

# ANTARCTIC

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NEW ZEALAND ANTARCTIC SOCIETY



## CAMP RIDLEY, CAPE ADARE

All that remains of the camps occupied by Borchgrevink's party in 1899-1900  
and Campbell's party in 1911-12. Cape Adare in background.

—Photo: D. C. Thompson.



# "ANTARCTIC"

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## Antarctic Nations' Conference

The 12-nation conference on the future of the Antarctic, called by President Eisenhower, opens in Washington on October 15.

The composition of the New Zealand delegation to the conference has not yet been decided. Australia's strong delegation will be led by the Minister of External Affairs, Mr. Casey.

The New Zealand Prime Minister (Mr. Nash) said on May 29 that New Zealand would leave her territorial claims in Antarctica in abeyance as long as international co-operation continued there. New Zealand would not renounce her claims to the Ross Dependency. They were soundly based on Antarctic activities including exploration, mapping and scientific work, extending from 1923 onwards. But the controversial issues of sovereignty had to be put in cold storage for the sake of international co-operation in scientific work, and New Zealand's claims would have no practical consequences while that co-operation continued.

### PURPOSE

The conference will try to write a treaty to promote the peaceful scientific development of the Antarctic wastes.

It was on May 2, 1958, that President Eisenhower addressed the governments of the other eleven nations participating in the International Geophysical Year activities in Antarctica, seeking such a treaty.

It took almost a year to get all the parties to hold the treaty con-

ference. In all, 47 meetings were held at which all 12 nations were represented.

On May 31 State Department officials said the Soviet Union had given assurances that it would not try to establish military bases in Antarctica. They said the Soviet Union had joined other nations in agreeing to respect the non-military development of the area.

While unwilling to speculate on the treaty's chances, the officials said they believed the biggest hurdles had been cleared in the last year. The Russian pledge was a key factor in making the parley possible.

### CLAIMS "FROZEN"

The diverse views and policies on Antarctica held by the 12 nations contributed to the delay. Many had to be assured that their territorial claims to parts of the southern-most continent would not be affected by a treaty.

The President told them in his message that the legal status quo in Antarctica would be frozen for the duration of the treaty. He suggested that the treaty provide, specifically, that such rights and claims would remain unaffected.

As United States officials see it, the treaty will not internationalise the area. It would simply provide the means of exchanging scientific information gleaned from the numerous expeditions already taking place or about to take place.

The treaty would ensure that peaceful conditions will continue indefinitely by mutual agreement, permitting development of scientific research and co-operation.

# Spring Journeys from Scott Base

With the sun now making its appearance for a short time each day, the men who have wintered at Scott Base, ten New Zealanders and three Americans, have already been making extensive sledge journeys.

The New Zealand party at Scott Base made an early start on the season's field activities. While the winter night still shrouded McMurdo Sound, a week before the sun reappeared, the first of two sledge journeys had already been made across the frozen surface of the Sound.

## TO CAPE EVANS

On August 16, station leader, Rod Hewitt, accompanied by Wise and Wedgwood, left Scott Base at 11 a.m. with a dog team and travelled to Cape Evans, 18 miles to the north of the Base. The party carried a spare tent, a radio transceiver, and eight days' reserve of food, fuel and dog food.

Visibility of only half a mile and a 20-knot wind slowed the party down during the first part of the trip, but ten miles out visibility improved enough to make a compass course no longer necessary. The surface was good except between Tent Island and the Razorback Islands. The men arrived at Scott's old hut at Cape Evans at 3.25 p.m. They found the hut drifted over on both north and south sides and the interior completely filled with snow. The doors were broken and there were many gaps in the external walls. The whole place is still "very dilapidated," says Mr. Hewitt.

A search for a sample of the aluminium wire used by the Scott party for telephone communication with Hut Point was unsuccessful.

Although the temperature at Scott Base on Monday was down to  $-57^{\circ}$  F. the overnight camp at Cape Evans was "quite comfortable". Sunlight was seen on the high north-west shoulder of Mt. Erebus. The three men breakfasted on one-year-old New Zealand biscuits and 50-year-old English greengage jam.

Until 9.30 on Monday morning no contact could be made with Scott Base owing to a complete radio blackout. There was a clear morning for the run home but during

the afternoon the weather deteriorated and cold, drifting snow and fading light made the last four miles very uncomfortable. The fact that the trip had been timed to coincide with the near full moon was a great help.

## TO CAPE ROYDS

Sandford and Wise with lead-dog Bowers' team left for Cape Royds at 11.45 on August 23. Good conditions prevailed as far as Cape Evans, which was reached at 3.45. Camping overnight, the party found two part-rolls of the aluminium wire used by Scott's party in 1911-12 for telephone communication with Hut Point, and secured a small sample from each as requested by the makers.

From Cape Evans, left at mid-day on the 24th, the surface was good all the way to Cape Royds, where the two men arrived at 1.30. The hut appeared quite habitable, but in need of minor repairs. Much canned food lay around the hut.

In the afternoon the party returned to Cape Evans and camped, leaving again at 11.40 a.m. on the 25th and reaching Scott Base at 3.40 p.m. It was a clear, calm day. Good radio contact was secured with the base each evening. The minimum temperature was  $-39.1^{\circ}$  F. at Cape Evans.

## WORK AT BASE

The Scott Base glaciologists have excavated their snow-pit to a depth of seven metres, with 3-inch cores taken down another eight metres. A permanent wooden hatch has been placed over the pit, which will be an asset for future glaciological work.

For June the maximum temperature was  $6.6^{\circ}$  F. on the 17th and the minimum  $-41.1^{\circ}$  F. on the 27th. The maximum wind gust was one of 80 knots on June 29th.

The maximum July temperature was  $24.4^{\circ}$  F. on the 30th, with a prolonged 50-knot wind. Minimum temperature recorded was  $-49^{\circ}$  F. on the 26th.

