulty along the eastern margin, due to crevasse trouble, caused an abandonment of one station, but otherwise all stations were set out as scheduled. The line of movement points set out by Malcolm Ford and Frank Graveson in February, 1963, from the mouth of the Aurora Glacier (flowing into the Shelf from between Mts. Erebus and Terra Nova) to Black Island were re-surveyed. Our measurements showed that accumulation over the period of approximately a year ranged from thirty inches in Windless Bight to zero near Black Island.

### SCOTT BASE PRESSURE RIDGES

Gerald Holdsworth and Alan Gough completed a cross section measurement across some of the ice folds north of Pram Point. Movement points within this area were re-surveyed.

### PERMANENT GLACIOLOGICAL EXPERIMENTAL AREA

An area for use by glaciologists has been marked out and adequately flagged, about two miles north-east of Pram Point. It is well away from existing roads and runways, and will, I hope, be kept in its natural condition. This is very important, for future research projects may require a clean natural snow area, where the experimenter can be assured of original snow conditions. Here we will obtain our samples for future nuclear bomb fallout analysis.

Unfortunately, my time as Deputy Leader, in the absence of Bob Thomson, kept me occupied a great deal of the time, and I was not able to get out in the field as much as I would have wished. However, a two-day trip to Lake Bonney for a short project was a pleasant break in routine work. Bill Lucy and I drilled holes through the ice in the narrow strait joining the two parts of Lake Bonney, and took soundings. This information was required by Tim Shirtcliffe, Victoria University of Wellington (see last year's work by Benseman and Shirtcliffe).

# NEW ZEALAND TEAM LANDS ON THE BALLENY ISLANDS

by TREVOR HATHERTON

[As forecast in our last issue, landing on the rugged, ice-girt Balleny Islands, 250 miles north of the Victoria Land coast, proved difficult. This account by Dr. T. Hatherton, leader of the New Zealand team investigating the possibility of establishing a base on the islands, outlines the work done and the prospects of further work on the islands.—Ed.]

Clear calm days in the vicinity of the Balleny Islands are, to use the vernacular, "as scarce as hen's teeth". Thus the group, consisting of Trevor Hatherton, Fred Kinsky and Tom Riggert (Dominion Museum), Elliott Dawson and Dick Singleton (N.Z. Oceanographic Institute) and Guy Mannering, which constituted the Balleny Islands Reconnaissance Party 1964, were especially fortunate in having two calm clear days for this "recce". The party left McMurdo on March 5 on U.S.S. "Glacier" and, after stopping off at Hallett Station to give all possible cheer to the party there after the fire, arrived in the vicinity of the Balleny Islands at 2100 on March 8.

## THE PLAN

The terms of reference of the party were:

- (1) To assess the operational feasibility and scientific desirability of mounting in a subsequent season an extended expedition to these islands for a period of up to two months for geophysical, geological, biological and oceanographic studies.
- (2) To obtain as much scientific data as possible during the course of the reconnaissance so that should a subsequent expedition prove impracticable, the maximum scientific value is derived from the operation.

## THE RESULTS

With regard to the latter the achievements were:

- (a) Five oceanographic stations were occupied with dredge and

trawl and two for water (microbiological) sampling. 333 miles of echo soundings were run during the two days.

- (b) The Sabrina Islet penguin colony was visited (a single Macaroni penguin was found among the Adélies and Chinstraps) and examined. Descriptions, photographs and logs of birds and seals were kept and specimens of birds obtained using the ship's searchlight. Birds flying into the beam were blinded and fell into the sea or the ship's decks.
- (c) Algae, lichen and moss collections were made on Sabrina Islet.
- (d) Gravity and total magnetic force observations were made on the beaches at Sabrina and Borradaile Islands.
- (e) Samples of rocks on Sabrina and Borradaile Islands were collected.

## NEXT YEAR?

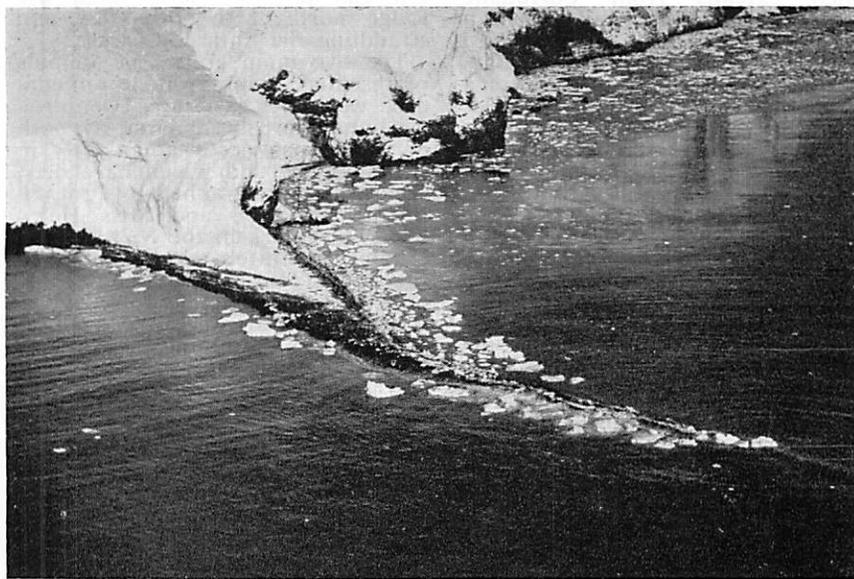
The logistic possibilities of a land-based expedition on the Balleny Islands are not favourable. Historical studies by Mr. L. B. Quartermain suggest that only six landings at four separate sites have been made during the 125 years since their discovery. All four sites were examined closely but to only two is it possible to get a helicopter. They are on Sabrina Islet and Borradaile Island, the latter being the site of the first,

## LANDING PLACES ON THE BALLENY ISLANDS

(Top) The beach on Borradaile Island on which Captain Freeman, of the "Sabrina", the second of Balleny's two ships, landed in 1839, and on which Australian Stuart Campbell landed in 1948. The New Zealand team landed here by helicopter.

(Bottom) Southern end of Sabrina Islet, looking east. The Monolith is out of sight on the right, almost linked with Sabrina Islet by the spit on which members of the New Zealand party and others are standing. Landings were made here by a party from the French ship "Commandant Charcot" (1949), and a party from U.S.S. "Staten Island" (1959).

LANDING PLACES ON THE BALENY ISLANDS



transitory, landing by Freeman in 1839. The photograph shows the spit which extends from Borradaile Island; this beach would have a negative freeboard in a rough sea and would be no place for a camp. Sabrina Islet offers more hope for a camp, on a snow-covered shoulder 50-60 metres above the beach, but the island is small and access to the other islands is virtually impossible for a small party operating from Sabrina. The large islands, Buckle, Sturge and Young, have forbidding cliffs around their shoreline and are capped with a 50 metre thick ice-cap which cascades freely over the cliffs making access to any beaches on these islands dangerous in the extreme.

Together the feeling is that a ship is the best expedition base in the Ballenys. It combines safety and mobility and these would be difficult to ensure on a land base.

### OCEANOGRAPHY

Two oceanographers, E. W. Dawson and R. J. Singleton, participated in the reconnaissance. We are indebted to Mr. Dawson for this note.

Two main aspects of work were done. Continuous echo-soundings were made round the islands, resulting in about 300 miles of soundings close inshore which now provide the basis for the first detailed bathymetry of the islands. Several benthic stations were made on an arbitrarily planned grid of positions. Very little indeed was known of depths or bottom conditions round the islands and it frequently happened that the depth of water was too great for the length of dredging wire available at many of the planned positions. However, it was possible to get a series of stations round the islands ranging in depths from 90 to 250 fathoms.

The bottom sediments consisted entirely of a black greasy mud, very uninspiring in appearance and unpleasant to handle. The animals living in it proved, fortunately, to be rather exciting to the biologist and some very welcome information is now available on the bottom fauna of the Balleny Islands particularly

in relation to the biogeographic position of the islands at the southern end of the south Macquarie Ridge, north of the Ross Sea, and straddling the Antarctic Circle.

The two main groups of animals represented, apart from notothenid fish, were Brittle Stars (Ophiuroidea) and Starfish (Asteroidea), both of which also occur abundantly in the Ross Sea and which have been regionally monographed by Prof. H. Barraclough Fell and Miss Helen Shearburn-Clark in the N.Z. Oceanographic Institute's series "Fauna of the Ross Sea". It was fortunate indeed that these monographs had already appeared since the task of naming and examining the Balleny Islands material is now much easier and some valid comments can be made on its significance.

A number of common Ross Sea brittle stars were collected (especially *Astrothoma agassizii* and *Ophiotus Victoriae*) but others are unrecorded from this sector of the Antarctic Ocean. One particularly spectacular starfish with 64 arms has been found to be a species of *Labidaster*, probably *L. annulatus* Sladen, 1889, hitherto known only from Kerguelen, Heard Island, South Orkneys and the South Georgia region. Further details of interest are emerging as the material is being worked through and this all continues to support our feelings at the time that, despite the short time actually had at the Ballenys, it was a most scientifically productive venture.

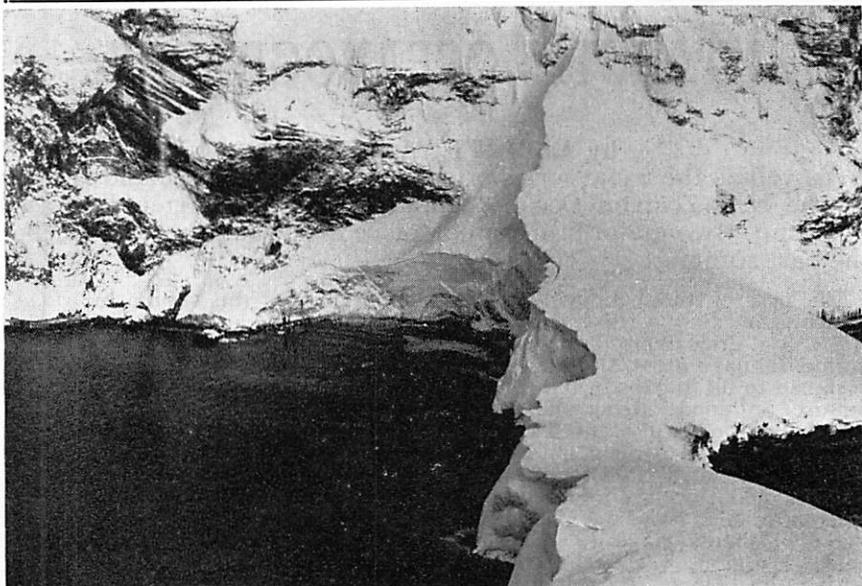
Our thanks go to Cmdr. Vie J. Vaughn, U.S.N., and the Ship's Company, U.S.S. "Glacier", for their friendly interest and co-operation in our work.

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### SCOTT BASE

May brought very variable weather. Several blizzards rising to a maximum 70 knots alternated with exceptionally cold spells. Minimum atmospheric temperature was  $-57.3^{\circ}$  F., the mean  $-17^{\circ}$  F.

Auroral displays have already been spectacular. In May a bright green drapery hung right across the sky.



#### WHY LANDING ON THE BALLENY ISLANDS IS DIFFICULT.

Most of the coastline is similarly rugged.

Photo: Guy Mannering.

#### ANTARCTIC CYCLISTS

An electrical mechanic R. D. Pinker, of the "Endeavour", hopes to chalk up another "first" for New Zealand shortly. He plans to be the first man to go around the South Pole on a one-wheel cycle.

The machine is stored in the ship and he practices on the main well deck.

This would of course not be the first cycle (bi- or mono-) in the Antarctic. As long ago as 1911 the late Prof. Griffith Taylor as a member of Scott's last expedition, rode a bicycle over the sea-ice from Cape Evans to Turk's Head. He walked back. The New Zealand Huts Restoration Party found the frame of this bicycle embedded deep in ice when they excavated the Cape Evans hut three years ago.

The late Colonel T. Orde Lees, as a member of Shackleton's Trans-Antarctic expedition, 1914-17, rode a bicycle a considerable distance across the ice from the beleaguered "Endurance." His return to the ship

was hastened by the inquisitive attentions of a leopard seal.

And New Zealander Don Webster had his bicycle with him at Scott Base in 1959-60. It was still there when he returned to winter over in 1963.

#### NEW ZEALAND'S OWN ANTARCTIC FILM

Camera-man Kel. Fowler spent most of the summer based on Scott Base while he "shot" the activities of the New Zealand Antarctic Research Expedition and recorded the background music provided by penguins, huskies and other noisy inhabitants of the Antarctic.

The film is now being edited and is to be distributed towards the end of the year. It will run for approximately 20 minutes and will be screened in New Zealand and Australian theatres and possibly further afield. The high reputation of the New Zealand National Film Unit ensures that this will be an outstanding record of New Zealand's effort in the Far South.

# ANTARCTIC OCEANOGRAPHY,

1963-1964

by ELLIOTT W. DAWSON

As well as the usual series of cruises in the New Zealand region by the New Zealand Oceanographic Institute's chartered vessel, "Taranui", two major cruises took place in southern waters during the past summer.

The first of these, known as the "Macquarie Gap Cruise", was in HMNZS "Endeavour" during the period January 6 to 28, 1964. It was designed to fill in gaps in the general picture obtained during the "Macquarie Benthos Cruise" of six weeks in April-May, 1963, which had resulted in detailed discoveries along the Macquarie Ridge, found to link Macquarie Island and the Macquarie-Ballenly Islands ridge to the New Zealand region. The areas covered during the "Macquarie Gap Cruise" were the western approaches to Foveaux Strait, the shelf around the Snares Islands, with several traverses of the Macquarie Ridge down to the Auckland Islands shelf region, and finally across the Campbell Plateau to the Pukaki Bank and back to Lyttelton.

The cruise, led by E. W. Dawson, included four other members of the Oceanographic Institute, and Mr. Newton Roberts, of the Geophysics Division, D.S.I.R., who ran a proton magnetometer throughout the cruise. Dr. Donald F. Squires, Chief of the Division of Marine Invertebrates, Smithsonian Institution, also took part to carry out special investigations of the Scleractinian corals of the Southern Ocean.

## THREE PHASES

The work of the cruise was divided into three phases, one involving the running of continuous echo-sounding traverses from Foveaux Strait across the northern end of the Macquarie Ridge, already charted in some detail during last year's "Macquarie Benthos" cruise in HMNZS "Endeavour", with lines of about 200 miles some 60 miles apart down to latitude 51° S. west of the Auckland Islands. This has enabled a good picture to

be obtained of this submarine ridge, important as a faunal migration route connecting the Macquarie Balleny Islands regions with the New Zealand region proper. Dredgings were made at selected high points on the Ridge west of the Snares and the Auckland Islands and rocks and fossils were collected which will be useful in interpreting the geological history of the Ridge.

The second phase of the cruise involved a closely spaced series of benthic stations where Agassiz-type beam trawls and modified cone-mesh dredges were used to collect samples of the animal life and sediments at positions occupied at 2-hourly intervals radiating out from the Snares Islands and the Auckland Islands. Some most interesting samples were taken and these will enable a useful contribution to be made to the ecology of the bottom-living animals of the Subantarctic.

The third phase consisted of shore collections and terrestrial observations on the Snares and on the Auckland Islands. It was hoped to land on the Solander Islands also to make intertidal and geological collections but the seas and visibility proved unsuitable. The three biologists on the cruise each had special interests in the shore work and a very satisfactory programme of collecting and recording was carried out on both groups of islands. Dawson and Singleton landed on one of the islets of the Western Reef of the Snares which had not been visited since Dr. R. A. Falla's landing of December 6, 1947.

## AUCKLAND ISLANDS

At the Auckland Islands landings were made on Enderby Island and Rose Island in Port Ross. With the

\* N.Z. Oceanographic Institute, D.S.I.R.

help of several members of the ship's company all the nests of the Southern Royal Albatross (*Diomedea epomophora epomophora*), which breeds on Enderby Island in very small numbers, were found and nine adult breeding birds were banded. One bird, banded during Dr. R. A. Falla's December-January, 1962-63 Auckland Islands Expedition, was found and this is of interest since albatrosses are often said to breed only in alternate years. A dead chick was found near the nest of this bird, R 3606, and it is likely that this dates from the 1963 season and the parent birds were breeding for a second consecutive year. The ancient sand dunes in Sandy Bay were examined and an interesting assemblage of subfossil bones of earlier animal populations was collected, including large albatrosses, a rail resembling the now extinct Auckland Island Rail (*Rallus muelleri*), and a bone of *Palaeocorax moriorum*, an extinct crow also formerly on the Chatham Islands. A good series of skulls of the New Zealand sea lion (*Neophoca hookeri*) which breeds in numbers on the beach were collected for the U.S. National Museum. The antics of the sea lion pups on the beach and the pugnacious behaviour of the bulls provided some good camera subjects for the photographers of the shore party.

In Carnley Harbour, at the southern end of the Auckland Islands, one shore party worked at Camp Cove and the nearby Masked Island and up the North Arm on Figure of Eight Island, making collections in the same localities as on the Mortensen 1914 Pacific Expedition which visited the Aucklands in the "Amokura". It was hoped to get additional specimens of some of the marine invertebrates collected by Mortensen and described later in his well-known series of reports. Another shore party landed on Adams Island, making shore collections and observing the breeding population of the Wandering Albatross (*Diomedea exulans exulans*), of which 34 birds were banded and measurements made for comparison with the subfossil bones of the Enderby Island sands.

Further benthic stations were carried out by the ship during this time in Carnley Harbour and in the shelf region east of the Aucklands. Great numbers of our old friend of the previous cruise, the swimming crab *Nectocarcinus*, were trawled and once again some of them provided a tasty addition to the supper menu!