# NEW ZEALANDERS WILL EXPLORE COASTS OF ROSS DEPENDENCY

In addition to maintaining the established scientific programme at Scott Base and, in conjunction with the United States, at Hallett Station, New Zealand expeditions will this summer extend exploration and research into areas of the Ross Dependency as yet little known.

Geological and survey parties will push south from Scott Base over the Ross Ice Shelf ("The Barrier") parallel with the Victoria Land coast, and endeavour to probe inland where earlier expeditions have been unable to penetrate. Another team organised by the Victoria University of Wellington will be working to the west and north of the Dry Valley area. A New Zealand Alpine Club survey party will explore the mountainous region lying east of the Beardmore Glacier. Smaller teams will be working on specialised projects in other parts of the Dependency.

Two U.S. oceanographers living at Scott Base will investigate the waters and the ocean bottom of McMurdo Sound. A physicist from the United States will work with a New Zealand scientist on problems of auroral physics.

## LOGISTICS

As in previous years, the Royal New Zealand Navy will operate H.M.N.Z.S. "Endeavour" for the annual relief of Scott Base. "Endeavour", under the command of Commander J. E. Washbourn, R.N., is scheduled to leave Wellington on December 27 for McMurdo Sound. "Endeavour" has been fitted with mizzen-sail and fore-sail to steady the vessel in heavy weather: an asset which will be of considerable value to the scientists carrying out oceanographical work.

As previously also, considerable transport facilities will be provided by the U.S. Navy, chiefly on the cargo ships "Private John R. Towle" and "Arneb". Between them these ships will carry many tons of food and fuel, including 12 tons of meat for dog-food and over 11,000 gallons of aviation fuel. They will also transport the Auster and Beaver air-

craft and the new hangar. Some New Zealand personnel will also be carried on these ships and on the ice-breakers "Glacier" and "Atka". U.S. aircraft will also fly in members of the various New Zealand parties and about four tons of stores and equipment.

## TOO MANY COOKS?

When the Antarctic Division advertised for men to carry out the projected New Zealand programme for the coming summer and for the wintering-over parties, over 160 men applied for the 20 posts.

Where two field assistants were required for the geological and survey work there were 72 applicants, 15 men applied for the job of cook at Scott Base, 23 potential maintenance officers (chiefly to service the Sno-cat tractors) volunteered for the two vacancies advertised, and five times as many oceanographers and biologists as are needed came forward.

The only difficulty confronting the Division rose from the lack of applications from experienced professional scientists for the key posts of scientific leader at Hallett and chief scientist at Scott Base. It now seems clear, however, that satisfactory teams will be available for each base.

Most of the men needed to carry out the extensive base scientific programme have already been selected.

## EXPLORING THE COAST

The geological and survey party will be operating along 150 miles of the Victoria Land coast where it meets the Ross Ice shelf, between Barne Inlet and Shackleton Inlet.

Four men with three dog-teams will leave Scott Base for Cape Selborne, south of Barne Inlet, on November 1. On November 7 they will be followed by four men with two

sno-cats, both parties arriving at Cape Selborne by November 14. The dog teams will then proceed inland and work southward, approximately 40 miles from the coastline, to the vicinity of Mount Albert Markham, carrying out geological and topographical surveys and possibly gravimetry, en route.

#### SNO-CATS SOUTH

Simultaneously, the sno-cat group will work along the ice shelf southward, making contact with the coastline where possible, conducting geological, glaciological, topographical and gravimetric observations, with possible contacts in Beaumont Bay or further south. Both dog and sno-cat parties will work south toward Cape Wilson, north of Shackleton Inlet by December 31. By this time, the R.N.Z.A.F. Antarctic Flight will be airborne and will support the geological and survey programme. From Shackleton Inlet, the sno-cat group will return across the Ice Shelf via the areas where glaciological work was carried out on the journey south.

#### RECONNAISSANCE

From January 1, the dog teams with four men, assisted by N.Z.R.-A.F. Antarctic Flight, will make a reconnaissance of the area between the Nimrod Glacier and the Beardmore Glacier, doing such geology and accomplishing such topographical mapping as is possible. In general, this reconnaissance is to facilitate a detailed study of this area, the area of the Beardmore Glacier itself, and even the areas to the east, during the 1960-61 summer. All parties will return to Scott Base from the Beardmore area by mid-February.

Meteorological observations will be maintained throughout. The party will carry a gravity meter and will obtain readings along, and inland from, the coast line between Barne Inlet and the Beardmore Glacier.

#### OCEANOGRAPHIC CRUISES

It is proposed to carry out oceanographic surveys from H.M.N.Z.S. "Endeavour" during a cruise in October, 1959, and during a series of cruises in January and February, 1960. The oceanographic work on

these cruises will be carried out under the direction of the New Zealand Oceanographic Institute.

#### OCTOBER CRUISE

On the first cruise, "Endeavour" will follow a course from New Zealand along the Macquarie Ridge to the vicinity of the Balleny Islands, and back to New Zealand on a more easterly course, an estimated total steaming distance of approximately 3400 miles. It is anticipated that visits will be made to Campbell and Auckland and/or Macquarie Islands.

Alternative shorter routes are planned in the event of weather, ice or fuel problems necessitating shortening of the maximum route.

Stations will be primarily biological (plankton and especially dredging, trawling and grab sampling), geological (sediment samples) and hydrological. A 14C profile and two geological coring stations are also envisaged.

The purpose of the biological work is to investigate the fauna of the Campbell Plateau and the Macquarie-Balleney Ridge and the intervening gut to establish the presence or absence of faunal connections between New Zealand and the Antarctic.

The geological work is to investigate the nature of the rocks and sediments of the Ridge.

Hydrological work along this section will assist in interpretation of the effect of the Macquarie-Balleney Ridge on the movement of water masses into the Campbell Island-Auckland Island region.

Echo-soundings as continuous as possible will be secured, supplemented by bomb-soundings where depths exceed the limits of echo-sounding.

#### ROSS SEA CRUISE

"Endeavour" will spend about a month on cruises in the Ross Sea later in the summer. The first two Ross Sea cruises will be devoted chiefly to seismic and magnetic surveys and the third chiefly to oceanographic investigations.

The chief objects of the seismic work are:—

(a) Refraction survey of the thickness of the glacial deposits and sediments overlying the basement

rock in the Ross Sea and across the continental shelf.

(b) Determination of crustal structure by refraction and reflection shooting on the oceanic side of the continental shelf.

(c) Reflection investigations of crustal structure in the Ross Sea.

The magnetic work will be carried out by towing a proton magnetometer behind the ship in passage between New Zealand and McMurdo Sound, during cruises in the Ross Sea area, and on the return trip to New Zealand. The chief objects are to elucidate the geological structure, and to investigate the accuracy of the total magnetic force charts.

The scientific personnel on board during the Ross Sea cruises will be from the Geophysics Division, D.S.I.R., the Naval Research Laboratory, the N.Z. Oceanographic Institute and the Dominion Museum.

The oceanographic work will include detailed bottom surveys over Pennell Bank and in the McMurdo Sound area, to investigate the influence of depth on the fauna; and a small scale survey in shallow water in the vicinity of Beaufort Island to determine if organic matter from the penguin colony affects bottom fauna. Two sediment traps will be installed in the vicinity of McMurdo Sound, and left down for a year. The under-water camera will be used as extensively as possible where depths permit.

### ALPINE CLUB SURVEY

A party of 8 selected members of the N.Z. Alpine Club will, with some U.S. support, be established at the U.S. Beardmore Weather Station by mid-November. Thence, they will operate on foot in the mountains to the east of the Beardmore Glacier, Commonwealth Range and Bush Mountains. The composition of the party has been governed by the ability of its members to undertake topographical and geological mapping. It is expected that R.N.Z.A.F. Antarctic Flight will be in a position to give some support in early January. This party will be withdrawn to Scott Base by R.N.Z.A.F. Antarctic Flight in mid-January.

### VICTORIA UNIVERSITY EXPEDITION

The main purpose of this year's expedition is to complete the mapping and studies begun by the two previous University expeditions in the Dry Valley systems north of the Taylor Glacier in Victoria Land. Something over half of the 2,500 square mile area has been mapped to date.

Work this summer will be in the west and north of the Dry Valley area, probably from two base camps set up in the upper and lower parts of the Victoria Valley. The geological work will be supplementary to that done by McKelvey and Webb and the T.A.E. geologists in 1957-58, and by last summer's V.U.W. party. General geological mapping of the whole of the remaining area will, it is hoped, be carried out.

It is intended to extend the gravity profile made by Dr. Bull last year westward to the plateau, mainly to ascertain whether or not there exists the rock step thought to be the ultimate cause of the existence of the Dry Valley area.

Determinations of ice thickness on one selected glacier, probably the upper Victoria, will be made.

General glaciological observations will be made wherever appropriate, in particular studies of recession by moraines, cirque morphology, altitude of cirque floors and so on. It should be possible to measure movement of one selected glacier and also to obtain information regarding annual accumulation at high levels above the firn line.

Two meteorological recording stations will be set up, both in the Victoria Valley—one at either end. Standard observations will be made by instruments, self-recording where possible, and the radiation balance measured. Measurement of the upper winds is very desirable, but may not be practicable.

The biologist will make a lymnological and biological survey of Lake Victoria and its vicinity, with special attention to the changes that take place over the summer period; also a general lichen survey examining especially the distribution of lichen species.

## PENGUIN WATCHING

During the summer, Mr. Graham Caughley, the young biologist who spent the 1958-59 summer at Scott Base, when he visited the Emperor penguin rookery at Cape Crozier, will, with one or two assistants, carry out a series of biological investigations at Cape Royds, McMurdo Sound. Commencing in mid-November the party will be at Cape Royds for about three and a half months. They will probably live in tents.

The two major projects are as follows:

1. A study of chick survival at an Adelie penguin rookery, by direct observation of banded and unbanded birds. Factors to be considered will include exposure, malnutrition, and the depredation caused by skuas. The breeding and food habits of the skua itself will also be studied.

2. A study of territoriality, breeding behaviour, social organisation, social cohesion, feeding routine, food studies and seasonal fluctuations in numbers in an Adelie penguin rookery.

If Mr. Caughley has sufficient assistance he will also carry out physiological studies on the penguins, skuas and seals, with a general survey of the wild life of the area. He will also make a census of the seal pups in Erebus Bay and collect mosses, lichens and invertebrates, as well as plants and animals in the nearby freshwater lakes.

## SEAL CONSERVATION

Biologists working at Scott Base have pointed out the danger that the seal population in the vicinity of the base may soon become depleted to an extent which would endanger the supply of seal meat for dog food. It has therefore been decided to curtail the use of seals for this purpose and to make fuller use of other sources of food for the Scott Base dogs. In the coming year one third of the dog food only will be seal meat, one third will be dog meal and the remaining third will be reject carcasses of New Zealand mutton. A proposal to utilise whale meat was not considered practicable.

## SOIL SURVEY

Mr. J. D. McCraw of the Soil Bureau will head a small party which this summer will investigate the soil potentialities of New Zealand territory in the Ross Dependency. The party is expected to leave Scott Base with two tractors on or about November 4 for Cape Royds, where two days will be spent before setting out on the return to the Base.

Leaving Scott Base again about November 11, again with two tractors, a party of five men in all will make for Cape Chocolate on the other side of McMurdo Sound, at the south-west corner of the "open" Sound, and work south and north of the Cape examining the scree and moraines. After three days the party will move north to the New Harbour area and establish a base camp, in the Taylor Dry Valley if practicable, otherwise on the coast. The tractors will then return to Scott Base.

The period from November 19 to December 12 will be spent by the soil scientists in the Taylor Valley. They will then leave by sledge for Marble Point or some other suitable location for an air-lift, work around the coast north of Cape Bernacchi, and then be taken by air to Scott Base. After further work in the vicinity of Scott Base the party will leave for New Zealand early in January.