#### SHALLOW WATERS

After sounding runs on the west coast of the Auckland Islands, particularly close in to the geologically interesting steep cliff near the scene of the wreck of the "General Grant", the return track to Lyttelton was just south of 50° S. latitude across the Campbell Plateau with dredging and trawling every 2½ hours to about 200 miles east. This was designed to investigate the shape and extent of the shelf to 100 fathoms around the Auckland Islands. Course was then changed to the south as far as 51° S. Further stations were carried out each 3½ hours along this latitude to 171° E., where course was set to the north to pass over the Pukaki Bank lying close to 49° S. An intensive series of echo-sounding runs was made over the Bank enabling a detailed chart to be prepared of the bathymetry of this interesting sea mount which rises to less than 30 fathoms from the surrounding depths of 200-300 fathoms. Several benthic stations were also made so that an account of the animals and sediments of this feature can now be prepared.

#### SUBMARINE CORAL BANK

One of the most exciting discoveries of the cruise was made during the final run east from Enderby Island. Dr. Squires had already shown how the presence of submarine coral banks could often be picked up by a characteristic trace on the echo-sounder. A clear trace, right out of the text-book, began to appear on the sounder not long after leaving Enderby Island and after mapping the east-west extent of the bank, proof of its coral composition was obtained by dredging up several species of scleractinians.

A particularly interesting feature of this cruise was the work carried out by Dr. Squires in the laboratories

in HMNZS "Endeavour", showing how very useful the scientific facilities in the ship are proving for the collection and examination of live animals.

Dr. Squires has provided me with the following report of his work which elaborates a little on the find of the coral bank.

"In the course of the 'Macquarie Gap' cruise, corals were collected at a total of 11 stations. The majority of these were taken in sufficiently good condition to warrant attempts at culturing. With few exceptions these attempts were very successful, particularly in that expansion of the polyps of the corals was achieved. Observations on the behaviour and reactions of the live corals were made, in some cases over a period of 10 days, through the successful use of a laboratory refrigerator as a culture unit. Photographs of these specimens in both colour and in black and white form important documentary evidence on the coral fauna of the region. Two new species of coral were collected. In the course of routine collecting, a sample was taken from the flanks of the first deep water coral structure to be found in the Pacific Ocean. Although the stage of development of this structure cannot be determined from the evidence at hand, the echo-sounding trace made in crossing the structure is strongly indicative of an advanced structure of either the coppice or bank stage. The presence of this structure at approximately the position of the postulated Bounty-Campbell gyral is of considerable interest and may represent biological evidence of such a current."

Other work on examination and preservation of live animals was carried out by other specialists on the cruise, E. W. Dawson with nemertean worms and I. N. Estcourt with Polychaeta. The newly added Quarterdeck Laboratory proved very useful for the preparation of microbiological samples by R. J. Singleton.

I must add here a few words of appreciation of the assistance of Cmdr. P. R. H. Silk, R.N.Z.N., and of the ship's Company, HMNZS "Endeavour", in making this a very profitable cruise. Without their con-

## MORE YANKIWIS ?

No fewer than seven New Zealanders were working with U.S.A. R.P., the United States Antarctic Research Program, in the Antarctic last summer. This is more than all other "foreigners" combined.

**K. A. J. Wise**, of Sumner, was the project leader of a group of scientists who are all from New Zealand. They were working with insects for the Bernice P. Bishop Museum, Honolulu. His assistants were **A. V. Spain**, an honours student from Lincoln College, and **K. P. Rennell** of Napier, who was on leave without pay from the Meteorological Service.

**G. Johnstone**, a motor mechanic, has been with U.S.A.R.P. for three years in addition to spending a season at New Zealand's Scott Base. He is manager of the programme's warehouse at McMurdo Station.

**A. J. Gow**, a graduate of Victoria University, now resident in the United States, is working on problems of ice structure for the United States Army Cold Regions Research and Engineering laboratory.

**W. D. Hall**, a geologist from the New Zealand Geological Survey, was working in the Sentinels with a party from the University of Minnesota.

**J. C. L. M. Mather** of the University of Canterbury, was ship-trapping insects in Antarctic waters.

## T.V. FARE

We are informed that the New Zealand Broadcasting Corporation will probably purchase and use the feature "Vostok 900" produced recently by the A.B.C. This well-reviewed documentary incorporates motion pictures actually photographed on the remarkable Australian trek from Wilkes to the Russian inland station Vostok in the 1962-63 summer, led by New Zealander Bob Thomson (see his article in "Antarctic", September, 1963).

Watch your "Listener" in two or three months' time. This documentary should not be missed.

Continued help and interest on our own efforts would not have achieved so much.

# HALLETT STATION STILL WORKING

The future of the joint United States-New Zealand Hallett Station, the nearest Antarctic base to New Zealand, is still under discussion following the disastrous fire on March 6.

The fire, briefly reported in a Stop-Press note in our March issue, struck heavily at the scientific potential of the station. The science building and the auroral tower and their contents were completely destroyed. This entailed the complete cessation of the ionosphere, aurora, riometer and photometric programmes, and many of the records in seismology, geomagnetism, earth currents, ionosphere and riometer were lost.

On the other hand, possible future work in seismology, whistlers and earth currents is unaffected and damage done to cosmic ray and geomagnetic control equipment has already been overcome. It has therefore been decided by the United States and New Zealand authorities in consultation to carry on for the present year approximately half of the usual scientific programme. Meanwhile a decision will be made regarding the future of the station, whether it will be restored to full working strength or used merely as a base for summer work. The station was built in 1956-57 by the United States, which has also supplied the equipment and logistic support, while New Zealand has supplied each year three out of the scientific staff of four men.

A New Zealander has been Chief of the Scientific Staff in alternate years, the present Chief Scientist being a New Zealander, N. M. Ridgway.

## TWO SCIENTISTS WITHDRAWN

Following the fire, in which the New Zealand personnel lost practically all their personal effects, two of the four scientific staff, one American, — Spitz, and one New Zealander, N. Green, were returned to New Zealand. The other two New Zealanders, Ridgway and Rowles, are at present wintering over at the Station with the United States support staff of nine men.

Hallett is regarded as an important station, as scientifically it is in a favoured zone and is on the air route between New Zealand and the McMurdo Sound U.S. and N.Z. bases. It is, however, a difficult station to reach by sea and to maintain, and many factors would be involved in restoring the station to full working order.

## FIRE DETAILS

The fire broke out 7.25 a.m. on March 6 and was not quelled until 1 p.m. In a strong 25-50 knot wind the chemical fire extinguishers proved inadequate to subdue the blaze, and the necessarily very limited water supply was taxed to the utmost. It proved quite impossible to save the Science Building, and the Auroral Tower was also completely destroyed. By desperate efforts the blaze was prevented from spreading to the sick-bay and other buildings.

At the time of the fire the U.S. ice-breaker "Glacier" was steaming northwards about 60 miles south of the station. "Glacier" now raced at full speed to Hallett and supplied replacements for the personal clothing, etc., which had been destroyed. Her personnel also assisted with the cleaning up process before the vessel left for Balleny Islands at 7 p.m. on March 7.

Dr. Trevor Hatherton, the New Zealand geophysicist who led the Balleny Islands reconnaissance, was on board "Glacier" and was instructed to investigate the possibility of carrying on the New Zealand science programme at a reduced level.

The whole unfortunate occurrence had one bright side: it highlighted the co-operation between the United States and New Zealand in Antarctic affairs. Apart from the assistance by both countries already mentioned,



HALLETT STATION ICE-SCAPE.

Photo: L. J. Wyld.

within four hours of the fire, the U.S. authorities at Christchurch, the Director of the U.S. program (in his bed at 11 p.m. in Washington) and the Superintendent of the N.Z. Antarctic Division (at work in his garden) were personally conferring by radio on the steps to be taken to meet the crisis.

#### EARLIER HALLETT NEWS

In an experiment to determine the viability of non-indigenous plants in this area, grass seeds (*Poa annua*) and alpine flowering plant seeds were planted in the field and in local soil indoors. The plots were examined daily and records kept of the daily minimum soil temperature. The indoor seeds have germinated and are growing well. Some of the grass seeds planted outdoors germinated after a month and a half and are beginning to grow slowly under natural conditions of warm period and abundant standing water.

**New Zealand Programme:** Studies and band-reading of the Adelie pen-

guins and skuas were continued. The first penguin chicks were hatched on December 8 and a new study of the food of penguin chicks was started shortly after the first chicks hatched. A study of the yoke and albumen contents of penguin eggs was undertaken. Snowfall and strong winds on the 2nd and 3rd destroyed some penguin nests and caused the abandonment of almost 25 per cent. of the skua nests. The majority of the skuas which lost their eggs re-layed full clutches after mid-December. The first skua chicks were hatched on December 15.

A short visit to a snow petrel colony was made by helicopter during the visit of the icebreaker, U.S.S. "Burton Island".

#### HALLETT RISK

A skua's life isn't what it used to be. "Antarctic Report" informs us that the construction of a skua trap at Hallett has enabled the biologists to check the bands on adult (and no doubt infuriated) birds.

## PERSONAL STORY

(We are indebted to Nev. Green of the New Zealand team at Hallett, who was evacuated to New Zealand as a result of the reduction of the science programme, for this personal account of his experiences during the fire.)

At approximately 0720 on the 6th. I was awakened by the sound of Norm Ridgway calling my name and shouting that the building was on fire. I stumbled out of bed, quite groggy from sleep. There was a smell of smoke in my room, and in the Ionosonde room smoke was collecting near the roof. As light was coming through the building windows, no one at any time switched on the lights.

### THICK BLINDING SMOKE

I picked up a 30lb. CO<sub>2</sub> extinguisher in the Ionosonde room, pulled the pin and broke the seal. By now I had the idea that the fire was located toward the front of the building. Norm "paged" the camp on the intercomm system and we both called out to Des (Rowles). Heavy black acrid smoke filled the vestibule. However, by keeping low to the floor, I was able to see flames somewhere about the top of the wall behind the diesel heater. The sharp crackling of burning material was heard. I played the CO<sub>2</sub> extinguisher in the vicinity of the flames for about 7 to 10 seconds. The smoke was thick, blinding, and I was beginning to gag. I pulled back.

Norm and I again called Des, who, already awake, had had the presence of mind to don some clothing. I dropped the extinguisher and undid the parrot's cage from its position. The air was hot and the smoke much thicker. Norm attempted to re-enter the building, but by now the entire doorway was full of smoke forcing him to withdraw. Des appeared, so Norm and I, barefoot, crossed the snow covered ground to the Sick Bay. The time was about 7.23 a.m. During this approximately 3 minutes period from waking to reaching the Sick Bay, all our movements had been executed with the utmost speed, as we realised the urgency of the situation.

Norm saved pyjamas and a watch; I saved pyjama pants, T shirt and a watch. Des was reasonably dressed and as Norm and I saw some people already moving to the scene of the fire, we thought it prudent to find some more clothing. This we did, then assisted in helping fight the fire.

### CAMP AWAKE

Very quickly the camp was fully aroused. Tractors were fired up and taken to the scene with no delay; the fire sled was pulled into position by the front door. Almost everyone carried some form of extinguisher. About this time the power to the building was shut off. Smoke poured out of cracks and the crackling of flames could be heard. An entry was attempted through the door, but the smoke was too thick and the wind gusting up to 30 knots did not help by blowing in the door when it was opened. The diesel fuel tank (almost full) was removed from alongside the building by a Traxcavator after having had the feed pipes severed by a hacksaw. A hose was pushed through the door and the fire was sprayed by powder. A small hole had burnt in the front wall near the roof and the hose was transferred to this position. 450lb. of powder was used on the fire at this stage with little appreciable effect. By now it was possible to see that flames had spread to Norm's room and smoke was everywhere. A water hose (no nozzle) and two series pumps were connected and I understand that 1600 gallons of fresh water was used on the fire. Water was played through the front door and the windows of the southern wall, i.e., my room and the Ionosonde room. Once a hose was removed from a window, the hole was boarded up to prevent the wind from entering.

### WIND RISES

The fire was brought almost completely under control and appeared to be once again only located at the front of the building, when the wind came into full force and by blowing through every crack and hole spread the fire again. The force of the fire grew to such an intensity it was decided hopeless to save it, but to confine the fire within the walls as

much as possible until it burnt most of the inflammable material, and to concentrate on saving the Sick Bay.

After the fresh water supply was exhausted, an estimated 5000 gallons of sea water from the storage tanks in the garage was used. A pumping unit was set up on the shoreline of the sea, and although it did not operate properly for quite some time, I understand that a further (estimated) 6000 gallons of sea water was pumped. The 21ft. 6in. distance between the Sick Bay and Science Building was insufficient to prevent flames from jumping the gap and blistering the paint on the southern wall of the Sick Bay. Water was sprayed down this wall and the roof of the Sick Bay.

The stairway to the Auroral Tower finally caught alight after smoking for a long time, and in a short time the Tower was afire. In 4½ hours the Science Building and the Auroral Tower had almost completely burnt out. By evening, one or two embers smouldered, but most of the remains of twisted girders and charred timbers were covered by light snow and all the applied water had turned to ice. The fire had caused complete destruction of everything in the building.

We were thankful conditions were no worse, e.g., night time, or worse still, midwinter. Actual conditions were: temp. 24° F., dropping to 19° F. later in the day; snow was being driven by the wind; the wind was in a SSW direction; average speed in the early morning was 10 knots, with 20-knot gusts, later rising to a peak average of about 30 knots with a maximum gust of 42 knots. These are actual recorded figures.

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nests in preparation for winter measurements. A radio-activity laboratory and a shelter for the detection of meteoric dust were installed provisionally.

The 14th Expedition has got off to a flying start and morale is excellent.

## TERRE ADELIE

The chartered vessel "Thala Dan" bringing home the "T.A.13" team from the French base in Adélie Land, Dumont d'Urville, berthed at Fremantle, Western Australia, on February 11 and arrived at Le Havre on March 25, bringing the expedition of 1963-64 to an end.

Meanwhile all goes well in Terre Adélie. A violent gale on April 16 resulted in the complete rout of the bay ice: after the storm the sea was entirely free of ice. The new generator house became operative on April 28 at 2 p.m.

The five French members of the French-Soviet glaciological expedition (EAS/EPF) in Queen Mary Land arrived at Le Havre on board the Russian vessel "Ob" on May 7. On the Antarctic ice cap in temperatures ranging from -42° C. (-43° F.) to -63° C. (-81° F.), at an average altitude of 3,000 to 3,500 metres (9,800-11,400 ft.), the team successfully carried out 6 "pentagons", the precision of the measurements being excellent. Electric soundings were made as well as cores. The team traversed a route of 2,630 km (1,630 miles). All returned in good shape—but many pounds down in weight.

When "Ob" arrived at Le Havre, among those on board were the Russian scientists Somov, Kapitza and Shumsky. They were given a warm reception at Expéditions Polaires Françaises along with 71 other Soviet expedition members.

Detailed plans for the forthcoming season in Terre Adélie will be confirmed at conferences to be held during June.

The departure of "Thala Dan" on January 27 saw the close of the summer season. The final days were marked by very bad weather with winds rising to over 50 m/s. In spite of a relatively cold February the interior fitting of the various buildings went forward side by side with exterior work—powerhouse, laboratories, distribution network, pipe-line, roads. Anemometers and thermometers were placed near

# Autumn Activities At Australian Bases

The teams for 1964 at all three Australian continental bases, Mawson, Davis and Wilkes, settled in quickly, and from all bases field sorties of varying magnitude were made before winter began to close in.

Probably none of those nations participating in Antarctic activities is more aware of the vastness of the Southern Ocean and its perils than is Australia. Her three bases on the continent, as well as Macquarie Island, have all to be maintained and relieved by ship, involving some ten or more thousand miles of steaming each season and every mile of it in the greatest void of ocean on our globe. Ships and shipping were matters of primary interest in former years of Antarctic endeavour, and it is a matter for regret that voyages which can never ever be without incident, tend to be regarded as routine. Occasionally, however, when the weather is more than normally severe, something is heard of these accepted conditions.

## NELLA DAN BATTLES HURRICANES

The relief ship "Nella Dan", moored in Horseshoe Bay, Mawson, was struck by a hurricane on February 20.

Winds over 85 knots were registered during the storm, and during the night two of the ship's five steel moorings failed. One four-inch steel bow cable snapped first, and a stern cable gave way shortly afterwards.

Had the remaining lines parted, the ship would have been washed on to the rocks.

The ship's officers and crew waited for a lull in the wind, then launched a boat and battled for several hours to land new lines.

Meanwhile, six Mawson men crouched in the shelter of boulders at the water's edge, waiting to receive and secure the lines.

The new lines held and 24 hours later the storm blew itself out, allow-

ing normal unloading to be resumed.

Only weeks later the "Nella Dan" had to race against a storm through icebergs and darkness in a nine-hour dash to reach the safety of Davis Base.

Before it was too late it was decided to head out of the pack ice and navigate in the dark through icebergs. Using the radar and echo sounding equipment and being directed by a radio beam from Davis the vessel made shelter after nine hours.

## LARGEST GLACIER

As a result of the latest Antarctic expedition, Australia can now safely boast of owning the world's largest glacier.

The Lambert Glacier in Australian Antarctic Territory was "mapped" for the first time by a seven-man team which made a three-month glaciological survey of the remote Amery Ice Shelf area.

The leader of the party, Ray McMahon, said that the trip had confirmed that the glacier was the world's biggest.

## NO HANDY SANDY BEACH

Sixty drums of sand were taken to Mawson by the "Nella Dan".

The Antarctic has no accessible sand of its own. The assignment was for making concrete for a hospital, a surgery and an emergency power house to be built at the base.

Also on the Australian National Antarctic Research Expedition craft were two Melbourne-made tracked scout vehicles, a caterpillar-pressure tractor, and a winterised, German designed car.