## AT THE BASE

During the coming summer, two new generators, each 45 kw output, will be installed at Scott Base. The new generator house will include space for the generators themselves, for snow-melting facilities, for storage of one week's fuel supply, and for heated workshop space sufficient to take any vehicle up to sno-cat size.

A further addition to the buildings at Scott Base will be an aircraft hangar. The dimensions of the hangar are 57ft. x 63ft., which makes it of sufficient size to store both the Beaver and Auster aircraft with wings on, and even to accommodate an Otter aircraft if required.

## ANTARCTIC FLIGHT

The R.N.Z.A.F. Antarctic Flight has been re-activated during 1959 and is in training in New Zealand at present, in preparation for activities in the Ross Dependency over the next two years. The Flight began training in the Mount Cook area in mid-August under Chief Guide Harry Ayres, a prominent member of the New Zealand component of the Trans-Antarctic Expedition. Ground training ended on August 21, followed by ten days' flying training with ski-equipped aircraft. For this period the ten men moved down to the Unwin Hut.

A total of nine personnel will comprise the Flight in the Dependency. They will arrive in McMurdo Sound in mid-December and hope to be airborne by December 20; from which time they will work in close support of the Geological and Survey party. The first rendezvous with this party is expected to be in the vicinity of Cape Wilson, Shackleton Inlet, in the last week of December. Thereafter, the Flight will assist the Geological and Survey Party in the reconnaissance to the west of the Beardmore Glacier, using for this purpose an advance depot at or near the U.S. Beardmore Weather Station.

The Flight will begin withdrawing the Geological and Survey Party in mid-February; all personnel, field and air, to be back at Scott Base in the last week of that month. The two aircraft of Antarctic Flight, Beaver and Auster, will be wintered at Scott Base but all personnel of the Flight will return to New Zealand.

### MISHAP TO "ENDEAVOUR"

New Zealand's expedition ship, H.M.N.Z.S. "Endeavour," sprang a leak during a heavy 72-hour storm between Raoul Island and Fiji. The ship's pumps were easily able to contain the water and at no time was there any anxiety for the safety of the ship. The "Endeavour's" future programme has not been changed. She is due to sail for southern waters on an oceanographical cruise on September 26.

## N.Z. ORGANISATION

Since May, 1959, the implementation of the programme formulated by the Ross Dependency Research Committee and approved by the Minister in Charge of the Department of Scientific and Industrial Research is the responsibility of the **Antarctic Division** of the D.S.I.R. The special functions of the Division are:

- (a) to be responsible for the execution of Antarctic activities undertaken by the New Zealand Government;
- (b) To supervise approved non-Government expeditions to Antarctica;
- (c) to maintain an information centre on Antarctic scientific research and exploration.

Responsibility for the scientific details of the approved programme, the procurement of scientific equipment and the working-up and publication of scientific data has been delegated to appropriate branches of the D.S.I.R. and other institutions.

Mr. G. W. Markham has been appointed superintendent of the Division. He will continue to be secretary of the Ross Dependency Research Committee.

Since May 4th, 1959, the Division has occupied premises at 124 Ghuznee Street, Wellington, C.2., and in future all correspondence on Antarctic matters should be addressed to the Superintendent, Antarctic Division, D.S.I.R., P.O. Box 6022, Wellington, New Zealand.

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(Stop Press)

### N.Z. MEN CHOSEN

Leader of the N.Z. Expedition for the coming year will be **Lt. Cdr. J. Lennox-King, R.N.Z.N.**, of Auckland.

The southern dog-team party will be B. M. Gunn (leader), Capt. P. J. Hunt, K. C. Wise and G. J. Matterson.

The sno-cat team will comprise Murray Robb (leader), J. H. Lowery, G. F. G. Ward and D. R. Goldschmidt.

# Hallett Men Risk Sea-Ice Seeking Coulman Island Penguins

The first field trip of the 1959-60 season from Hallett Station came to a sudden end when a weasel carrying three men broke through the sea-ice half-way between Cape Hallett and Coulman Island.

Five men from Hallett Station left on August 14 in an attempt to reach Coulman Island, the site of one of the few known Emperor Penguin rookeries. Coulman Island lies 15 miles off shore from the continent, and about 70 miles south of Hallett Station.

The team was led by New Zealand biologist Brian Reid of Berhampore, Wellington, and included the station leader, Mr. Charles Roberts, an American. The journey was made over rough sea ice in two U.S. Navy weasels. Supplies for three weeks, a prefabricated "Hallett-built" hut, fuel and equipment were carried on sledges pulled by the weasels. Daily radio contact was scheduled to be maintained with Hallett. During the 10 days planned for the trip the team proposed to collect scientific data on the Emperors, band 100 adult birds, conduct a population survey and take weather observations.

## SUDDEN ENDING

The trip ended in near disaster. At 4 p.m. on the second day out, off the foot of the Tucker Glacier about 38 miles from Hallett, the party had just passed through an area of pressure, and were in sight of Coulman Island, when the scouting weasel suddenly and without any prior indication broke through the sea ice. The three occupants, Roberts, Reid and a naval rating, escaped from the weasel just in time. It had fortunately been fitted with pontoons fore and aft for just such a contingency and did not sink at once. Roberts, however, was in the icy water up to his waist. All the equipment on board was retrieved just before the vehicle finally sank.

The party made camp on the ice for the night and next day returned to Hallett without further incident.

## STATION NEWS

Hallett Station observed Independence Day (July 4) by lavish decorations, fireworks, and a "brunch" from 10 a.m. till noon described as "a gourmet's delight." The high point of the day occurred when all U.S. citizens rose up in revolt and cast all citizens of the British Commonwealth, Reid of Wellington, Black of Christchurch, and Jones of Hawera, into a "brig" especially made for the purpose. Following the Kiwis' good-natured participation, they were declared "honorary American citizens" by U.S. station personnel and promptly released.

On Sunday, August 2, at 12.15 p.m., the upper half of the sun rose above the horizon between two distant mountains, and blazed for seven minutes before again disappearing. The whole station turned out in welcome. Hallett was the first of the American and New Zealand stations to greet the sun.

Brian Reid, as part of his biological programme, operates a fish-trap with which he fishes through a three and a half foot deep hole in the ice. On August 4—Independence Day—besides the usual shrimp, worms and other Antarctic marine life, his catch included Maine sardines, Japanese tuna, Colombia River salmon and red cherries, all repackaged for export!

## WINTER SPORTS

When Hallett's winter sports season began in May, New Zealand names figured prominently among the prize-winners. Brian Reid was a member of the six-man team which completed a planned four-day hike in one and a half days. The hike was intended to test stamina, ruggedness and endurance. The temperature was  $-30^{\circ}\text{F}$ .

"All track and marathon events were overwhelmingly won by 'Kiwi' Llewellyn R. Jones," says an American report. "His victories were partially attributed to the fact that he was able to dispense with the burden of clothing."

The angling event was won by Reid, but he was later disqualified for being unable to produce proof of his catch. He claims this was due to the close attention and acute interest shown by "Husky Hal", the station mascot. All mishaps were investigated by "Husky Hal", who lavished copious lingual affection on the injured.

Winners of the various events were rewarded with a hair from the champion beard, belonging to New Zealander Alec Black.

#### PENGUIN ROUND-UP

To cope with a sudden influx of livestock, which increased the Hallett Station population by more than 100 per cent on May 26, it was necessary to build a large new corral. Unique in design, the corral is built of up-ended 55-gallon oil drums. The herd consisted of 21 Emperor penguins, the first to arrive save one. Among those participating actively in the round-up was Husky Hal. As a result of his enthusiasm, one penguin had to be destroyed. The rest were released on June 2.

Reid cut his leg severely with an ice-axe while chopping a hole in the sea-ice for marine biological studies. The direction of the auroral programme was taken over temporarily by his fellow-New Zealander Jones.

#### RELIEF PLANS

Responsibility for the logistic support of Hallett Station rests with the United States. The cargo ship "Arneb" is scheduled to arrive at Cape Hallett with an ice-breaker escort in early January to offload supplies and equipment. It will be an amphibious operation. Personnel will have already been exchanged by VX-6 aircraft from McMurdo. The 16-man wintering over party will be flown out in late October or early November. No new construction is planned for Hallett Station.

At Hallett during the coming year three New Zealanders, one of whom will be the station scientific leader,

will carry out auroral, geomagnetic, ionospheric and seismic observations. Two United States civilian meteorologists and three naval aerographers will make daily upper air and surface weather observations and conduct research in solar radiation. A doctor and six other naval support personnel will run the station.

#### WANTED!

##### Penguin with a Cold

Or, expressed more prosaically in the language of science: Donald S. Douglas is going to Hallett to gather data on the salt and water metabolism of the penguin. Using the extensive penguin colony at Cape Hallett as his laboratory, Douglas will examine the nasal discharge of the Adelle to determine whether the salt taken in by the bird is eliminated from the body by this means.

#### N.Z.-U.S. CO-OPERATION

The verbal understandings which made possible the very harmonious co-operation between United States and New Zealand participants in Antarctic exploration during the IGY period have been set out more formally in a "Memorandum of Understandings" which is to remain in force until December 31 and may be brought up to date or extended in force in later correspondence. An exchange of notes between the two Governments to this effect was tabled in the New Zealand House of Representatives on July 7.

The New Zealand Government will provide, as far as possible, facilities in New Zealand requested by the United States authorities in connection with operations in the Antarctic. It agrees to the establishment of operational headquarters in New Zealand and to the transit of United States personnel, ships and aircraft through New Zealand. A military and affiliate radio station may operate in New Zealand under arrangements made with the R.N.Z.A.F.

The United States Government undertakes to provide, as far as possible, logistic support requested by the New Zealand authorities in connection with New Zealand operations in the Antarctic. The U.S. Government is again interpreting this clause very liberally in the coming season.

# Russians Will Enjoy Comfort On 3,700-mile Antarctic Journey

Three of the great Kharkovchanka tractors in which Russian explorers hope to cross the Antarctic Continent next summer have already been tried out on journeys to the Soviet stations in the heart of the Antarctic.

On the flat tops of each vehicle a superstructure of low thermal conductivity materials accommodates the living and working quarters of the crew. The vehicles are hermetically sealed and each provides sleeping accommodation for six men.

At the end of the day's work, while blizzards whine outside, the crew will be able to take a warm shower before signalling the cook to serve dinner.

Mail from home, dropped by aircraft, can be read by the tractor's own electric light. Photographs of the interior show table lamps of the kind which any Russian housewife can buy in Moscow.

There is brown linoleum on the floor. Curtains strung across the nine portholes, through which the crew views the world of ice and snow outside, serve both to keep out the glare and to remind the men of civilisation.

## AIR CONDITIONED

Powerful air-conditioning plants send jets of warm air through nozzles into every corner of the interior and between the double thickness glass portholes to prevent frosting.

It is claimed that the crew can travel across the ice-cap and carry out a complicated programme of seismic depth recordings, as well as other research, without stepping outside the cosy interior of the vehicle.

## COMFORT AND SAFETY

These vehicles are specially designed for working at high altitudes and at extremely low temperatures. Apparatus for carrying out a broad programme of research is fastened to the exterior hull of the tractor in such a way that the scientists can jot down their data from inside the vehicle. Even seismic recordings

with the use of explosives can be effected from inside.

A perspex blister mounted on the metal roof of the tractor provides for astro-navigation without letting in the cold.

Navigational instruments are so perfected that the machine "cannot lose its way." If they care to erect a 300-foot portable radio mast the explorers can contact Moscow. Day to day contact with Mirny is maintained by using a 20-foot mast, fixed to the tractor's flat top.

## SPECIAL FEATURES

The Kharkovchankas can operate in temperatures down to  $-94^{\circ}\text{F}.$ . Their 12-cylinder diesel engines produce a basic horsepower of 520—or 1000 with the supercharger brought into play—which can send the vehicles churning through the three feet thick snow of the ice-cap at anything up to 28 miles an hour provided that the weather is good and there are no crevasses.