## AROUND THE BASES

### MAWSON

In February the 1964 Mawson team assumed control of the station. Except for two days of stormy weather, the voyage from Fremantle aboard the "Nella Dan" was quite smooth.

The scientific team, Francis, Francey, Cooke, Taylor and Seedsman, busied themselves installing new equipment and preparing for the year's task of scientific data collection. The meteorological staff under the guidance of Stalker began attempting to unravel the mysteries of Antarctic weather.

During March Mawson had three bad blizzards, each with winds in excess of 90 m.p.h. and visibility two to three yards, and each lasting for two to three days. The maximum temperature was 28° F., the minimum -4°. The pressure dropped to an alarming 946 millibars. Stalker and Trajer managed a record high radiosonde flight to 5 millibars or 107,000 feet. With a normal three blizzards, the temperature readings may not have been accurate, since the instrument screen only six yards from the Met. Shack could not be found. These blizzards piled snowdrifts around the huts.

### INTO THE FIELD

The autumn field party left on March 16. It consisted of Budd (glaciologist, leader), Farley (surveyor and navigator), Lawson (engineer), Whitehouse (radio operator) and Beck (cook).

Late April saw the return of the field party after being away for five weeks on the inland ice cap. It was a successful trip, depotting fuel to within 22 miles of the Amery ice shelf for the coming spring journey, for picking up the weasel abandoned last year, and for Budd to measure snow accumulation along the route. Although often rebellious, all tractors came home after much coaxing from Lawson. Farley had the difficult task of navigating from a D4 tractor and, in spite of the rough travelling over high snow dunes, was only lost on a few occasions when visibility was limited by heavy drifting snow,

complete whiteout or darkness. Radio reception conditions were not good but, owing to Whitehouse's persistence, contact to base was maintained. During the trip the average temperature was 50 degrees below freezing. They were blizzard-bound for 7 days and there were 9 days of whiteout.

At Mawson, April was a month of weather extremes. The base reached the lowest April temperature on record for Mawson, -15.4° F., and had two blizzards, one being accompanied by temperatures as high as 27 degrees. More snow than ever lay around the station and the camp was half buried. Those interested in skiing were disappointed as the snow cover still did not extend to a suitable area.

### DAVIS

February weather was: Maximum temperature plus 42, minimum plus 18.2 F., maximum wind gust 83 knots.

The "Nella Dan" arrived at Davis on February 28, bringing news of home, companions of twelve months ago from Mawson, and the Davis party for 1964.

For the next six days work proceeded at a great pace, with extra sleeping quarters and an auroral hut being built. Another 72-foot radio mast was also erected, and a year's supply of stores was unloaded. In addition to being used for transferring stores from ship to shore, the Army DUKWs proved most useful in obtaining ice from bergy bits to augment our rapidly dwindling water supply. Throughout the changeover period the sea was trying hard to freeze and there was much speculation as to whether "Nella Dan" would remain for the year. However, she was seen disappearing among the icebergs early on March 6.

Once the new party was left alone they started work on getting as many stores inside as possible. Buildings had to be completed and made weather-proof. The concreting of the cold porch floor provided work for all on hand mixing concrete.

The first venture on to the sea ice was on March 13 to collect some bergy ice for fresh water. During the next week several trips were made on the ice, including a couple with the dogs for the purpose of obtaining ice and seals for dog meat. Wignall, weather observer and dogman, was kept busy looking after the dogs and obtaining seals.

The Meteorological team has worked whenever possible on polishing the perspex dome from the old auroral hut in which they hoped to mount their theodolite for tracking balloons.

The sea ice mentioned above disappeared on March 22 during the first blizzard. As well as removing the sea ice, the wind left many snowdrifts which became covered by sand and it also forced snow through the least suspected cracks in some of the buildings. Late in the month the sea had re-frozen sufficiently for the dogs to be taken out again and, on short trips with them, 300 elephant seals were observed within three miles of the station.

March weather was notable for overcast days with little sunshine. Maximum temperature, 27.9°F., minimum -41°F.; strongest wind, 65 knots.

In April, with the approach of cold weather, wildlife deserted daily. Many elephant seals were seen making for open water across the sea ice. Skuas and Nellies also left for warmer places, so that birds were by now a rare sight.

The month saw several short ventures away from camp. Griffin and Trott used dogs to visit the Sorsdal Glacier and place stakes for measuring the glacier's movement. Then Wignall and Trott, with dogs, visited the remote station, "Platcha", situated where the Plateau meets the Vestfold Hills. The snowtrac next went to Platcha to check the Plateau access route established by last year's party.

Weatherwise, this was the coldest April recorded at Davis. The minimum temperature was -27.7°F., and the maximum 26.0°F. A blizzard at

## AT WILKES EMERGENCY OPERATION

An emergency operation was carried out on Friday, March 6, on David Rogers, radio operator, who was suffering from acute appendicitis.

The operation was successfully carried out by Dr. Lyndon Murray, with O'Leary as surgeon's assistant, Neville Woods, radio operator, as anaesthetist, and Leon Jennings-Fox, weather observer-in-charge, as theatre "sister". The station kitchen-mess was converted into an operating theatre by draping walls and ceiling with sterilized sheets and installing operating light, table and sterilizers.

The patient recovered rapidly. He was fortunate that a field trip upon which he was scheduled to leave the station some days earlier was delayed by a blizzard, otherwise his attack could have occurred many miles from the station facilities.

## ANTARCTIC ICE DOME EXAMINED

Led by Ray O'Leary, eight Austrians have returned to Wilkes Station after spending two months investigating an unusual ice dome about 100 miles south-east of their station. The men who set out on this field trip on March 10 returned home on May 4.

The ice dome is of particular interest to scientists because it is virtually a small-scale model of the Antarctic Continent, which is itself of this formation. The ice dome examined by the party resembles the large continental dome in shape, in the gradual flow of the ice and in the way in which snow accumulates on its surface. For these reasons glaciologists may better understand the behaviour of the ice of Antarctica as a whole with an area of over 5 million square miles.

The exploration party travelled for

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the end of the month greatly increased the drifts and gave easy access to what remained of sea ice in open water within a mile of the camp. The maximum wind gust was 94 m.p.h.

500 miles in crossing the dome several times as they measured the thickness of the ice, its rate of movement and the accumulation of snow by observing measuring-stakes planted in the ice a year earlier. The work was carried out in very severe cold, with temperatures falling as low as  $-60^{\circ}$  F., while the men often worked with considerable difficulty under blizzard and whiteout conditions. Valuable results, however, were achieved and the men returned to Wilkes safe and well.

### REHABILITATION

A man who should have died in the Antarctic relaxed a bandaged arm across his chest and recalled his amazing experience. (See "Antarctic," Vol. 3, No. 7, p. 288.)

The man was Dr. Richard Lippett, 35, of Manningham, who returned to Adelaide on May 1 after convalescing in Melbourne.

Dr. Lippett and two others had to dig their way out of a tent after a 120 m.p.h. blizzard covered it in snow in August last year.

They walked the 25 miles back to the Mawson base through further blizzards. The walk took 15 hours.

Dr. Lippett said American survival experts estimate a man could last only 12 hours under such conditions. "We outlived their predictions by 36 hours," he said.

He and another man spent three months in bed at Mawson. The third man later died, but Dr. Lippett thinks his death was not due to their ordeal.

In Melbourne surgeons had to amputate joints from the fingers of Dr. Lippett's right hand. Frostbite affected both hands and there is little feeling in the fingers of his left hand.

Those 48 hours have changed Dr. Lippett's plans for his future. "I can't see myself ever operating again," he said, and moved the hand under his bandage. And he can never return to the Antarctic, because the cold affects his hands.

He was working for a thesis on the food absorption rate of men in sub-zero temperatures.

He had to abandon that work. "But there is still plenty of scope for doctors and scientists to carry out research work in the Antarctic," he said.

### PARADOXES

He recalled the paradoxes of life at the Mawson base:

A temperature of  $70^{\circ}$  in the sleeping quarters was uncomfortably hot when the outside temperature could be  $-34^{\circ}$ .

The danger of sunburn from the ultra-violet rays reflected from the snow.

The need for refrigerators because intense cold destroyed some food.

Dr. Lippett was to return to Melbourne in about a week for a further examination of his damaged fingers. He hopes to continue working for the Commonwealth Government.

### AUSTRALIAN SCIENTIST TO VISIT McMURDO

Dr. P. D. Tilley, of the Department of Geography, University of Sydney, is to visit the McMurdo Sound region next summer to verify the reported absence of loess in the area and to locate any limited formation of the deposit. He will also observe the work on patterned ground being carried out by the Department of Geology, University of Wisconsin. Dr. Tilley has been doing similar work on Macquarie Island.

### SNOWGIRLS OUT

Women scientists are not likely to take part in Britain's Antarctic research work for the time being, says Sir Vivian Fuchs.

Sir Vivian, Director of the British Antarctic Survey, described conditions at the survey bases as "still extremely arduous". Women would be unable to handle the heavy cases of supplies now designed to be handled by men, he said.

New buildings also would have to be erected for women, and their presence would "change the whole psychological atmosphere of the bases".

Sir Vivian was speaking to reporters at Southampton after having farewelled the "Kista Dan" on its way to South America and the Antarctic Peninsula.

# TWO SOVIET TRACTOR TRAINS MAKE LONG ICE CAP JOURNEYS

Dr. M. M. Somov told an interviewer on April 8 that the Soviet expedition had had a successful season which was a "signpost" in Soviet Antarctic research.

The season had differed from previous ones, said Dr. Somov, in that a large and decisive role had been played by the second flight into the Antarctic by IL-18 aircraft. As a result of the fly-in, new men at the Bases had been able to start their work much earlier. The flight had also made possible two long inland journeys, totalling 5,300 kilometres (3,280 miles) of over-snow travel.

During the change-over period Russian aircraft under Boris Minkov, Chief of the Polar Air Division, delivered material to Vostok Station and to the tractor trains travelling far inland. The Division also air-lifted the new arrivals in to the Novolazarev Base and gave support to men engaged on reconnaissance work.

## SHIP MOVEMENTS

"Estonia" arrived at Mirny on January 11 and left on January 29.

"Ob" arrived Mirny January 11, left February 10 for Mawson (February 14), Molodezhnaya (February 16-March 13), Novolazarev (March 17-19), Molodezhnaya again (March 17) and back to Mirny on March 31, finally leaving on the return voyage to Europe on April 4.

## BUSY DAYS FOR "OB"

A despatch from the "Ob" on March 11 described the unloading at Molodezh station, where 1,300 tons of equipment and stores had to be transferred from ship to ice. A 25 metres per second (56 m.p.h.) wind stopped unloading on the first night and was followed by a hurricane during which hawsers snapped, including six Capron cables and one steel cable. When the vessel was

carried away from her moorings the position became serious but by the use of radar and depth-soundings the off-shore danger spots were avoided.

## AT NOVOLAZAREV

After unloading at Mirny (95° E.) and Molodezh, the "Ob" radioed when south of the Indian Ocean on her way west to Novolazarev Station that she had been forced to change course further to the north, as all attempts to force a way through a 90 mile wide belt of ice had failed. Captain Sviridov gave the engines full power, and late on March 17 the ship arrived at Novolazarevskaya (11° 49' E). Twelve Russians who are to winter over at the station, which lies inland from Leningrad Bay, now went ashore, with the Czech magnetologist Majmir Konечy and the English glaciologist Charles Swithinbank, who will both winter at Novolazarev Station.

The "Ob" which had left Leningrad three and a half months before, was unloaded by March 19. During the unloading a sledge tractor-train with men from the base arrived at the high cliff of the Lazarev Ice Shelf 60 miles from the station. It took them three days to reach the "Ob" because of blizzards and crevasses. The vessel left on March 20, bound for Molodezhnaya (45° 51' E.). The Novolazarev shore party gave them the traditional Russian farewell with sirens and rockets.

## TWICE AT MOLODEZH

After unloading stores, equipment and building materials at Molodezh, "Ob" sailed back west to Novolazarev, a difficult journey through

heavy pack-ice and scattered bergs about 60 miles off shore. On one day only three miles progress was made.

The vessel now went back to Molo-dezh, picked up the men who had just arrived there by tractor train from Vostok (see below), and then sailed on east to Mirny on the Pravda Coast. "Ob" reported on April 4 that she was close to Mirny after skirting the coast for 620 miles.

#### LAST DAYS AT MIRNY

Two weeks were spent unloading the 1,800 tons of supplies and equipment, which included diesel fuel and building materials. The transfer of men between ship and station was carried out by air. At times the vessel had to pull out from the ice edge because of gale-force winds. The glaciological trek from Vostok ended at Mirny on April 3, and next day "Ob" left for home. A snow-storm prevented those at Mirny from watching the "Ob's" departure, but her farewell rockets were seen.

Coastal research was now carried out, with emphasis on the distribution of ice and icebergs.

#### "ELECTRON 2" OVER ICE CAP

"Pravda" on February 4 reported that the men wintering over at Vostok had made an addition to their library of sound recordings. At 21 hours Moscow time in the 20,005 megacycle waveband the leader of the station V. Ananov and the radio operator B. Chernov received signals from the space station "Electron-2" and recorded them on tape.

The Pole of Cold and Vostok are continuing to keep a radio check on the space explorers.

#### RUSSIAN WINTER TEAMS

Mirny: 90 men (one Hungarian).  
Vostok: 14 men (one from U.S.A.,  
one from Czechoslovakia).

Novolazarevskaya: 14 men (one  
from Czechoslovakia, one from  
England).

Molodezhnaya: 37 men.

**Total: 155.**

One Soviet scientist will winter at the English station on Stonington Island and one at the American base Byrd.

#### CREVASSE TRAGEDY

Tragedy struck a transport column towing sledges near Mirny early in March. Anatolii Shcheglov, aged 24, one of the Russian mechanics, and one of those responsible for the preparation of the vehicles for the long trek, lost his life when the tractor he was driving crashed through a snow-bridge and fell 60 feet into a crevasse.

A search party flew out from Mirny when the transport became overdue and sighted the crevasse from the air. The two other occupants of the tractor, Tgulin and Pronin, were rescued, not seriously hurt, but Shcheglov was killed when the crash occurred. He is described by transport leader Lebedev as "the youngest and toughest of the tractor team". Shcheglov had already spent one year in the Antarctic when preparations for the long trek were being finalised. As another mechanic was needed he volunteered to stay on for an extra year.

#### ALASKAN AT VOSTOK

A report from College, Alaska, says that John Jacobs (25), a young graduate student in physics from the University of Alaska, will be the first American to visit a Soviet station in the interior of the Antarctic Continent. He will winter over at Vostok, 11,444 feet above sea level. At home in Alaska Jacobs may have experienced a temperature as low as  $-45^{\circ}$  F., but at Vostok a temperature of  $-127^{\circ}$  F. has been recorded.

Jacobs' visit, arranged by the Academies of Science of the United States and the Soviet Union, is financed by the United States National Science Foundation.

#### AT MIRNY

A happy occasion was the celebration of Hungary's national day as a tribute to Hungarian scientist Tatkos. The Hungarian flag waved above the station and Hungarian films were screened.

The supply ship "Estonia" arrived back at Odessa from the Antarctic on March 5.

## FROM VOSTOK TO MOLODEZHAYAYA

Readers will recall ("Antarctic", March issue, pp. 390-1) that a Soviet tractor-train of two Kharkovchanka vehicles and an A.A.T. tractor set out from the inland station Vostok ( $78^{\circ} 27' S.$ ,  $106^{\circ} 52' E.$ ) early in January to attempt the long journey across the lofty ice-cap, via the Pole of Relative Inaccessibility, to the coastal station of Molodezh (  $67^{\circ} 40' S.$ ,  $45^{\circ} 51' E.$ ) following a route which would take them through areas never previously seen by man, even from the air.

from McMurdo Sound to the South Pole but some 600 miles to the west, now turned towards the coast and travelled roughly north-west towards the so-called "White Spot" — a blank space on the map — at  $78^{\circ} S.$ ,  $25^{\circ} E.$  This section of the journey was approximately 480 miles, and was accomplished in eight days. The train reached the "White Spot" on February 15. (See sketch map.)

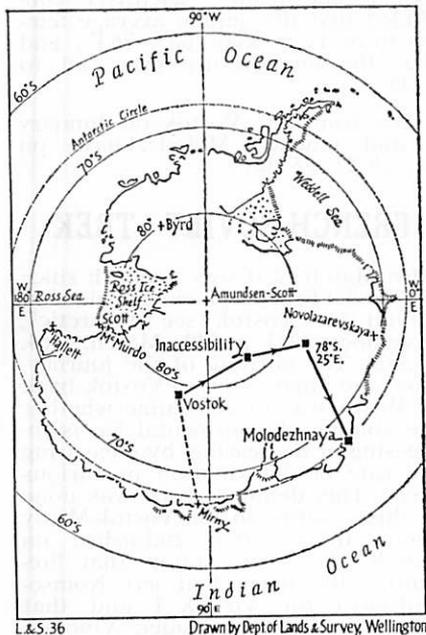
### TOUGH GOING

Weather conditions were now severe. The train was crossing small sastrugi sometimes swept by ground wind. When it was fine, the sky was a delicate blue, but more often it was a milk-white. The temperature rarely rose above  $-40^{\circ}$ . They were travelling at an altitude of three and a half kilometres (over two miles). There was one and a half times less oxygen than at sea level. The mechanics were having a hard time. Metal had become brittle and machine parts were often going wrong. The steel "fingers", for instance, connecting the tracks were causing a lot of trouble: they had to be knocked out with sledge hammers and new ones knocked on.

Already, results of great scientific value had been obtained. From Vostok to the Pole of Inaccessibility the scientists had made an exact geodetic survey of the surface of the ice-cap with the aid of "radio telemeters" (tellurometers).

### RIGHT TURN

Andrei Kapitza, the trek leader, reported by radio at the end of February from  $74^{\circ} S.$ ,  $40^{\circ} E.$ , that his train had changed direction nearly  $90^{\circ}$  a week before and was travelling approximately north-east direct to Molodezh Station. Some days had been spent at the "White Spot". When Kapitza reported, the train had travelled a further 430 miles and had been halted for the first time in days because the last drum of fuel had been used up. This was completely according to plan, however. It had been arranged that a plane



The Pole of Inaccessibility was reached early in February and five days were spent here. Fuel was taken on which had been cached by the 1958 expedition. The men were able to have baths. The journey was resumed on February 6. The train, which had been travelling for 875 miles almost parallel with the line

should fly from Mirny to Molodezh, take on drums of fuel, and fly out to drop them to the tractor-train, which by this time had travelled 1,550 miles without a planned refuel.

### HALT

A blizzard at Mirny delayed the aircraft's departure and necessitated a longer wait than had been planned. During the wait the tractor-crews made further measurements of the ice-cover and the scientists were busy "constructing graphs and cross sections and systematising and analysing results". Geodesists Buchkov and Safonov, said Kapitza, had been able to determine the altitude of the surface of the highest part of central Antarctica—up to 4,000 metres (13,120ft.) above sea level. By seismic soundings Sorokhtin had discovered new sub-glacial mountains rising to 1,200m. (3,940ft.) above sea level. Perhaps his most specular "find" was that of a 4,750ft. mountain under a 9,496ft. layer of ice. It had become clear that as a result of the team's work the map of the surface relief and sub-glacial bed of this part of the Antarctic will be greatly altered. In another field, the meteorological and actinometrical observations made by Nozdryukhin and Sakunov and radioed to Mirny by Kovtanyuk were being used by foreign stations and by the Soviet Antarctic whaling fleet. A notable discovery was the existence of an ice-shed or divide in a region where such a feature had not been expected.

### RE-FUEL

The period of waiting ended when an IL-12 piloted by Valentin Melnikov appeared above the train and descended to a height of 20m. The heavy (300 k.g.) drums of fuel were dropped and bounced off the hard snow surface. In a matter of minutes electric pumps transferred the fuel to the empty tanks of the Kharkov-chankas and the aircraft were heading back to Molodezh Station for more. They were expected back in two days.

The long journey ended at Molodezh Station on March 29, when the men there were able to hear the approaching tractor train and welcomed the traverse team with a barrage of multi-coloured rockets. Hot

steam baths had been prepared and dainties had been saved to provide a special meal.

Supper was served in the main hut, the mess-hall. All the trek-men had lost weight but were cheerful and well.

### POLE OF COLD

The tractor-team claims to have discovered the coldest spot in the Antarctic. This "Cold Pole" is situated in 81° S., 80° E. on the Sovietsky Plateau, 262 miles from the South Pole and half way between Vostok and the Pole of Inaccessibility. By measuring the temperature of the ice-cap, the team's scientists concluded that the annual average temperature here may be -76 F., and that the temperature may fall to -148°.

The train left Vostok on January 4 and reached Molodezhknyaya on March 21: 76 days.

## FRENCH-SOVIET TREK

On March 12 it was a month since the Soviet-French glaciological team set out from Vostok (see "Antarctic", December, 1963, p. 340; March, 1964, p. 392). The purpose of the journey, from the inland station Vostok back to Mirny, was to determine whether the volume of continental ice is increasing or decreasing, by measuring the rate of deformation in various areas. This detailed work was done at three points on the Vostok-Mirny route. In a report published on March 12 it was stated that "recently" the party had left Komsomolskaya for Vostok I and that Shumsky, the trek leader, Vinogradov and their French colleagues were analysing the data obtained. The train reached Vostok I after travelling 500 miles.

The doctor on the trek was also the cook. There had so far been only three calls on Dr. Gennadii Gusorov's services—as doctor. One of his patients was Prof. Bauer.

The transport department head on the trek was Eugeni Zimin. Every 10km. there was a stop for the over-

haul of the vehicles. Zimin reports that at the high altitude at which they were travelling they were troubled by shortness of breath, and the cold "literally burned the respiratory tracts".

### JOURNEY'S END

The train reached its destination, Mirny, in a stiff autumn breeze on April 3. After the long journey of 2,000 kilometres (1240 miles) the members of the glaciological team were "tired but infinitely happy" and they received a warm welcome. A group from the main Russian base went out to meet them and did so in a region of crevasses. An LI-2 aircraft also flew out to welcome the team.

Twenty-five kilometres from Mirny the welcoming rockets were sighted. As the tractors roared into the base, in the leading vehicle were Professors Shumsky and Bauer (leaders of the trek and of the French component respectively), also Andrei Kapitzka, who had led the still longer traverse from Vostok to Molodezhnaya. At Mirny they were welcomed by Dr. M. M. Somov, leader of the 1963-64 Soviet Expedition.

En route the team had made six glaciological and geodetic stations. Shumsky claimed that over the route covered there were "few riddles left". During its 48-day journey the team encountered temperatures of from 55 to 60 degrees of frost. Nearing the coast they crossed a region of deep crevasses. The highest point on the route was 3,730m (12,228ft.) above sea-level.

The primary purpose of the trek was to estimate any change in the volume of the continental ice and to assess its rate of movement.

Prof. Shumsky's team left Vostok on February 16 and arrived at Mirny on April 3: 46 days.

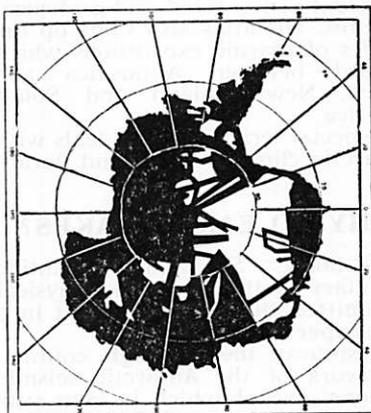
### REMOVING THE BLANKS

In an article in the publication "Antarktika, 1962", the Soviet geographers V. L. Lebedev and P. A. Movsesyan point out how rapidly the

unknown area of the Antarctic is disappearing.

Only about 140 years ago before the expedition of Bellingshausen and Lazarev, they say, the unmapped area around the South Pole was up to 8,000km. in diameter and about 37,000,000km.<sup>2</sup> in area, i.e., much larger than the African continent (30,000,000km.<sup>2</sup>).

"The unmapped area of the South Pole was gradually reduced and in 1956, for the first time, some parts of it were traversed by air routes. Its total area at the end of 1956 was about 8,000,000km.<sup>2</sup>, i.e., more than half the area of the Antarctic continent (about 14,000,000km.<sup>2</sup>).



"An extremely intensive study was made of the area of Antarctica during the I.G.Y. and the following years along land and air routes. By the end of 1961 the area of the continent not yet known to man was about 3,500,000km.<sup>2</sup>, about 6 times the size of the Ukraine."

The accompanying map of the regions of Antarctica unexplored up to that time is reproduced from the Soviet journal.

The gradual reduction of the size of the unexplored areas of the South Pole from the year 1500 can be traced from maps of Antarctic expeditions compiled by the Department of General Geography of Moscow State University for the first Soviet atlas of Antarctica (see below).

## SOVIET ANTARCTIC ATLAS

### 500 MAPS

The present state of knowledge about the regions around the South Pole is well depicted in the 500 maps of the first Atlas of Antarctica, compilation of which has been completed in Leningrad. Twenty Soviet research institutes took part in compiling this two-volume atlas of charts, photographs, drawings and other materials. The two volumes are to be published in 1965.

Nearly all the maps contain new data about the Antarctic coastline, its mountain ranges, bays, glaciers, intracontinental relief and geological features. The atlas also sums up the results of marine expeditions which cruised between Antarctica and Africa, New Zealand and South America.

A special series of maps deals with Antarctic climate, fauna and flora.

### WHY NO EARTHQUAKES?

(Nicholas Shebalin, Scientific Secretary of the Soviet Geophysical Committee, discusses the point in a newspaper article.)

In spite of the thorough, continuous work of the Antarctic seismic stations, one of which is even situated right at the South Pole, not one earthquake has been detected here yet. The coastal stations have only recorded occasional slight tremors, and these have been caused by the calving of icebergs. Indeed, under the thick ice cover of Antarctica lie high young mountains, the orogenesis of which is still incomplete, yet there have been no earthquakes. No satisfactory explanation of this strange phenomenon has yet been found.

Far into the interior of Antarctica extends a continuation of the South American Andes. The most violent earthquakes in this mountain system occur on the American continent (one need only recall the 1960 Chilean catastrophe). But the earthquake belt appears to be broken off at a point near Antarctica. The epicentres occur in rings along the

underwater ridges around Antarctica.

What causes the earthquake belt to, as it were, come to a halt near the edge of the ice cap? What prevents the formation of huge faults in the earth's depths?

Most probably the cold ice cover forms a "fur coat" around the earth. It makes it difficult for the earth's heat to escape into the surrounding space. Almost cosmic cold reigns on the surface of the Antarctic ice cap — as low as  $-90^{\circ}\text{C}$ . ( $-130^{\circ}\text{F}$ .), but where the ice meets the rocks the temperature is much higher — about zero degrees. The heat of the earth even melts the ice, forming a layer of water. The excess heat under the Antarctic ice cover causes additional heating of the earth. The rocks then become more plastic and the possibility of earthquakes occurring diminishes.

These are only assumptions. They need thorough theoretical and experimental verification. Further analysis of data from research carried out in accordance with the programme of the International Geophysical Year will bring us closer to solving one more of nature's riddles.

### COMING — BUT WHEN?

The possibility of using the Antarctic as a staging point on civil air routes is increasingly a talking point. The "Dominion's" aviation correspondent on May 29 said that aviation interests were already turning their eyes south.

"About a year ago a German tourist agency expressed interest in sending parties to Antarctica. Australian agencies and an American airline have also indicated that they would be interested in such a project.

"Interest can be expected to quicken when Tasman Empire Airways gets her new jets next year. They could easily fly from New Zealand via Antarctica to South Africa or South America.

"Though via Antarctica flights are probably still a long way off, Teal may well dream of establishing a New Zealand-South Africa service one day."

# UNITED STATES SUMMER WORK COMES TO AN END

Deep Freeze 63-64, the U.S. Navy's massive support of the United States Antarctic Research Program, came to an end on March 16, with the emigration of all the summer parties from all the U.S. bases throughout the Antarctic continent.

The last of this season's major field journeys was completed, the ships and aircraft giving logistic support were headed for home, the stations were settling down to their more restricted winter activities and the numerous scientific disciplines — biology, meteorology, seismology, Upper Atmosphere physics, cartography, geology and glaciology — were preparing for their off-season work and consolidation. Already plans are afoot for next and future years' activities.

## LOGISTICS

By March 12, all ships of the U.S. Naval Support Force, Antarctica, were north of 60° South latitude, and therefore, officially, out of the Antarctic.

For the most part, the season has been a good one for the ships, with light ice in the Ross Sea area, and only 30 miles of channel to be cut in McMurdo where last year there had to be 60 miles. U.S.C.G.C. "Eastwind", at the Antarctic Peninsula, found heavy ice, as was the case also in the Weddell Sea and elsewhere, but no calls for icebreaker assistance were received.

In the air, the flight from Cape Town to Williams Field in 14½ hrs. made Australia the only remaining large land mass in the Southern Hemisphere from which aircraft have not yet penetrated to the Antarctic. The replacement of C-124s by C-130Es considerably reduced both the loss and the labour involved in the former air dropping of supplies to inland stations.

Scientific assistance was also given by air by placing parties in the field, and by the new venture of using turbo-powered helicopters to provide

the transport for the Ellsworth Mountains survey, thus cutting the period of survey from weeks to days.

A late flight to Amundsen-Scott Pole Station on February 25 with essential spare parts and scientific instruments, combined with Rear-Admiral Reedy's earliest-ever landing in polar history on October 23 last year, made this season at the Pole station the longest austral summer it had experienced.

## STATION NOTES

The weather is always a topic of conversation anywhere in the world, and this season's Antarctic weather has given residents of the U.S. bases there material for their conversation. At Byrd Station March was quite unseasonably warm, with a record-breaking average of minus 13.5° F., covering a range of temperature up to the almost maximum summer heat of plus 16° F. December and January, conversely, each brought the second lowest maximum temperatures ever recorded in those months. High temperatures were also the order of the day at Amundsen-Scott when the highest temperature ever recorded for March was enjoyed on the fourth of the month, with the thermometer registering minus 18.5° F., 16.5° warmer than the previous maximum March warmth.

At Eights, too, the weather was conversation-worthy. Low and middle-type clouds were much higher on the average; persistent storms with strong wind gusts, snow, blowing snow and ice fog brought higher than usual snow accumulation, with colder temperatures than those averaged in other March months. This

year's mean temperature was minus 12.3° F. (minus 2.1° F. last year) and minimum temperature minus 47° F. (minus 28° F.). Yet in the first two days of March the temperature soared to plus 28° F., while at the end of the month another unseasonable heat wave, accompanied by 40-knot winds, saw the temperature go from minus 35° to plus 9° overnight, only to plummet to minus 13° within an hour. During the mid-month cold

spell, a fire broke out under the roof of one of the trailer vans, but it took only 30 minutes to put it out.

McMurdo's nuclear power plant underwent its first run on maximum power late in March, with highly successful results. Despite this test, and its ability to continue to generate power at a high rate, it has not yet been used to supply the full load of power required by the station.

## UNITED STATES ANTARCTIC RESEARCH PROGRAM

### FIELD JOURNEY

The last major traverse operation, that of the University of Wisconsin and Coast and Geodetic Survey, returned to Byrd Station on February 20 after having completed 1,450 nautical miles in 92 days. Forty-five seismic reflection points and one reversed reflection profile, 520 gravity and 2,060 magnetic points were made, twenty-five temperature measurements in 10 holes, all providing information on the area around and below that between Byrd Station and the Filchner Ice Shelf. The party also established two small stake networks for strain measurements, collected some 80 m. of ice cores for micrometrical and glaciological studies, water samples from the 10 holes for chemical and stable-isotope analyses, electrical resistivity measurements at nine stations and rock samples from two nunataks.

Results of all these samples and soundings included the finding of a gently sloping ridge connecting the Thiel and Sentinel Mountains, of six almost entirely buried mountains near the Pensacolas and a completely buried extension of the Ellesworth Range, of the southern boundary of the Filchner Ice Shelf and of a rapidly flowing current of ice within the slowly-moving ice cap moving from the polar plateau through the intervening mountains.

### "ELTANIN"

The ocean research vessel "Eltanin", reported in last "Antarctic" as having completed her longest yet cruise last September, has since then concluded three more expeditions. Cruise No. 10, "Eltanin's" seventh in Antarctic waters, took her from Valparaiso for 61 days over 7,000 miles. Thirty-three oceanographic stations were taken on 55° South latitude, plankton samplings between stations in the pack ice, two hydrographic casts and more plankton samplings at the north and south boundaries of the Antarctic Convergence. The investigation of a submarine slide area off the coast of Chile was also included in her operations.

Eleven days after "Eltanin's" return from Cruise 10 she left Valparaiso again on Cruise 11, with investigators from Columbia University and the Lamond Geological Observatory (Microbiology), Columbia University and the Lamont Geological Observatory (Plankton Sampling), Smithsonian Institution (Pelagic Phosphorus Metabolism), and the University of Southern California (Marine Biology). Two Chilean students also participated in this cruise, from the Universities of Valparaiso and Chile.

On March 2, "Eltanin" started off on her twelfth cruise, in the Scotia Sea. She is expected to visit Wellington in mid-July.

Routine scientific reports have continued to flow from the U.S. bases and vessels in and around Antarctica, adding to man's knowledge of not only this continent but the world at large and of the disciplines concerned.

### BIOLOGY

Biology, which is studied both in general and in certain specific directions by University teams at the bases and aboard "Éltanin", has had the additional findings of a combined John Hopkins University and Bernice P. Bishop Museum team working as guests of the British Antarctic Survey at Bird Island, off the newly named Antarctic Peninsula, formerly known by Americans as Palmer Peninsula. Landed on Bird Island from R.R.S. "Shackleton", the party, comprising an entomologist and ornithologists, completed nearly fifteen months of investigations, before returning to England, en route to their home bases. Banding of giant petrels and Mollymauk nestlings, pathological collecting, meteorological observations and a plane table survey of Wanderer Valley were among the activities.

One by-product of the main ornithological programme carried out was the collection of frozen material for the study of D.D.T. content in fat deposits of penguins and seals. It has been stated that D.D.T. has "invaded the water environment of the world" and as this chemical tends to accumulate in fatty tissue and has been found in surprisingly large amounts in the fats and oils of deep sea fish, these deposits should provide further information in the global research which is being conducted. Plans are made to analyze water from the glacial ice of both the Arctic and Antarctic to try to discover whether the D.D.T. has been carried by air currents or whether it has entered the water cycle through the movement of plant or animal life.

### GEOLOGY

Geologists and glaciologists, studying the secrets beneath the surface of rock and ice, covered many thousands of miles on foot, on vehicles and by air, studying what Antarctica is made of, its history and what it

could tell them about similar conditions elsewhere in the world.

Geologists of a U.S. Geological Survey party, exploring remote areas of the Pensacola Mountains, discovered rocks several miles thick, 400 to 600 million years old, which they hope will give the information needed to fill in the gap which covers present knowledge of that era of Antarctic history. Foldings in the layers of sedimentary rock now discovered show that these mountains have been twice formed, with periods of being under shallow water and exposed to fresh air. Sub-ice geology studies have shown that the trough thought to split the continent in half does not extend the full distance from the Ross to the Weddell Seas, but only about half-way, while a University of Wisconsin aeromagnetic survey of 27,500 miles of Antarctica's icecap has revealed data which, after three months' translation and interpretation, may reveal a mountain ridge buried under the ice lying parallel with the Prince Albert Mountains of Victoria Land, and other previously unknown facts.