Special broad tracks, with knife-like gripping edges three feet wide, give exceptional traction performance and keep them going in soft snow when other vehicles would be halted.

The Kharkovchanka is approximately 30 feet long and 13 feet wide. Although the vehicle weighs 35 tons its broad tracks spread the load so lightly that at no point is pressure on the ice heavier than that of a man's foot.

It has a winch to haul itself out of danger, and each tractor is expected to haul a 70-ton trailer.

## ANYBODY SEEN A MOUSE?

U.S. rocket Discoverer III, fired on June 3 with four mice on board, failed to go into orbit, and is believed to have come down somewhere in the Antarctic.

# Soviet Antarctic News Round-up

The diesel-electric ship "Ob", which some time ago returned from a survey voyage in the Antarctic, is now being prepared at the port of Murmansk for her next expedition. The members of the expedition are now in Leningrad analysing the data collected.

One result of the work of the last expedition is that seventeen new geographical names have appeared on the map of the Antarctic; a mountain range discovered during the voyage has been named "Gory Russkie" (Russian Mountains). The gulf on whose shores stands the Lazarev Station has been named "Leningradsky". An ice cap situated 12 miles north of the new station has been given the name "Universitetsky".

## MOUNTAINS LOST

Two mountain ranges in Antarctica have vanished since they were first "discovered" ten years ago.

American pilots of the High Jump expedition reported sighting from the air a major mountain range between the 65th and 70th meridians, about halfway to the South Pole. The mountains were entered tentatively on maps.

Previously Lincoln Ellsworth had reported a mountain range in the neighbourhood of the 80th meridian. This range was later regarded as an extension of the one discovered during Operation High Jump.

Now it is claimed that neither mountain range exists. The claim is made by Russian explorers who have flown over Princess Elizabeth and MacRobertson lands between the Ross and Weddell Seas, extending roughly from the 65th to 80th meridians.

During their own flights, say the Russians, no mountains were visible, even though visibility was good from an altitude of about 1,200 feet for 70 to 80 miles in all directions. The mountains previously reported had disappeared from the map.

"Apparently during previous flights some individual alto-cumulus clouds of purplish colour which oc-

asionally occur above Antarctica in otherwise cloudless weather, had been mistaken for remote mountain peaks."

## MOUNTAINS FOUND

On December 8, 1958, an "IL 12" aircraft (Pilot V. M. Perov) carried out a flight from Mirny to the caterpillar-sledge train on the way to the Pole of Inaccessibility.

On the return journey the aircraft flew over completely unexplored areas. At 75° 14' S., 61° 08' E., a pyramid-shaped half snow covered peak of 3300 m above sea level was discovered. It could be established that along 74° S., from 60° to 60° 30' E., a mountain range extends which includes 17 peaks. At 74° 10' S., 63° 20' E. a massive two-peaked mountain stands out. At 73° 45' S., between 64° 20' and 66° 00' E., six peaks were observed which are not recorded on maps and appear to be the southern continuation of Prince Charles Range.

All these mountains are of block-fault structure, and some of the peaks are flat topped.

At point 73° 35' S., 70° 10' E., four sharply peaked nunataks were observed which are not shown on maps, and at 73° 15' S., 72° 10' E., another three nunataks.

At 73° 40' S., 71° 40' E., two glacial cupolas of the Masson Island type were discovered.

At 74° 50' S., 62° 10' E., the course of the aircraft led across the origin of an unknown glacier which apparently extends along the meridian in the trough of an ice fold.

In the region of the discovered peaks and cupolas, on the western slopes of a large trough, a number of crevasse zones were observed.

## CONCLUSIONS

Russian scientists state that these discoveries have great geological significance. They "confirm the hypothesis of an extended region of ice-covered block-fault formations which in the interior of Eastern Antarctica stretches from Olav-Prydz Bay to the South Pole." If the re-

gion does extend to the Pole, it may join up with the extensions, of similar structural formation, of the Great Antarctic Fault Ridge which stretches along the West Coast of the Ross Sea.

More careful aerial exploration of the district 75-76° S., 65-70° E. may well lead to the discovery of new nunataks or even of entire mountain ranges.

(Summarised from "Bulletin of the Soviet Antarctic Expedition," No. 5, 1959.)

### BACK FROM MIRNY

Morton J. Rubin, the American meteorologist who spent 15 months with the Russians at Mirny, visited several of the Soviet stations in the interior with groups from Mirny. These interior stations are located in one of the most inaccessible and little-known areas of the Antarctic, near the central dome of the great east Antarctic ice plateau, at elevations near 13,000 feet.

Rubin joined the Soviet expedition at Capetown on November 3, 1957, and left it at Capetown on February 8, 1959. He travelled to Mirny aboard the Russian diesel electric ship "Ob", which was specially equipped for scientific observations, and returned from Mirny aboard the "Kalinin", a Russian passenger ship.

Mr. Rubin will head the newly created Polar Meteorological Research Unit in Washington, D.C. In this capacity he will co-ordinate all weather bureau research activities in the circulation of the atmosphere and heat-water budget studies, resulting from the collection of new data from the Antarctic during the I.G.Y.

The South African Weather Bureau reports that the "Mikhail Kalinin", which called at Cape Town, is a "posh" passenger vessel normally employed on the trade route between London and the Baltic Sea. With her modern lines, spacious accommodation and women stewardesses, she seemed out of place for a vessel engaged on Antarctic research.

### MORE ABOUT LAZAREV

"Ob" reached the Queen Maud Land coast on February 9. Stormy weather held up exploration of the coast until February 12, when the aircraft were unloaded on to the ice. The search for a suitable station site continued for two days. No rock outcrops or rocky cliffs were visible anywhere; only glaciers flowing down to the sea.

It was decided to establish the station on a glacier, so unloading of equipment and supplies began on the 14th. A total of 900 tons of freight had to be unloaded on the ice.