### THE UPPER ATMOSPHERE

Knowledge of Upper Atmosphere physics has been increased already with the initial stages of a programme started this past season; a programme which provides an extensive probe of solar cosmic ray activity in the ionosphere. This survey demands a widespread, high-frequency radio communication network, the forward scatter network having been set up this season, representing another international effort. Signals from Byrd Station will be transmitted to Amundsen-Scott and McMurdo; from McMurdo signals will go to Vostok and further plans call for the addition of Australian, British and French stations to the network.

### SCIENCE IN MAPS

Antarctic research is not confined to the Antarctic continent. Back in Washington, the National Science Foundation has initiated several projects to encourage and promote the dissemination of Antarctic scientific knowledge. Supported by the N.S.F., the American Geographical Society has undertaken the task of publish-

ing a series of map folios covering aspects of antarctic research which lend themselves to map presentation. This will include geophysical, geological and seismological maps and explanatory texts in the first folio; glaciological studies in the second; aerial photography in the third, and aeronomical parameters, including maps of electron density in the ionosphere and other Upper Atmosphere physics findings. In the planning stage are further folios covering exploration history, island glaciers, climate, geology, oceanography, magnetism, gravimetrics and marine and terrestrial biology.

### PUBLICATIONS

The American Geophysical Union will publish in May the first of a series of books reporting the results of U.S. research in Antarctica, research papers too extensive, or otherwise unsuitable, for inclusion in standard scientific journals. Vol. I will cover marine biology, Vol. II Antarctic glaciology, while material is already available for inclusion in a further five volumes on geology, meteorology, aeronomy, pedology and botany.

As well as the Antarctic Map Folio Series and the Antarctic Research Series, N.S.F. are also sponsoring another three projects to disseminate research results from the Antarctic. "Records of U.S. Antarctic Specimen Collections" aims at establishing a central record of the physical location of multitudes of specimen collections scattered all over America. Information to be recorded will include the identity of specimens, where collected and where deposited. Also N.S.F.-sponsored is the Smithsonian Oceanographic Sorting Centre project of sorting U.S.A.R.P. specimen collections before they are distributed to specialists, deposited with the Institution or forwarded to S.O.S.C. (see above). Finally an "Antarctic Bibliography" to meet domestic needs for a comprehensive and annotated source of Antarctic information is being compiled at the Library of Congress. Efforts are at present concentrated on current literature, but a search for older material is contemplated.

### FUTURE PLANS

Two major projects for next season's Deep Freeze have already been outlined ("Antarctic", March 1964) and a later report from Washington adds a further, civilian, project. A team of top U.S. mountaineers and scientists has proposed an expedition to try to conquer the highest and as yet unclimbed peak on the Antarctic continent — Mt. Vinson, a massif on approximately 78° 40' S., 85° W., only 800 miles from the South Pole, rising above the ice cap to nearly 17,000 feet. Scientific exploration of the rocky Sentinel Range, including several other peaks which appear from photographs to consist of pure white marble, is planned in conjunction with the alpine attempt, which, it is hoped, will be made in December and January next.

Rear-Admiral Reedy, states a report from Sydney, gave an outline of one of the most ambitious expeditions ever planned by the U.S. in Antarctica — the crossing of the continent by a scientist-explorer team during the next three summer seasons. The team will travel over some 3,000 miles of mostly unexplored areas, criss-crossing the area from McMurdo, over the Pole and on to the Belgian base at Roi Baudouin on the opposite side of the continent. This expedition is, presumably, part of the four-year traverse into Queen Maud Land already announced.

### BRIEF MENTION

The depths to which a Weddell seal will, or anyway can, go have been recorded by a University of Arizona zoologist studying in McMurdo Sound. Gauges accurate to within 2 per cent were attached to seals, and two of them have recorded dives of 1,480 feet where pressure would be about 700 lbs. per square inch, some 46 times that of the atmosphere. How low can you go?

A cheque to the value of more than £850 has been presented to the Chief of Navy Staff in Canberra, representing the amount given by officers and men of the U.S. Navy serving in the Antarctic to the "Voyager" relief fund.

## U.S. BASES

### THE POSITION TODAY

In the years that have elapsed since the International Geophysical Year, the United States has built many scientific and support stations in Antarctica to help her scientists fulfil their part in the international scientific co-operation that is now a feature of that continent.

There are five permanent U.S. Bases in the Antarctic—McMurdo, Byrd, Eights, Amundsen-Scott and the joint N.Z.-U.S. Hallett, covering an area from 72° 19' S. and 170° 13' E. to 90° 00' S. and 119° 32' W. and varying in elevation from 16 feet to 9,184 feet.

McMURDO, the base camp, contains 70 buildings and houses a winter population of some 200 naval personnel and 10 scientists operating weather services and a biology laboratory. In summer, McMurdo can house up to 726 people. Its functions are numerous; as well as supplying the U.S. Naval Weather Service and biological research facilities, it is the communications and logistics centre for U.S. ships and aircraft from outside the continent. The airfield for McMurdo is Williams Field. Specialized laboratories for cosmic ray physics, geology and glaciology house other research teams. Its position is on Ross Island, 102 feet of elevation, built, in 1956, on a base of volcanic ash. A nuclear power plant and a water distillation plant are among the facilities the base supplies.

Next to be built was HALLETT, a much smaller, purely scientific base, situated on an Adélie penguin rookery on the west coast of the Ross Sea, about 380 miles north of McMurdo Sound. With a winter personnel of scientists from the U.S. and N.Z., plus 9 Navy personnel, Hallett provides equipment and laboratories for biological research, both marine and terrestrial, upper atmosphere physics, meteorology, geomagnetism and seismology. Hallett is dependent on the sea for most of its resupply as the bay ice adjoining the glacial moraine on which its

11 buildings are built is firm enough for aircraft for only 4-6 weeks at the beginning of each summer season.

The AMUNDSEN-SCOTT POLE station, also established in 1957, consists of 11 buildings on the inland ice 9,000 ft. above sea level at the South Geographic Pole on the high polar plateau of Eastern Antarctica. Difficult of access and with a mean annual temperature of -56°, this station has not been very suitable for outdoor research but it is hoped that with improved logistic capabilities a number of sciences will soon be worked on here. As it is, some nine scientists and 13 navy men winter over here annually.

The NEW BYRD Station, 880 miles from McMurdo, was built in 1961-2 to replace the 1957-established Old Byrd, by then under the surrounding ice. To avoid a second disaster of this nature, New Byrd was built below the ice, with laboratories especially designed to be free of the Station's own electrical and radio interferences, and with facilities for seismological, meteorological, ionospheric, auroral and radio-noise research. At present, 12 scientists and 21 navy men winter over at New Byrd, about half way between McMurdo and Eights Stations.

EIGHTS, situated near the base of the former Palmer Peninsula separating the Weddell and Bellingshausen seas, is the most recently established U.S. Station in Antarctica, as well as the smallest of the year-round ones. Built on the site of the temporary Ski-Hi station which operated during the 1961-2 summer, Eights is a year-round scientific base and is a conjugate point to a similar station near Quebec City in Canada. Its building was a major undertaking (see "Antarctic", March, 1963), it supports six naval support personnel and five scientists, and the emphasis of its work is on upper atmosphere physics.

In addition to these five permanent stations, the U.S. also has three weather stations—Beardmore, further inland towards the pole from McMurdo, Little Rockford to the

# BRITISH ANTARCTIC SURVEY WORK MARRED BY ACCIDENTS

The summer was an unfortunate one for the British Antarctic Survey, aircraft damage, difficult ice and weather conditions, and a fatal accident on H.M.S. "Protector" combining to delay the programme and lower the usually high level of trouble-free operations.

An early setback occurred in September, 1963, when both the De Havilland Otter aircraft were damaged in a severe gale at Deception Island, before they could fly south to start field work from Adelaide Island. Spare tail units could not be delivered until early December, and the planes did not fly forward until January 6.

From January 6 until March 10 the planes relieved Fossil Bluff and laid depots for 1964, but flying hours were curtailed because of bad weather and unexpected unserviceability. After four or five years of arduous Antarctic service, it became apparent that major overhauls were required earlier than anticipated. By and large, therefore, the various field projects in progress and planned for 1964 received less support than was desirable.

## FIELD WORK

### (i) George VI Sound

Lacking air support, the surveyors were unable to start the triangulation of the northern part of the Sound. Instead, together with their assistants, they sledged to the area

west and the automatic Little America V; a summer research station operated by three men, Delta Sub One; and the Shipboard Research Station, the USNS "Eltanin". Yet another permanent station, for biological research, is planned for establishment on the Antarctic Peninsula.

and carried out reconnaissance work in preparation for the projected new work in the area bordering the plateau north of the Batterbee Mountains. They selected two survey stations to link the work with the Sound and discovered good routes readily accessible from Fossil Bluff. At the same time a geologist continued the detailed studies of the East Coast of Alexander Island.

### (ii) East Coast Central Graham Land

A team of geologists and a geophysicist started work in the Churchill Peninsula area by sledging over the plateau from Stonington Island, and using depots previously laid by air and motor toboggan. Starting at Cape Disappointment and working southwards they reached the Churchill Peninsula again in December. For one month thereafter they were plagued by deep soft snow and poor visibility, and finally in the absence of air support, they were forced to sledge back to base.

### (iii) Graham Land Plateau Margin in the area north of the Batterbee mountains

It had been the intention to start work in this region of many isolated mountain groups and nunataks in the period January to March, using aircraft support. This had to be abandoned because the "John Biscoe", with new surveyors on board, was held up by ice, and because of the difficulties experienced with the aeroplanes. A reconnaissance had, however, been made as described above, and substantial depots were laid by air in two places ready for the team which will enter the area in September, 1964.

#### (iv) Tottan Mountains

Supported by Muskeg tractors a party of four men from Halley Bay, including one geologist and one surveyor, worked in the area from November, 1963, to April, 1964.

#### BASES

All the bases were relieved and re-supplied by ship during the 1963-64 season. Hope Bay was closed after twelve years' continuous occupation, in February.

### BRITISH ICEBREAKER

The Navy Department on April 9 called for tenders to design and build a replacement for H.M.S. "Protector", the Navy's only ice patrol ship, now 28 years old.

"Protector" is a converted net-layer with a hull strengthened to withstand floating ice. But to reach the southern B.A.S. bases, either directly or by helicopter, "Protector's" successor must be able to push her way into and out of the solid Antarctic ice. She will be the Royal Navy's first icebreaker.

The new ship will be of approximately 7,000 tons displacement, 260 ft. long, 64 ft. beam and 30 ft. draught. Her hull will be all-welded and designed for breaking thick ice. A stabilisation system will be fitted to reduce rolling. Heeling tanks will enable the ship to be "rocked" to free herself should she become wedged in heavy ice.

In common with all modern icebreakers, the ship will be powered by a diesel electric propulsion system driving two propellers. Her powerful machinery can be controlled directly from the bridge and the ship can be conned from several positions.

This ship will be fitted with extensive laboratories and deck equipment to be used in oceanographic work in Antarctica and elsewhere. Survey boats and other equipment will be used to conduct hydrographic surveys of the Antarctic coast.

Two Wasp helicopters will be carried to assist in survey work, to convey scientists and their equipment to advanced bases and to reconnoitre for suitable passages through ice.

#### WITH THE SHIPS

##### R.R.S. "Shackleton"

The "Shackleton" relieved and re-supplied Signy Island. She also carried out extensive geophysical surveys in the region of the Scotia Arc. Her dual seismic programme with H.M.S. "Protector" was unfortunately curtailed by a premature explosion on board "Protector", which resulted in the death of two sailors.

##### R.R.S. "John Biscoe"

The "John Biscoe" experienced exceptional difficulty in relieving the bases at Adelaide Island and Stonington Island. Pack ice clung to the coast of Adelaide Island throughout the season barring the approaches to Marguerite Bay, and it was not until February 29 that it opened sufficiently to allow the "John Biscoe" to get through. In the meantime operations had started in an effort to relieve the bases under emergency conditions. To this end a landing was made on the hitherto unattainable west coast of Adelaide Island, and a route forced through a two mile zone of complex crevasses. At the head of this route a supply dump of essential materials was built up ready for collection by air. Some 10,000 lbs. of stores were delivered and almost half the men exchanged in this way before the ice finally made way for the ship. It was at this time that some rare good weather prevailed so permitting the first summer flight to the Larsen Ice Shelf. This meant that a large quantity of geological equipment and some geophysical instruments were recovered when hope had virtually been abandoned. After leaving Marguerite Bay the "John Biscoe" embarked the Royal Naval Hydrographic Survey Party, and assisted them in the Bismark Strait area until April.

##### M.V. "Kista Dan"

The "Kista Dan" relieved and re-supplied Halley Bay without any real difficulty from ice.

Travelling on "Kista Dan" was Sir Vivian Fuchs, Director of the Survey, and a Russian scientist, Dr. G. E. Grikurov, of the Scientific Research Institute of Arctic Geology at Lenin-

## In the Steps of Shackleton

The British Admiralty announced on March 16 that a 10-man expedition would be sent to the Antarctic to retrace the steps of Sir Ernest Shackleton in South Georgia.

After his ship "Endurance" was crushed by pack ice in 1916 in the Weddell Sea, Shackleton sailed with a crew of five in a small boat from Elephant Island, in the South Shetlands, to South Georgia to organise help.

With two other men he then set out to walk to a whaling station on the other side of the island. The journey was one of extreme hardship and a "miracle of mountaineering".

The new expedition will be led by Lieut.-Cdr. M. K. Burley, R.N. His team, chosen from hundreds of service volunteers, comprises officers and men from the Army (4), Navy (2) and Air Force (3), and includes surveyors, scientists, a medical officer and photographers.

The enterprise is regarded as the most ambitious combined services expedition since World War II.

The men will spend five months in South Georgia.

As well as attempting the crossing of the island by the route of Shackleton, Worsley and Crean, the team will include in its ambitious project attempts on two unclaimed peaks and the exploration of an uncrossed mountain range.

The party will fly to Uruguay in October and be landed on South Georgia by naval ice patrol ship H.M.S. "Protector".

The actual landing at Shackleton's "Peggoty Camp" will be by helicopter from the "Protector", towards the end of November. It is anticipated that the crossing will take from five to ten days.

It will be recalled that in October, 1955, Duncan Carse, who led a series of South Georgia Surveys, crossed

grad. He will work with the survey in the Marguerite Bay area, while a British scientist works at one of the Russian bases.

the island in the opposite direction to that taken by Shackleton's team, but it is believed that Carse's party crossed by the Karl Larsen plateau, which is some distance from the route taken by Shackleton.

### PLASTIC LAB.

Despite a late start, the new laboratory at Signy Island had been erected, and the interior fitting was progressing well by the end of the season. The new method of construction using moulded fire resistant plastic and fibre glass panels was a success. The two-storey building, to accommodate 22 men, is the first of its size and kind in the Antarctic. The work in marine zoology at this base was somewhat curtailed because of building commitments, but the remainder of the biological programme proceeded according to plan.

### AT LONG LAST

The British Admiralty said on March 18 that a naval survey party had landed on tiny, uninhabited Cook Island in the South Sandwich group, which lies in the Antarctic ice flow east of Cape Horn.

This was the first recorded visit since the island was discovered by Cook in 1775.

The survey party, from H.M.S. "Protector", which is co-operating with the British Antarctic survey investigation of the South Sandwich group, went ashore by helicopter.

For three days a party also camped on the nearby "active volcano" island of Bellingshausen to take scientific and survey details.

Antarctic conditions are nearer to those on the moon than anywhere else in this world. This is the belief of an expert of moon exploration plans who went to the Antarctic specially to study conditions there. Geological exploration of the moon, restricted living conditions and conditions of scientific research generally will, he considers, be similar to those being experienced by men in the Antarctic.

## South African Base Reports

The following news items covering March and April have been received from the South African base SANAE, on the Queen Maud Land Coast of the Antarctic Continent in approximately 70° 30' S., 2° 30' W.

One of the Muskegs was destroyed by fire during March. This is a heavy blow for geologist André du Plessis, who had his field programme worked out in detail, as he had been here for more than a year. However, he is still confident of undertaking a trip to the mountains in the summer as the training of the huskies is going well. Meanwhile he is concentrating on glaciological work and intends making a comprehensive survey of the Trolltunga glacier, 45 km to the west of S.A.N.A.E.

The seismographic apparatus, installed by the American seismic team, has been functioning satisfactorily on the short period seismometers and it is hoped that, during the winter, good results will also be obtained from the long period seismometers. In the last week of March the seismograph registered its first big earthquake, viz. that which occurred in Alaska.

A triangular traverse to the ice rise east of S.A.N.A.E. was completed. As the winter draws closer the men are busy with final preparations. Sufficient fuel for the winter has been pumped into the drums in the snow-passage, the sledges have been put on drums, and the aerial systems have been closely checked so as to prevent the necessity of repairs in very low temperatures during winter.

Sun and star fixes have been taken, in order to obtain the exact position of the station.

Some faint auroras have already been observed.

André du Plessis is experimenting with an indoors vegetable garden kept at a reasonable hot house temperature by fluorescent lamps. The first produce has been fresh green parsley, and it is hoped that other vegetables will follow later.

The S.A.N.A.E. team is largely a meteorological one. Of the total of 13 men, four are meteorologists, the remainder comprising a geologist, a geophysicist, an ionosphere observer, a doctor, three mechanics, and a radio operator, as well as the leader.

The South African Antarctic Association published in January the first number of its own journal "Antarktiese Bulletin". A bilingual publication (the first number is predominantly in English), it is intended to issue the journal once every two months. The full cost of production is borne by B.P. Southern Africa (Pty.) Ltd., with no more acknowledgement for the company than the display of its trade-mark on the front page. The editor is J. J. Taljaard.

South African weather men in the Antarctic reported late in April that they had picked and eaten their first lettuces, parsley and radishes, which were cultivated with the help of heat from a fluorescent lamp.

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### "TIROS"

Tiros, the weather satellite, is playing its part in Antarctic logistics as well as meteorological information. Although there are considerable limitations on the reception of information from Tiros, it has already proved a great help in supplying immediate weather forecasts for the area to be flown by aircraft operation between New Zealand and Antarctica. It has also revealed a low pressure system between Christchurch and McMurdo that no land or ship station had ever reported. A readout station for receiving pictures is being installed at McMurdo to be ready for planned satellites that will be placed more nearly in polar orbit.

# Summer Work At Argentine Antarctic Bases

Relief of Argentina's five bases in the Antarctic Peninsula area and seasonal scientific work was carried out by the Argentine Antarctic Institute, the Naval Antarctic Group, the Navy Hydrographic Service and the Army.

## ARGENTINE ANTARCTIC INSTITUTE

An inspection team comprising Capitan de Fragata Federico W. Muller, assisted by Aroldo Mansilla, inspected General Belgrano Base and the Naval Post Almirante Brown. The inspection of General Belgrano Base, which took place between January 2 and January 5, had for its purpose to test the functioning of the all-sky camera and the ionosonde transferred from Ellsworth Station in the summer of 1962-63; and to inspect the work carried out by the Institute personnel transferred from Ellsworth during 1963.

At the Navy's Almirante Brown station the scientific installations were examined. This task was completed on February 16.

A team led by Dr. Hector A. Orlando (palaentologist), with Carlos A. Migliore (geology assistant) and Anibal J. Spairani (assistant), left on the ice-breaker "General San Martin" on October 21 and returned on the transport "Bahia Aguirre" on February 22. They worked on Rosamel, Decepcion and 25th of May Islands.

The "General San Martin" was blocked by ice off Rosamel Island and could not reach the first objective, Robertson Island. However, geological observations and petrographic collections were made at Rosamel Island and also at Decepcion Island.

In Lasserre Bay on 25th of May Island reliefs were effected at Martel Cove, Mackellar Creek, Steinhouse Point and Herequin Point. A collection of characteristic rocks was gathered from this area and observa-

tions were made; samples of soil and seaweeds were taken, and biological specimens collected, especially of the flora of Martel Cove and Hannequin Point.

## FILCHNER ICE SHELF STUDIES

A team comprising Cesar A. Lisignoli (glaciologist) and Manuel A. Fernandez (topographer), left on board the "General San Martin" on December 9, carried out work on the Filchner Ice Shelf, and returned on March 3. In the Moltke and Bertrab Nunataks area, astro-fixes were determined of Bertrab Nunatak and measurements taken to determine the rate of movement of the ice-shelf. At Salta refuge-hut in front of the Moltke group of nunataks co-ordinates were again checked and the distance from the refuge to the nunatak was remeasured. The co-ordinates of General Belgrano and Ellsworth bases were re-calculated, and the old Chica Bay base was flown over and the formation of a new crevasse to the south was noted.

In the zone defined to the north by the line Ellsworth-Moltke and to the south by the Great Crevasse (Gran Grieta) it was possible to confirm from the air that there have been changes in the width and length of the crevasse. The formation of new crevasses was also noted.

Jorge S. Dulman (assistant biologist), who left on January 3 on the transport "Bahia Aguirre" and returned on the same ship on February 22, took samples of blood from penguins for micro-biological analysis.

Pedro Waibal was responsible for maintaining and operating the neutron monitor installed on the "Gen-

eral San Martin" to carry out nuclear testing during the voyage.

Alberto E. Pedroni and Jose Basbous from the Argentine Antarctic Institute landed at General Belgrano base where they will spend the 1964 winter and carry out a programme in aurora and ionospheric physics.

### NAVY ANTARCTIC GROUP

The Antarctic Naval group under Capitan de Fragata Jorge E. Zimmermann operated the ice-breaker "General San Martin" and the transport "Bahia Aguirre" (Capitan de Fragata Victor H. Pereyra Murray).

The ships' itineraries were as follows:

#### General San Martin

Left Buenos Aires on October 21, bound for Esperanza to carry out the relief of the base personnel. On October 31 the vessel penetrated to Teniente Matienzo Base but was unable to complete the relief here because of adverse ice conditions. The ice-breaker was ice-bound in Erebus and Terror Gulf for 17 days. As conditions showed no signs of improving, an aerial reconnaissance was carried out on November 8, using a 2-H-13 helicopter, which crashed into the sea. The relief of the base personnel was effected on November 11 by two Beaver aircraft of the Argentine Air Force, which flew from Matienzo Base and landed on a floe 2,000 metres long and 800 metres wide, near the ship.

Returning to Esperanza on November 17, the ship left the same day for Decepcion to re-supply the naval detachment there. When this task was completed "General San Martin" left for Ushuaia to disembark the returning men, then went on to Buenos Aires, arriving there on November 27.

"General San Martin" left again on December 9 for the South Orcades Islands to discharge the cargo which could not be unloaded on the earlier voyage owing to ice conditions and adverse weather. Reaching General Belgrano Base on December 17 the ship relieved the personnel and re-provisioned the base. Returning to Orcadas on January 5, the operation was this time successfully com-

pleted. On the 17th the ship was again in Ushaia where she embarked cargo for Matienzo Base. On the way she called in at Lasserre Bay to assist the Argentine Antarctic Institute men working there; then made for Esperanza on the 24th and Robertson Island, where the Matienzo Base was relieved and re-provisioned.

"General San Martin" now sailed to Decepcion to transfer cargo and personnel to the "Bahia Aguirre"; then on February 12 continued to the Melchior Islands to inspect the installations there, carrying out oceanographic work and laying buoys in the Gerlache and Bismarck Straits en route. The Almirante Brown detachment was inspected before the vessel returned to Buenos Aires on March 3.

#### "Bahia Aguirre"

The transport "Bahia Aguirre" left Buenos Aires on January 3 for Orcadas, arriving there on the 11th to carry out the relief of personnel and to re-stock the base. A small team was left to carry out repairs at the base. Decepcion was reached on January 14, and here too after relief and re-provisioning a working group remained. The relief of Esperanza was completed on the 22nd. Men from the Argentine Antarctic Institute were left at Lasserre Bay and the ship then made for Ushuaia, arriving there on January 25 and disembarking the returning men.

"Bahia Aguirre" left on February 2, calling at Orcadas and Lasserre Bay, to re-embark the parties left there on the earlier voyage. On February 10 she was at Luna (Moon) Bay to inspect the installations of the Teniente Camara Naval Detachment, and at Decepcion to pick up the repair group left there previously. After a reconnaissance voyage through Gerlache Strait the ship returned to Ushuaia.

A group of notabilities now came on board for a voyage of inspection which began on February 20. The party visited the Esperanza and Decepcion bases, Paraiso and Leith, arriving back at Ushuaia on February 28 and Buenos Aires on March 5.

## FIELD JOURNEYS

During the last three months of 1963 several field trips were carried out from Argentine Antarctic bases.

Between September 17 and October 1 a team led by Major Hector R. Toledo set out from the Teniente Matienzo Base and covered 840 km. (520 miles), installing refuge huts at Santa Teresita (66° 22' S., 62° 55' W.), Virgen de Loreto (65° 33' S., 61° 30' W.) and Mayor Arcondo (66° 09' S., 61° 44' W.). The party was supported by Beaver aircraft flights. En route the men carried out meteorological observations and collected geological specimens.

From General Belgrano Base a team under Teniente Tramontana travelled 600 km. (372 miles) between October 15 and November 5. This was a reconnaissance journey aimed principally at pegging out the section of the route as far as Gran Cristo and the erection of a refuge-hut "Santa Barbara" at 80° 17' S., 36° 30' W.

### IN CHARGE

Leaders of the Argentine bases for 1964 are:

**Decepcion** (Deception Island) (14 men): Teniente de Fragata Juan C. Canepa.

**Orcadas** (South Orkneys) (13 men): Teniente de Corbeta Antonio Mollini.

**General Belgrano** (23 men): Teniente Primero José Tramontana.

**Esperanza** (Hope Bay) (22 men): Major Raul H. Toledo.

**Teniente Matienzo** (13 men): Capitan Héctor R. Guidobono.

### ONCE AGAIN?

Readers will recall that on two previous occasions, in 1957 and in 1963, plans were announced for a German Antarctic Expedition which did not eventuate. The German philatelic news-sheet, "Dill Reports the News" (issue of May 8), now quotes an A.P. report that "this year again the Deutsches Institut fuer Auslandsforschung will prepare a German Antarctic Expedition". Others will share the editor's feeling that "this year again they will not succeed if they will not get great sums from the Government".

## JAPAN IS PREPARING FOR 1965-66

Plans for the construction of a new Japanese Antarctic observation ship were announced by the Education Ministry recently. Japan is scheduled to resume Antarctic observations in the fall of 1965.

The ship will be designed by the Defence Agency's Technological Research Headquarters. According to the plans, the new icebreaker will be far more powerful than the present "Soya" which had been used in past Japanese Antarctic observations. It will be in the same category as the icebreaker "Glacier" now in use by the United States.

The new icebreaker's basic displacement will be 5,000 tons, rising to 8,500 tons when loaded to capacity. The ship will be about 1000 metres long, 22 m. wide and equipped with a 12,000 horsepower electric propulsion engine providing a speed of 17 knots. It will be capable of loading 400 tons of freight and three large helicopters.

It will have an instantaneous ice-breaking power of about six metres, and be capable of moving through a 2.8-m. icefield at a speed of 2.1 knots.

### HELICOPTER PORT

The ship will be equipped with various oceanological observation instruments and its deck will be constructed to enable large-sized helicopters to take off and land easily. Elevators will also be installed in the ship in order to facilitate the transportation of freight. Manning the ship will be 200 crewmen in addition to the 35-member observation team.

Construction of the new icebreaker will be initiated this summer, with its completion scheduled for August, 1965, at a cost of approximately Y3,100 million. After a three-month period of testing, the ship is expected to leave for the Antarctic in November next year.

The final design of the new vessel will be decided by the end of May this year, and the keel will be laid in July. At the Navy Technical Institute

extensive tests with a model (1:20) in 250 m. pool have been carried out.

### MEN PREPARE TOO

A monthly meeting on Antarctic problems is being held at the Polar Division of the National Museum under the chairmanship of the Division Chief, Mr. M. Murayama. There is considerable enthusiasm concerning the re-opening of Showa Base.

### MAPPING

The National Geographic Survey Institute of Japan has completed a map of the coast-line near Showa Base, occupied by J.A.R.E., the Japanese Antarctic Research Expedition, from January, 1957, till February, 1962, except for the greater part of the year 1958. The map covers a total of 125 miles of coast-line. The task of charting this area was entrusted to Japan by S.C.A.R. The 98 islands, capes, glaciers and other geological features discovered by Japanese field parties have been given Japanese names.

## S.C.A.R. HAS A NEW PRESIDENT

Succeeding General G. R. Lacroix as President of the Scientific Committee on Antarctic Research (S.C.A.R.) is Dr Laurence M. Gould, Chairman of the Polar Research Committee of the U.S. National Academy of Sciences.

"Larry" Gould was second in command and scientific leader of Admiral Byrd's first Antarctic expedition, 1928-30, during which he led a notable geological dog-sledge journey from Little America, south to the Queen Maud Range, a journey covering 1525 miles. He was chairman of the committee which planned the Antarctic portion of the U.S. scientific programme for the I.G.Y. and was in the Antarctic himself during the 1956-57 summer.

Until his retirement in 1962 Dr Gould was for many years President of Carleton College, Minnesota. He is President of the American Association for the Advancement of Science.

## "MAR CHILE III"

The Chilean Navy vessel "Yelcho" has completed the oceanographic cruise which was named Mar Chile III, the third such operation in the "Chilean Sea". The cruise was carried out in the Drake Strait area between South America and the Antarctic Peninsula and was the culmination of a series of oceanographic and geological investigations. During the operation the vessel crossed the Antarctic Circle in the course of its scientific programme which began in October last year. Technicians and scientists from five organisations took part in the operation: the departments of Navigation and Hydrography of the Navy, of the Concepcion, Catholic of Valparaisa, and de Norte Universities and of the Geological Observatory of Lamont. Members of the Naval Reserve gave assistance also.

The main objectives of the cruise were to add to the soundings in the area agreed upon at the Eighth International Conference of Hydrography, Monaco, 1962, and the continuation of the oceanography and geological investigations carried out in 1959, 1961 and 1962 in Drake Strait, as part of the co-operative programme between the Navy and the Geological Observatory of Lamont, University of Columbia.

### BELATED NEWS

In December, 1960, "Antarctic" recorded Duncan Carse's plan to live alone for 18 months on South Georgia, and in June, 1961, mentioned that he had been put ashore from H.M.S. "Owen". We had no further news of him.

We now learn that he was established ashore at Undine Harbour, and his hut was built; but he was picked up again a few months later by a sealer, taken back to Grytviken and subsequently to the United Kingdom. He reported that a tidal wave had swept inland, spoiling much of his gear and making his withdrawal necessary.

# The Belgian-Dutch Expedition

Fourteen men, ten Belgians and four Dutchmen, are carrying out an extensive scientific programme at Base Roi Baudouin during the first winter of the combined expedition in the new quarters.

During March and April weather conditions were exceptionally severe. In March there were 29 days of drift, of which 11 were blizzard days; and in April again 29 days of drift, 14 of them with blizzard conditions. As a result of these frequent blizzards the new base has been snowed up much more quickly than the old one was up till 1958. Practically no stores were stacked outside the buildings.

March temperatures were: maximum  $-3^{\circ}\text{C}$ . ( $26.6^{\circ}\text{F}$ ), mean  $-13.1^{\circ}\text{C}$ . ( $8.4^{\circ}\text{F}$ ), minimum  $-25.5^{\circ}\text{C}$ . ( $-13.9^{\circ}\text{F}$ ). Corresponding April figures were  $-7.2^{\circ}\text{C}$ . ( $19.1^{\circ}\text{F}$ ),  $-17.1^{\circ}\text{C}$ . ( $1.2^{\circ}\text{F}$ ) and  $-30.5^{\circ}\text{C}$ . ( $-22.9^{\circ}\text{F}$ ). An end of May report added, "The polar winter is approaching, as the sun, when it is visible, disappears already at midday".

Building operations are at an end. In addition to the three main buildings (living quarters, science laboratories, power plant), there is an astronomical observatory 100 metres south of the base proper, and two geomagnetic huts 150 metres to the west. The prefabricated covered-way, 50 metres long, which links the three principal buildings is commodious and well lighted. Transistor radios connect the various buildings and outbuildings mentioned above.

An oil tank 10 metres from the generator house holds enough fuel to last the station a month without anyone having to venture out to do refuelling. Thanks to improved insulation of the floors, the consumption of fuel is only two-thirds of that required by the old base.

Inside, the buildings are comfortable and a steady temperature of  $20^{\circ}\text{C}$ . ( $68^{\circ}\text{F}$ .) is maintained. A bathroom and a shower with hot and cold water have just been installed.

The wintering-over men are well satisfied with their meals and health and morale are excellent.

Among the amenities may be mentioned the cinema sessions once a week. From time to time visits are made to the old "ghost base" which is now buried under eight feet of snow, by men looking for old hams and other well preserved delicacies.

Since April the full science programme has been in operation. The Dines anemometer began functioning on April 19.

## LINK BROKEN

The last survivor of the "Belgica" expedition of 1897-9, led by Adrien de Gerlache, died towards the end of April. He was **Jan Van Mirlo**, who was one of the "Belgica's" crew. He was 85. The men of this Belgian expedition were the first to endure an Antarctic winter, as the ship was trapped in  $71^{\circ} 30' \text{S}$ , west of the Antarctic Peninsula and drifted helplessly for a year and a month before being liberated.

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## BOB THOMSON, O.B.E.

The well-known New Zealand Antarctic man, R. B. Thomson (Hallett 1960, Scott Base 1961) has been awarded the O.B.E. for his outstanding work in Australian Antarctic expedition.

Mr Thomson, whose home is in New Plymouth, was a member of the Australian National Antarctic Research Expedition in 1962-63 and officer-in-charge at Wilkes Station in 1962. He led a party of six which made a successful return journey of 1800 miles from Wilkes to Vostok, the Russian station at the magnetic South Pole.

# Sub-Antarctic Islands Report

## KERGUELEN (FRANCE)

The annual relief was carried out by M.S. "Gallieni", "Gallieni" left Mar- some 2,500 tons, "Gallieni" left about 30 expedition members on board, and called at Tamatave, Reunion and Nouvelle-Amsterdam en route to Kerguelen. Two Army helicopters assisted the disembarkation programme and the scientific and cartographic work. Overall, 240 men took part in the relief operations, under M. Rolland, Chef du Territoire des Terres Australes et Antarctiques Françaises.

The complete reconstruction of the Kerguelen Islands station is being planned, but this season only the necessary repairs and alterations to existing installations were undertaken. These included the re-siting of the seismological station and the formation of a laboratory from one of the old military camp buildings. Two cartographers from the National Geographical Institute undertook a photographic coverage of the islands from helicopters.

"Gallieni" made a brief call at Port aux Français on January 13 en route to Nouvelle Amsterdam and Reunion. Warm mild weather favoured the completion of the summer programme. The two Army Alouette II aircraft assisted in cartography and photo-coverage and biological and geological collection and observation.