The seven scientists wintering over, headed by Yu. A. Kruchinin, a geographer, will live in two prefabricated huts. Other buildings comprise an electric power station, a radio station, warehouse and provision for aerological, meteorological and glaciological observations. The station has two caterpillar tractors and a cross-country over-snow vehicle. While the station was being built, a group under Prof. M. G. Ravich set up a field camp and began research activities.

The station was officially opened on March 11. It is situated in 69° 58' S., 12° 55' E. The distance from the edge of the ice is 1 kilometre.

### AN INLAND OASIS

The Russians are also reported in an American publication to have claimed the discovery of an "inner oasis" in the Prince Charles Mountains, about 300 miles from the coast and covering more than 500 square miles. It lies roughly along the 75th meridian, about a third of the way from the sea towards the Pole of Inaccessibility. In an area almost completely free of snow, the space between the mountains was occupied by level areas and winding strips of blue ice, resembling frozen mountain lakes and streams. Traces of irregular freezing of water were seen on the ice areas, and here and there patches of dark, apparently young ice were visible.

In the same general region the Russians also report, says this source, "what may be the second largest glacier in the far south."

### FOREST FIRE IN THE ANTARCTIC

In the Antarctic there are peculiar miniature "forests". In them the vegetation has two strata and, though very rarely, even animal life is to be found in them. In these forests grow very pretty, richly branching little shrubs of greenish-yellow or black lichen of the *Neoropogon* family. Their height is merely a few centimetres.

On terraces between the rocks one may find small lichen carpets spreading thickly over the stones. The lower stratum of the forest, its undergrowth, consists of a layer of epilithic lichen and in places where a little soil has collected, of fine moss hardly visible to the naked eye.

At damp spots one may find in the moss tiny animals, rotifera and cyclopes. On the barren rock surrounded by ice even this dwarfed vegetation pleases the eye.

On one occasion, we were greatly startled when flames burst out from between the rocks so close to the ice: there was nothing in the Antarctic, we thought, that could burn. One of our comrades had lit a cigarette and thrown away the still burning match, utterly unaware that he might cause a fire. But soon we knew better. The match landed on a lichen shrub and, since in the border zones of the Antarctic humidity is very low and the bright sunshine had warmed the dark rock to a temperature of 60°-68°F., the tinder-dry lichen burst into flames like gunpowder. A fire was raging in the "Antarctic forest" and causing a great deal of destruction.

By this accident we learned that even in the Antarctic one could light a camp fire with local materials.

(E. S. Korotkevich in "Information Bulletin", Sov. Ant. Expd.)

### UNUSUAL FINDS

The Russians report finding a smoke-coloured penguin. There are very many colonies of Adelie penguins along the Antarctic coast, with for instance some 15,000, all like one another, on Haswell Island. One day, explorers spotted in the colony on Penguin Island a queer bird with an astounding colouring. They took it away with them to Mirny. Its

plumage was of a light, almost smoky, grey; its bill was of an orange brown, its flippers of a light tone, and its claws of a bright orange colour. It was an exceedingly rare specimen of an albino penguin.

Ichthyologists have discovered fish whose blood is white. Their gills are not red, but of a light-cream. When dissected, the fish give off a colourless liquid, which can hardly be distinguished from water or slime.

These fish are of a species new to science. The Norwegian scholar, J. Rund, established in 1954 that their blood contains no haemoglobin or erythrocytes while its iron content is only a tenth of that in the blood of ordinary fishes. These fishes belong to a particular family of white-blooded pike. They are more than 18 inches long and have prominent teeth.

### COMRADE PENGUIN

A. D. Sytinsky writes in the "Information Bulletin of the Soviet Antarctic Expedition": "One day I went with others to a seal colony some mile and a half from where the "Lena" was anchored. When we scrambled down the ship's ladder on to the ice, a penguin joined us, and began to examine us with uninhibited curiosity. One man tried to put his cap on the penguin's head, but the bird expressed his indignation with shrieks, made for the cap, worked it over with its beak and hit at the cap with its wings.

"We set off. To our great surprise this penguin followed in our footsteps to the seal colony, keeping at a distance of 10 yards behind us. We stayed among the seals for about an hour. All this time the penguin was standing close by. Quite obviously it took a keen interest in what was going on. Soon a large congregation of penguins gathered, who also examined us with the greatest curiosity. On the way home, many of them tried to accompany us, but they could not keep up with our pace, and only our old friend managed to come with us right up to the ship."

# AUSTRALIANS AT MAWSON SUFFER GRAVE FIRE LOSS

The satellite auroral observatory at Taylor Glacier, 50 miles west of Mawson, the main Australian Antarctic station, was totally destroyed by fire on July 4.

At the time of the fire, the observatory was manned by Morris, physicist, and Only, weather observer. Both men were able to take refuge in a second hut, and were picked up and taken back to Mawson by air three days later.

They were slightly affected by fumes from the carbon tetrachloride extinguishers they used to fight the fire.

Valuable auroral instruments, films and data, as well as radio equipment, clothes, bedding, and utensils, were lost.

Ignition by a heater of fumes from petrol accidentally spilt caused the fire.

The observatory was established after considerable effort two years ago to carry out meteorological, auroral and biological studies.

This is the third fire at Australian stations in four months. On March 30 the ionospheric hut on Macquarie Island was burnt down with serious loss of equipment. On April 3 the newly-constructed powerhouse at Mawson was completely destroyed by fire.

## EARLIER NEWS

The mean temperature at Mawson for May was 6°F., with 17,000 miles of wind-run averaging 23 miles per hour.

Another huge mass of ice-cliff beyond the doglines toppled through the sea-ice on May 7 and rose as dozens of minor bergs bearing heavy floes raised twenty feet in the air. Kirton's seismographs and photographs by Evans recorded the crash.

"Feeding the dogs with seal meat which is frozen hard as redgum is tough," reports Bechervaise, "especially for the men and not least, reckons Kirton, when a main chain housing a team of dogs breaks loose at feeding time in streaming drift. An extra chore has been the hewing

out of seals from beneath several feet of March's frozen spray. Most of us have given a hand but Armstrong has used explosives quite effectively."