Biological, geological and geophysical laboratories and a new neutron monitor were installed. Four rometers with their antennae, and a meson telescope were installed and a laboratory for magnetic weather station was soon again in going-order and the base prepared for balloon launchings and radio-soundings.

Boat trips were made for oceanographic and biological observations with fruitful results. 250 metres of new roadway was constructed.

Six tons of lucerne were harvested

Construction of the new base now proceeded rapidly as men waged

on l'Île de l'Est.

## CROZET ISLANDS (FRANCE)

During 1964 the construction of a station on l'Île de la Possession in the Crozet group will be undertaken. The erection of a permanent station here was decided upon in 1960. (See "Antarctic" June 1963, pages 261-3.) The new base, planned to house 15 men, will be located on the plateau which dominates la Bate du Navire. It will be linked with the landing beach by a flying-fox, 600 metres long. The base will comprise seven metal buildings.

The Crozet team will have to land 400 tons of building materials by means of pneumatic rafts. The success of the disembarkation will depend upon the weather. M. Alfred Faure will head a party of 22 men.

Very bad atmospheric conditions, with violent gales and rain making outside work unpleasant, prevailed throughout the quarter, with disturbances becoming more and more frequent. Nevertheless, 570 tons of cargo were unloaded, including two trailer tractors and a crane. The re-activation of the cable railway made possible the lifting of 120 tons up to the plateau where, from early January, roadways and construction sites began to take shape. The automatic weather station was soon again in going-order and the base radio functioning.

On January 28 the "Gallieni" along with the "Doudard de la Grée" appeared off Port Alfred. M. Jacquiot, Minister of State, set foot on l'Île de la Possession and

Construction of the new base now proceeded rapidly as men waged

on l'Île de l'Est.

all-out war against the winter which was already approaching. The communal hall, the sick-bay and two barracks buildings had been erected by the end of March, and 1,200 metres of trenches had been dug.

### MACQUARIE ISLAND (AUSTRALIA)

There was excitement on Macquarie on March 2, writes leader Robert Nunn in the March "Newsletter", as in dense fog "Noel Barrett picked up on Rusty Rachel (our radar) a strange object approximately one mile off shore moving at 7 knots in a northeast direction. . . . We still don't know whether it was another iceberg or a ship passing."

"Nella Dan" anchored in Buckles Bay two days early, on March 22, bringing extra stores for the winter and three new party members, Dr. Middleton, Purchase and Calwell. Additional scientific equipment was installed, including the All-Sky camera photometer, tidal gauge and automatic developing unit. Ten men, the summer party, including the balloon group (see below) returned to Australia by the "Nella Dan".

### ZOO BOUND

Among twelve passengers embarked on "Nella Dan" at Macquarie Island and bound for Australia in March were Min and Henry—female and male elephant seals respectively. They were bound for Sydney's Taronga Park Zoo. Born at Macquarie Island in the spring of 1962, Min and Henry, now 18 months old, each weigh about 520 lb. and measure almost seven feet overall.

They stood the voyage well. Food and water presented no problem for at this time of year they were undergoing one of their customary fasts, when young seals, plump and glossy, exist solely on their blubber reserves.

It is hoped that Min and Henry will quickly adapt themselves to the warmer climate after their 2,000 mile journey. It is hoped to study the events leading up to the elephant seals' moult, which cannot be done in the natural habitat because the

animals are at sea until just before the hair-shedding begins.

April brought many gale force winds with snow and sleet. Several glass panes in the mess-house had to be replaced and outside jobs such as painting "Moaning Nelly", the 100-foot radio aerial, were interrupted.

On April 18, all hands formed a working bee carrying sand and equipment 250 feet up Wireless Hill for the installation of a sunshine recorder. Taylor is reported as "aiding egg production" by installing power to the fowl-house, thus keeping the fowls warmer and, it is hoped, producing more eggs.

### BALLOON LAUNCHERS

A team of four led by Dr. N. R. Parsons of the University of Tasmania arrived at Macquarie Island in December to carry out a three-month balloon flight programme and succeeded in carrying out all the proposed flights.

Landing with some 60 crates of equipment, 180 cylinders of hydrogen and a pile of materials with which to build a hut, their aim was to launch 30 large hydrogen-filled plastic balloons carrying aloft instrument packages to record the intensities of various types of radiation at altitudes of about 100,000 feet. Different detectors were sensitive to X-rays, neutrons and electrically charged particles such as protons, electrons and mesons. Everything worked well and the team was virtually untroubled by electronic difficulties.

Very fortunately, writes one of the team in "Aurora", they were treated to considerably more geophysical activity than they had expected and were able to make many of their flights, particularly simultaneous flights pre-arranged with a University of California team in Alaska, during periods of interesting disturbances.

Some of the balloons were of 80,000 cubic feet volume, some of 58,000 feet. "They were made of very thin polyethylene,  $\frac{3}{4}$  of a thousandth of an inch thick, and consequently required extremely careful

handling. Despite the thinness of the plastic, the larger balloons weighed about 40 lb and the smaller about 30 lb. The larger were used to carry a payload weighing 15 lb and the smaller for instrument payloads of about 9 lb."

Holding the partially inflated balloons in the notorious sub-Antarctic winds required the combined efforts of seven or eight men, and very good judgment, to give the balloon every chance to pick up the instrument package and antenna without their being dragged and damaged.

The balloons rise about 250 feet per minute and on reaching 100,000 feet level off and remain floating steadily at that altitude.

## HEARD ISLAND

### (AUSTRALIA)

#### THE ATTACK ON BIG BEN

Some further details have been released concerning the Heard Island Big Ben Expedition planned for the coming southern summer. The organisers, several of whom are Outward Bound instructors, have chartered the Hunt Brothers' "Patenela", a 63 ft, 16 ft beam, gaff-rigged schooner with 2,000 sq. ft of working sail and a 165 h.p. Rolls Royce diesel engine. The "Patenela" sailed to Macquarie Island some years ago under charter to a group interested in reopening the sealing industry there. Government and public opposition forced the abandonment of the project.

A team of eleven, in addition to the owners of "Patenela", has been announced. It includes Major W. M. W. Deacock (leader), Dr. Graham Budd, Dr. Malcolm Hay, Major H. W. Tilman and Dr. Russell Pardoe. Besides climbing Big Ben, the team proposes to carry out a programme in marine biology, meteorology, volcanology, glaciology, topography and physiology. Films will be made and a book written.

The party expects to leave Sydney about the beginning of November on the 2,400 mile voyage to Heard Island. Specialist members will make marine biological and meteorological studies en route. The team will be away for about 14 weeks.

## MARION ISLAND

### (SOUTH AFRICA)

The South African Antarctic research ship "RSA" left Cape Town on February 26 with the relief staff and supplies for Marion Island for the year March 1964 to March 1965. The new leader is Theo von Ludwig and he has three meteorological assistants, 1 radio operator/mechanician, 1 medical orderly and 2 men from the Department of Public works who will do maintenance work on the buildings. The ship arrived at Marion on March 2nd and left again on the 10th with the returning party, arriving in Cape Town on the 17th.

The new staff members are gradually digging in and are kept very busy unpacking and storing supplies.

Two of the men had the fright of their lives when, while fishing one morning, two killer whales surfaced right in front of them.

The sheep that are kept on the island have apparently been very well trained by Lou de Beer, the medical orderly. Every afternoon he roars something through the window and all the sheep come running from wherever they are grazing to be locked up for the night.

## GOUGH ISLAND

This island experienced a "drought" during the second half of March resulting in a shortage of water at the weather station. This is due to the steeply rising topography and consequent swift run-off of rain water.

The "RSA" left Cape Town on March 22 with the Gough relief team under the leadership of L. I. Naudé. After having made a detour to Bouvet Island, it arrived at Gough Island on the 9th. The relief staff was ferried ashore by helicopter. Bad weather and strong winds hampered off-loading which was not completed until a week later. On the return voyage the "RSA" also called at Tristan da Cunha where cargo for the Islanders was off-loaded. It arrived back in Cape Town on May 3.

## BOUVET ISLAND

When the "RSA" left Cape Town on March 22 with the Gough relief, it also carried a team of experts which was to investigate once more the possibility of opening a weather station on Bouvet Island. This team consisted of 2 meteorologists, a geologist, a glaciologist, a building expert and an airworthiness inspector. A rendezvous was arranged with H.M.S. "Protector" on her way home from the Antarctic, and the two ships were at the island between March 29 and April 2. The weather was unfortunately very unfavourable and it was not possible to make as many landings as was intended. One landing by helicopter on a beach of recent volcanic origin on the western side of the island revealed some very interesting features. The final report of the reconnaissance is not yet available.

## CAMPBELL ISLAND (NEW ZEALAND)

Met. observer Ron Craig had the misfortune to crush his thumb in the door of the hydrogen platform when releasing a met. balloon in an 80.9 m.p.h. gale. The Civil Aviation Administration chartered the vessel "Holmlea" which left Dunedin for the island on April 24. On board was a replacement for Craig, Cliff Farr. Fortunately the weather at Campbell was beautifully calm on the 26th, when Ron was taken on board, and he was safely back in New Zealand on the 28th.

Anzac parade was observed on Campbell Island, the last post being played by Bill Cousins who made quite a good job of it. The usual refreshments were taken afterwards.

Two 21st Birthdays were held on the Island, each falling within 12 days of each other, this coming about with Ron Craig being repatriated on medical grounds and his replacement Cliff Farr arriving on the Island a few days before his birthday.

The boys are starting to look at their waist lines as they are putting

on pounds and pounds of weight, due to the excellent cooking of the chef Bob Rae.

With the last transport gone the boys have now settled down and are looking forward to Midwinter's day, when it is hoped that a link-up can again be arranged with the Midwinter diners in Wellington.

## ANTARCTIC PENINSULA

A long-standing and needless source of friction has at last been eliminated.

The great peninsula that carries Antarctica to within 600 miles of Cape Horn has been re-named the Antarctic Peninsula.

The British have always referred to it as Graham Land and to the Americans it has been the Palmer Peninsula, while the Chileans have called it O'Higgins Land.

The Antarctic Peninsula will take in all the territory from Prime Head, its northernmost extension, to a line drawn provisionally between Cape Adams, on the Bowman Peninsula, and a point on the mainland coast south of Eklund Islands.

The northern part of the peninsula will be designated Graham Land.

The southern portion of the Antarctic Peninsula, from the provisional southern boundary to a line from Cape Jeremy to Cape Agassiz will be known as Palmer Land.

On Russian maps the peninsula has been known as Antarctic Peninsula for about two years.

The change of name occurred on February 21 when the United States Secretary of the Interior (Mr. Udall) approved a list of Antarctic place names submitted by the Board of Geographic Names.

The decision, with which the British Government concurred, brought closer to an end long years of discussion on the name of the peninsula, and will, we are sure, be widely welcomed. This journal has generally used the name "Antarctic Peninsula" for some time.

## THE VETERANS PASS

T. C. CLISSOLD

Tom Clissold is dead. The remarkable man who was a first-rate cook at Cape Evans during the first year of Scott's Last Expedition and who delighted Scott by proving himself also a skilled and adaptable mechanic, died suddenly at his home in Napier (New Zealand) on October 20, at the age of 77.

At the age of 22, Clissold was the youngest man in the expedition. He was an artificer in the Royal Navy when he learned cooking in order to qualify himself for a place in the expedition. His inventive genius was a constant source of interest to the other members, his most famous invention being the device whereby the "rising" of the bread completed an electric current, rang a bell (for a specified period) and switched on a red light. This was made from "odds and ends, such as a cogwheel or spring here and a cell or magnet there". As for his cooking, Scott writes, "We had some seal rissoles today so extraordinarily well cooked that it was impossible to distinguish them from the best beef rissoles. . . our cook . . . really is excellent."

On one occasion he trained a team of dogs which had been pronounced useless, took them to Cape Royds, and brought back a load of 100 lb a dog in about two hours: "a good performance for the best dogs in the time," says Scott.

Clissold frequently acted as "model" for photographer Ponting. On October 8, 1911, he slipped when "posing" on top of an iceberg and fell, injuring his back and suffering concussion. This accident prevented his joining the southern "motor party" as Scott had planned; but he was one of a party of four which in December 1911 and January 1912 man-hauled extra provisions to One Ton Depot, 200 miles from Cape Evans, to replenish the stores depotted there to aid the return of Scott's Polar party.

However, it was not considered safe for him to remain for the second winter, and he was sent back on

"Terra Nova" when she left for New Zealand on March 5, 1912. He served in the first World War in the Imperial Army. Emigrating to New Zealand, he was employed by the Transport Department and was a vehicle inspector at Napier from 1938 till his retirement in 1953. He is survived by his wife, one son and one daughter.

### PROFESSOR L. A. COTTON

Leo A. Cotton, a young Australian, accompanied Shackleton's "Nimrod" expedition in 1907 as an assistant for the voyage and the establishment of the base at Cape Royds. "Never," wrote Shackleton of him, "had we a more willing worker." He joined the staff of the University of Sydney, and was Professor of Geology from 1925 till 1948. He died on July 13 aged 79.

### NO SWISS EXPEDITION

The abandonment of the proposed Swiss Expedition under Gilbert Caillet is officially confirmed. We have received a communication from the Liquidation office in Berne dated February 25 which states categorically: "this company is in liquidation. There will be no expedition".

"Ice Cap News" reports that the Swiss Federal Government in dissociating itself from the project, described it as "foolhardy, dangerous and lacking a scientific basis". Bankruptcy proceedings were opened on November 26.

Proudly claiming the largest circulation in the continent, a morning newspaper produced at McMurdo Sound, the "McMurdo Sometimes," did much to maintain the high level of morale at the station during the 1963 winter.

News, a sports page, an advice column under the guidance of "Dear Gabby" and an art section comprise the make-up of the paper, and there is even the occasional advertisement e.g. "When out of the country, use Antarctic Rent-A-8, the best vehicle found anywhere on the continent" or perhaps one inserted by an enterprising barber.

## BOOKSHELF

**Blizzard and Fire:** John Béchervaise, Angus and Robertson Ltd. 252 pages, ill., maps. 25/- (N.Z.)

The explorer-author of this unusually arresting book was leader of the Australian team at Mawson Base in 1959, a year in which disaster followed disaster: near shipwreck, a disastrous fire and terrific blizzards in which two aircraft were destroyed. The story of the year is told in a series of 27 letters actually written by Béchervaise to various friends. This variant of an old method has one great advantage: as the author himself says, "letters written at the time possess a kind of immediacy that may be lost in later writing". On the other hand, the result is inevitably somewhat disjointed, there are quite lengthy digressions written "round the inconsequent moment" with little relevance to the main theme, and many of the personal references mean nothing to the reader of the book.

Mr. Béchervaise's consciously literary style will delight some readers and annoy others. It is the natural style for a poet and lover of books to use. There is an occasional strained figure: "Everything external is insubstantial in blizzard and, by contrast, there is a withdrawal into the self; the body becomes an extra layer of clothing, an insulation to consciousness". But this is more than balanced by passages of strong, lucid prose.

"I was glancing out of the window, when I saw a wild cyclonic disturbance racing up over the granite from the north-east. It swirled clouds of snow high in the sun. It reached the timber dumps and lifted planks, and even anchoring railway sleepers, clean in the air. The next second sheets of plywood were streaming through the station."

Many such incidents are re-created with an accuracy and power which compel the reader to share the emotions of the writer. Take these 17 words about the holocaust which destroyed the irreplaceable powerhouse: "We fought through an agony

of impotence, and all our weapons were only spittle in a volcano." Unforgettable, surely.

You haven't read a book quite like this about the Antarctic before. It is not a book to turn to for facts and figures, or for quick reference. It is a book to read carefully, thoughtfully, a book to savour.

L.B.Q.

### PUBLISHED IN NEW ZEALAND

**Surface Temperature Gradients at the Antarctic Convergence:** Th. J. Houtman. N.Z. Jnl. Geol. Geophys. 7: 2. May 1964: 245-270.

### MAPS

**Geology of the Tucker Glacier area, Victoria Land, Antarctica:** Wellington, D.S.I.R. Includes inset maps of Ridley Beach, Hallett Station. Obtainable Geological Survey, Lower Hutt. Price 5/-.

### CLASSIFICATION OF POLAR LIBRARIES

After 18 years' practical experience in the use of the UDC system at the Scott Polar Research Institute, Dr. Brian Roberts compiled "**Universal Decimal Classification for Use in Polar Libraries**". A second edition, revised, a 185-page volume, was published last year, and supplements, to appear at irregular intervals, will be sent free to owners on request. All those concerned with the classification of Polar books will find this an invaluable aid. It may be obtained from the Scott Polar Research Institute, Lensfield Road, Cambridge, England, price 21/- (\$3.00), postage free. 17 pages of cyclostyled "Hints" are an added advantage.

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### NORWEGIAN-BRITISH-SWEDISH EXPEDITION, 1949-52

Part 3 of the Scientific Results, Vol. 6, of this Expedition, published by Norsk Polarinstitutt, is the General Report by J. Gjaever and V. Schytt. In 40 pages with over 20 plates the authors give a clear, colourful account of this notable expedition.

## BOOKS COMING

The closing months of this year should see a spate of New Zealand-written books of Antarctic interest. The following are all in course of publication.

1. The story of New Zealand's part in the Trans-Antarctic Expedition of 1957-58. To be published by the New Zealand Government Printer, "ANTARCTICA" by A. S. Helm and J. H. Miller will tell the story from the inside, as Mr. Helm was secretary of the Ross Sea Committee and Mr. Miller was deputy leader of the New Zealand component of the expedition. (Approx. price 37/6.)

2. The successor to the Society's "The Antarctic Today", edited by Dr. Trevor Hatherton, also probably with the title "ANTARCTICA", is being published by the well-known English firm of Methuens. Details of the contents of this important volume of scientific information about the Antarctic were given in "Antarctic" for September, 1963, p. 317. (Approx. price £3 3s. 0d.)

3. A completely different type of book will be "SOUTH: A New Zealand view of Men and Nature in Antarctica" by Guy Mannering (photo-editor) and Graham Billing (text), to be published by the New Zealand firm of A. H. and A. W. Reed. This will be the first New Zealand pictorial book on the Antarctic, an imposing volume comprising 80 pages of text and 120 pages of illustrations, the majority in colour. The text deals with Antarctica in general with special emphasis on New Zealand work there. It should make an acceptable gift. (Price 42/-.)

4. A more modest publication will be "SOUTH FROM NEW ZEALAND" by L. B. Quartermain, author of "Two Huts in the Antarctic". A booklet of some 80 pages with illustrations and maps, it is described as "An Introduction to Antarctica". It will provide a historical and descriptive outline written especially for the ordinary man or boy who wants to know more about the Antarctic (especially that part of it in which New Zealanders have been actively

engaged) and what happens there. Published by the Government Printer, it will have a similar format to the author's earlier book. (Approx. price 5/-.)

### WHAT, AGAIN?

Readers of Antarctic books have long complained about the exasperating repetition of identical titles, e.g., "Endurance". Now confusion will be worse confounded! There will be at least eight books entitled "ANTARCTICA" (by Nordenskjold, Debenham, Hayes, Schulthus, Caras, Eklund, and now the two mentioned above), while Shackleton's classic story of his "Endurance" expedition has a prior claim to the title "SOUTH".

## SOVIET WHALERS IN MELBOURNE

On April 26 one thousand and thirty-two Russians with £50,000 in their pockets arrived in Port Phillip Bay, Melbourne, Australia. They were the crews of the Soviet whaling fleet under Commodore Alexei Solyanik, just back from the 1963-64 whaling season in the Antarctic. The ship was thrown open to the public. The first visitors arrived at the pier six hours before the public was to be allowed on board, and two hours later the crowd had swelled to about 10,000. Only 1,000 managed to get on board.

Melbourne, agog to welcome the Russian visitors, besieged them with invitations to everything from a Lord Mayor's reception to suburban family dinners.

The first half of the fleet comprised the giant 33,000-ton "Sovetskaya Ukraina", and 16 800-ton chasers. The remainder, the smaller (14,700-ton) factory ship "Slava" and 16 chasers arrived on May 4, four days after the departure of the earlier arrivals. The "Slava" fleet left for home on May 9.

Fifty-year-old Commodore Solyanik is quite a character. He has his daily swim in his "flag-ship's" 10-ft. square swimming pool—even when the ice has first to be broken.

But Melbourne's reporters' most excited words were retained for

# THE READER WRITES

## Sidelights of Antarctic Research

### OVERSNOW TRANSPORT

Sir,—The following notes on recent developments in "oversnow" transport may be of interest to those who are not familiar with the various vehicles now being used.

**Type A:** These vehicles have light "Caterpillar" type tracking, running over jockey wheels—

Weasels (U.S.)

Pole-cat-articulated (U.S.)

Swamp Fox (converted Weasels) (U.S.)

Snowtrac (Swedish)

**Type B:** The tracking of these vehicles runs over normal size pneumatic tyres. A good example is the Nodwell (Canadian) now at Scott Base.

Musk-ox (U.S.)

Polecat—Mark II (U.S.)

Bombardier Muskeg (Canadian)

Thiokol Snow Spryte, Trackmaster and Imp (U.S.)

**Type C:** This type is a rear propeller driven ski-equipped vehicle.

Lansing Snowmobile (Canadian)

Polaris Air-Sled (U.S.)

**Type D:** This vehicle is partly of Type B manufacture, but has the addition of front steering skis.

Bombardier Snowmobile (Canadian)

**Type E:** This group covers all types of motor toboggans, some of which will be known to "Antarctic" readers. At Scott Base we have one model of the Polaris toboggan; USARP field parties have used Polaris and Eliason machines.

Bombardier Ski Doo (Canadian)

Polaris Sno-traveller (U.S.)

Eliason (Canadian)

Arctic Cat (U.S.)

**Type F:** An example of this type is the Tucker Sno-cat (U.S.) as used by Sir Vivian Fuchs in the Trans-Antarctic Expedition. The tracking revolves around a solid pontoon, giving a complete bearing surface onto the snow.

I should be glad to give further information to any interested person.

ARNOLD HEINE.

Antarctic Division, D.S.I.R., P.O. Box 6022, Wellington.

\* \* \*

(Letters of approximately 500–600 words are invited from readers who have observed some little-known facet of Antarctic life or who have reached conclusion on some Antarctic problem of general interest.—(Ed.)

\* \* \*

### JOURNEY'S END

Readers will remember the controversy early in 1963 about an attempt to transport penguins from the Antarctic to the Aalborg Zoo in Denmark ("Antarctic" March 1963, p. 174). We now have news of the result: through Captain Pedersen, back in Hobart for another voyage south on another "Dan" ship.

Of the 38 penguins on "Magga Dan," 13 reached Europe. All 24 Adelies had to be destroyed on the ship, and efforts were concentrated by the worried ship's crew on saving the 14 Emperors. They were kept cool in the tropics with frequent showers and all but one survived.

If it is any comfort to bird-lovers—the survivors were given a royal welcome at Aalborg. The Director of the zoo turned out in a dinner suit to greet them, and the town's Lord Mayor in full regalia!

the commodore's "beautiful honey-blond" wife Svetlana. There were 60 women altogether in the fleet, including interpreter Mary Jikhareva, 27-year-old graduate of Odessa University.

## WHALING TALKS

New Zealand's Director of Fisheries Research, Mr. K. R. Allen, who for the past three years has been one of a four-man international team of scientists undertaking an investigation into Antarctic whale stocks at the request of the International Whaling Commission, has resigned from the New Zealand Marine Department to take up an appointment in Canada. However, Mr. Allen will attend the fourth and final meeting of the scientific committee at Lowestoft, England, which opens on June 8 and lasts for four or five days. At this meeting the Committee will prepare a report on its studies.

The New Zealand Minister of Marine, pointing out that "what happens in Antarctic waters during the whaling season directly affects our own whaling operations off the New Zealand coast", said that it was important for New Zealand that Mr. Allen should again participate in the Committee's work.

Mr. Allen is expected to return to New Zealand on June 15 and will leave for Canada a fortnight later. His place at the next meeting of the International Whaling Commission in Norway in the second half of June will be taken by Mr. G. L. O'Halloran, Secretary of Marine.

### DRASTIC BAN?

A press report from The Hague dated March 5 quotes the Dutch Prime Minister as saying the scientific committee intended to propose a general ban on the catching of "blue finback whales", and that the ban was intended to remain in force for a number of years and not just for one Antarctic pelagic whaling season. It was intended that measures to conserve the various whale species should be much more far-reaching than at present.

### SHIP LOST ANCHOR

The 8,600-ton Japanese whaling mother ship Seifu Maru called at Fremantle on April 3 carrying 7,000 tons of whale meat. The ship was on its way back to Japan from the Antarctic.

While taking on bunkers and stores at Fremantle, the ship used

a wharf crane to hoist her spare anchor into position. The ship lost one anchor during heavy weather in the Antarctic.

### OIL YIELDS

Summary of yield (in barrels) of whale oil and sperm oil in the 1963-64 pelagic whaling season: last season's yield in brackets:

Whale oil first; then sperm oil.  
 Norwegian (4): 127,795 (125,215);  
 36,315 (35,485).  
 Dutch (1): 21,515 (47,048); 10,746  
 (13,527).  
 Japanese (7): 412,829 (466,277);  
 102,941 (57,784).  
 (from "Norwegian Whaling Gazette").

Commodore Salyanik reported the recovery from a sperm whale harpooned 200 miles south of Tasmania of a 370lb. chunk of ambergris, which he says is worth £75,000.

### INSECTS 400 MILES FROM POLE

Insects and mites have been discovered at about 84 degrees South near the Shackleton Glacier, said the New Zealand entomologist, Keith J. Wise, in Christchurch recently.

Mr. Wise, who has been working in the Antarctic for the Bernice P. Bishop Museum, Honolulu, said that the insects discovered were primitive soil insects commonly known as springtails, and about two to three millimetres long. The mites were much smaller.

Mr. Wise said the insects and mites were extracted from moss and algae brought back by a New Zealand field party.

Asked if they could support any other form of animal life such as parasites or predators, he said: "We have no information on either.

"We are still looking into the problem of their food. We know the springtails will feed on mosses, where mosses occur.

"They have occurred in other places where there is no moss and it seems they feed on microscopic plants in soil, such as fungi and algae.

"We think the mites probably feed also on microscopic plants in soil."

# The Mystery Of The Stranded Fish

A New Zealand scientist now working in the United States has produced important new evidence which may help to solve an old Antarctic mystery. He is Anthony J. (Tony) Gow, a glaciologist who was born and educated in Wellington but has been in America for some years and has been investigating the chemical and physical properties of Antarctic ice since his first visit to the Antarctic during the I.G.Y.

More than 50 years ago Frank Debenham of Scott's Last Expedition (now Professor F. Debenham of Cambridge) discovered four-foot long dead fish and invertebrates such as "glass" sponges (sponge balls with delicate spicules) and coral scattered on top of the thick ice that covers south-western McMurdo Sound. The remains were largely intact and remarkably well preserved, except that some fish were headless. There was no obvious cause for this appearance of marine bottom life on the ice surface in uninhabited Antarctica.

But Debenham knew that this ice came from the fresh-water Koettlitz Glacier flowing out over the sea from its coastal mountain valley. He formed the theory that sea-water froze beneath the ice-shelf, all the way down to the floor of the sound, trapping the bottom dwelling life. Over the years, sun and wind wasted away the top of the shelf—as evidenced by the highly-eroded surface and summer melt pools—but sea water kept freezing below the buoyant ice to replace the loss.

In this way the animal remains could gradually work up through the ice until they reached the surface. According to Debenham's theory, at this point the original fresh-water ice would have all disappeared, leaving a shelf made entirely of frozen sea water.

Three years ago U.S. scientists discovered a large concentration of marine bottom life near the easternmost of the Dailey Islands, which protrude through the ice shelf. They found the same kinds of remains as Debenham had observed, as well as groups of clam-like shell-fish and

heads of fish which they estimated must have had bodies about five feet long. They interpreted their findings as supporting Debenham's hypothesis.

Now we come to the new evidence produced by glaciologist Anthony Gow. With two assistants he camped on the ice shelf for six days and cored completely through the shelf near the island. Later he discovered by laboratory analysis of the ice-core crystal structure that **the shelf is fresh-water ice from top to bottom**, not sea ice as required by the theory. Nor did he find any animal remains in the cores, as might be expected from the theory. His measurements show that the ice depth varies from 20 to 50 feet in the area.

Gow's research provides two possible leads toward a solution to this old problem. He discovered a layer of fresh water sandwiched between ice-shelf bottom and sea-water. He thinks this may be caused by shelf-bottom melting or from melt-water running off the surface and down cracks and fissures that split the shelf in many places. He discovered that some of his cores, though composed of fresh-water ice, do not appear to have glacial crystal structure. This may be caused by freezing of the fresh-water layer underneath the shelf and gradual build-up of a fresh water, but non-glacial shelf in a manner similar to Debenham's theoretical process.

Gow also found that the invertebrate remains were most concentrated in areas of surface moraine, suggesting that perhaps both moraine and animals arrived in the same way. But the island and the

moraine in front are composed of volcanic rock, and dirt was found throughout the core taken at this spot, indicating that perhaps the moraine, and with it the invertebrates, may have possibly come from the submerged edge of the island.

"Whatever mechanism is responsible for the presence of marine remains on the ice must be extremely delicate," Gow is reported as saying. "Fragile glass sponges remain intact, clam-like shells are still hinged together, and coral stays attached to rock. Only the fish have been marred.

"Another unusual aspect of the fish is that they are all of the same family. Most fish caught by biologists in this area are less than one foot long, so I would expect to find some of these smaller fish on top of the ice, but there are none. Seals bring up big fish, and sometimes leave their catch to look for more, so this might explain the presence of damaged fish, but would not account for the other animals. Another solution for the fish alone is that they swim up cracks in the ice and become trapped.

"Perhaps there is one explanation for the fish and another for the invertebrates, which might be picked up by the glacier as it passed over an old shore-line before it reached the sea. It has been suggested that they might even have floated up from the ocean bottom to the underside of the shelf on filaments of ice which are known sometimes to form around them, but each explanation has objections.

"A survey of temperatures, salinities, thicknesses, depths, and flow rates should be made of the shelf and underlying waters not only to help explain the mystery of the animal remains but also because of the glaciological importance of the ice shelf."

[Adapted from a USARP press release by Gene Rodgers.]

## SUN NOT OBSERVING THE IQSY

The world has entered the International Quiet Sun Year—the time of minimum activity in the 11-year cycle of sunspots. Those whose duty it is to watch the sun should be able to expect a quiet time, with little to report.

But it is not so. Things have been popping on the sun right at the time when it should be most tranquil. Not only have there been active groups of sunspots this month, but they have been accompanied by solar flares causing radio fade-outs.

The magnetic and ionospheric storms started on September 14. There was a pause from September 19 to 22 (a weekend), but they continued until Tuesday.

A complete radio fade-out was recorded at the Godley Heads ionosphere vertical sounding station from 12.30 p.m. to 1.45 p.m. on September 15.

At Scott Base hourly readings are usually noted, but when a magnetic storm blows up, the work has to be done every quarter-hour, and information has to be coded to be sent to New Zealand.

One experienced observer was quite upset. He is George Lewis, the senior technical officer at Scott Base, Antarctica, who dashed off this telegram to the Geophysical Observatory at the Department of Scientific and Industrial Research:

No, no please, don't you dare,  
Not another solar flare,  
Nor another AGI warning,  
Or I'll quit this very morning.  
One more code, one more crit,  
One more plot and this is it.  
For no matter how I tries  
There are spots before me eyes,  
From the 14th pro rata,  
You'll be sent all the data,  
For no matter what I tell,  
I'm still plotting, so all is well.

The department replied:  
Looking forward to the data,  
On the fourteenth pro rata,  
What has happened on the sun,  
Is upsetting everyone.

## COOPERATION

In March this year, "Antarctic" printed a brief summary of U.S. co-operation with scientists of other nations in Antarctica. The same month, "Antarctic Report", the National Science Foundation's bulletin on Antarctic Research Programme work, published a much fuller account of international co-operation in Antarctic research, written by the Director of International Co-operation and Information Programme with N.S.F.

Tracing the history of this development back to I.G.Y., Mr. Francis outlines the foundation and work of the joint stations of Wilkes (Australia-U.S.), Ellsworth (Argentina-U.S.), and Hallett (N.Z.-U.S.), commending the co-operation between New Zealand and U.S. as perhaps the largest single and most successful programme between international expeditions in Antarctica. This co-operation has been continuous both at Hallett and in the Scott Base-McMurdo area, as well as comprising the more specific ventures.

Multilateral co-operation is illustrated by the visits of U.S.A.R.P. scientists to Macquarie Island with the Australian National Antarctic Research Expedition, whose work was also supported by the New Zealanders on Campbell Island; and by the fact that the N.S.F. supports a U.S. representative to the International Antarctic Analysis Centre in Melbourne, along with meteorologists from France and Argentina.

The exchange of scientists, particularly the Russian-U.S. programme, is outlined, followed by an account of how assistance has been given by N.S.F. to Belgium and Japan in their endeavours to re-establish bases in Antarctica.

In the Antarctic Peninsula, USARP scientists have been able to work outside the normal range of their country's logistic capabilities by help given them by Argentina, Chile and the United Kingdom. Some eighty foreign nationals from sixteen countries have joined U.S. research teams as students, research assistants and teachers, while the U.S. research

ship "Eltanin" has been berthed and supplied in Chilean, Argentinian and Uruguayan ports, and for her part has been host to numerous scientists from Chile, Argentina, Brazil, Canada, Britain, Iran and Israel. Exchanges of scientists have also been made between "Eltanin" and the Soviet research vessel "Ob".

Further examples of international co-operation are given by means of data exchange of findings in Antarctica covering mapping, naming of geographical features and all the various scientific disciplines studied in the continent.

## CANTERBURY BRANCH

Activities over the past six months indicate the vitality of the Canterbury Branch of the N.Z. Antarctic Society, centred in Christchurch. Members arranged a display of Antarctic Historical Relics and Equipment at the Antarctic Week Open Day at Harewood in November. During the week also four films "90° South", "Antarctic Voyage", "Blue Ice" and "Priceless Laboratory" were screened. In addition three films were screened in a suburban hall. A further film evening was held on February 6, when "Power for Continent Seven" was screened as well as "Priceless Laboratory".

On March 18, by courtesy of Operation Deep Freeze, 60 members of the Branch inspected U.S.S. "Glacier" at Lyttelton.

On April 16 Mr. Baden Norris described the excavation of Scott's hut at Hut Point, illustrating his talk with his own and Mr. Hurrell's slides.

Prior to the annual meeting on May 28, the "Gateway to the Antarctic" will be screened.

### BURSARY SCHEME

(v. "Antarctic" December, p. 322)

The Branch's plan to provide a bursary of at least £120 for a University of Canterbury Expedition member each summer for about five years is under way. Members have themselves contributed about £100 and an appeal is to be made to business houses. Christmas cards were printed and sold to members for the Bursary Fund.

# 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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## " THE ANTARCTIC TODAY "

This volume is out of print, but a limited number of the following **separate sections** is available, the stapling slightly rusted:

**Ionosphere Research** (J. W. Beagley).

**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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Of our predecessor, the "ANTARCTIC NEWS BULLETIN", only the following numbers are available:

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