## LATE FLYING

Early in May there were four photo-mapping flights. Then Sandercock, Budd and MacIntyre spent May 9 to 22 at Davis, on a "bartering and foraging" mission. Mack did some essential aircraft work on the Davis lathe and Newman turned some special bolts to attach the dozer blade to a tractor. The weather and light conspired to delay the return, and runways had to be dug by night-long work through snow clogging the Davis sea-ice. The westward return eked out sufficient light by chasing the noon sun but the home landing on sea-ice in fifty gusty knots crowned the flight.

"The R.A.A.F. Antarctic Flight continues to give fine support to the expedition," reported Bechervaise on June 13, "flying, almost daily, on twilight 'milk-runs' to Taylor Glacier, carrying out surveys over the plateau, making landings on the sea-ice for coastal triangulation and, until very recently, for astro-determinations at Mount Elliott and Baillieu Peak."

A team effort almost completed the concreting of two new engine-rooms, one of them put up to house the small Armstrong Siddeley generator. "We make bricks without straw," comments Bechervaise, "having lost vital items like rock drills, lathes and welding equipment in the fire of April 3."

## SIGNS OF SPRING

The first official record of spring sunshine, three quarters of an hour, was logged on July 13.

The wind run for June was the lowest ever recorded at Mawson for

that month. However, an over-enthusiastic blizzard averaged above 40 miles per hour for four days continuously. June's mean temperature was 3.8°F. and temperatures below zero were recorded on nineteen days.

There have been other incidents—Banfield's intrepid landing with the damaged aileron, the astonishing job of repair carried out by Rippon, using infinite skill, patience and rivets; the unpleasant day when the snow-drifted hangar became filled with carbon monoxide (an event which will never be allowed to happen again), and the breaking of an engine spindle, constituting a difficult problem in these latheless days, but which could fortunately be matched by resourcefulness.

### KNUCKS RESCUED

Early in July Mawson men spent 10 hours digging a trench through concrete-hard ice to rescue a husky pup which fell down a crevasse.

The officer in charge, John Becher-vaise, told in a radio message how the men spent all their spare time for three hours—even in the dark—searching for the pup, called Knucks.

When Knucks was found in the crevasse, Armstrong was lowered, but could not get close enough.

Relays of men working with picks and crowbars then dug a 10ft. deep trench in the ice.

After a good meal of seal meat, Knucks quickly recovered from his 48-hour ordeal.

### NEW ROOKERY FOUND

After a 12-day dog-sledging journey, late in July, three members of the expedition discovered what is probably the largest Emperor penguin rookery ever seen.

The rookery, about 35 miles east of Mawson, is surrounded by pressure ice and hundreds of grounded penguins.

About 18,000 penguins were discovered and about 16,000 were carrying eggs on their feet.

The resident birds were nearly all males, which incubate the eggs while the females are away for weeks on end gathering food.

The members of the party spent five of their 10 days in a tent on

low granite islands to protect themselves from storms and blizzards.

Temperatures dropped to minus 20 deg., and during one period the wind exceeded 80 knots.

The men, under the command of Macklin, had to build windbreaks of heavy snow blocks to preserve their damaged tents during blizzards.

### HIGH WINDS

A violent blizzard with winds up to 124 miles an hour damaged buildings and equipment at Mawson during the three days, July 26-28. The winds averaged 77.7 m.p.h. for one period of 24 hours, with many gusts exceeding 100 miles an hour. Flying debris pierced some hut walls. A pair of aircraft floats, tied down outside a hangar, were torn from their moorings and severely damaged when they were hurled against the hangar. The high velocity blasts forced far more drift snow than the usual into the huts. The snow drifts piled up by the blizzard were immense.

### UNKNOWN AAT

In a recent article Keith Mather states that Australia's decision to send a DC-3 aircraft to Mawson in 1960 "transforms in one stroke the entire conception" of Australian Antarctic operations. Equipped with skis and J.A.T.O. bottles this plane will be able to land and take off again from surfaces up to 10,000 feet in altitude. With some modifications it could operate a thousand miles from its base, compared with the 400 miles which is the extreme range of the Beaver at present in use.

With air support of this kind, Mr. Mather claims, Australia will be able to stage a full-scale exploring venture into the Prince Charles Mountains south-west of Mawson. With a Weasel for scouting in possibly heavily-crevassed areas ahead of the air-fuel-supplied tractor trains, the trains could then push on to the "zone of inaccessibility" in 82° S., linking up with Russian probings from Mirny into the same area, and then filling in a vast unmapped region between the Prince Charles Mountains and the Sor Rondane Mountains inland from the Princess Ragnhild Coast.

## NEWS FROM DAVIS

On May 9 Sandercock flew the Beaver over from Mawson bringing Doctor Budd and Sergeant McIntyre. They landed safely despite falling snow and poor visibility. The visitors stayed until the 22nd although they had planned to spend only three or four days. The weather did not permit flying any sooner. During their sojourn the Doc gave all the men an overhaul, including teeth, and expressed his satisfaction with their good state of health.

By this period the station was drifted over to roof level. A snow plough had to be built to clear a runway on the sea-ice. However, by the time the weather improved sufficiently to permit flying a blizzard had blown most of the loose snow away.

Base-leader Steiger on June 2 complained of a heat wave. The temperature had risen to 12 degrees below freezing and everybody felt uncomfortable but the following week everybody was happy again; the temperature was down to 40 below.

June at Davis was in fact a month of good weather, neither much wind nor snow and the temperature was quite bearable. As expected, the sun was seen last on June 7 and from then on there was only twilight in ever decreasing quantities.

### NO SHACK

After reports from two men who had made a trip to Lake Clear and Sorsdal Glacier, it was decided to examine the possibility of building a shelter in that area in case anybody should be caught by bad weather. Also it could be used as a weekend shack giving two or three men at a time a break from camp routine. So four men set out with tractor and big sledge across the sea-ice. Unfortunately they had to return before reaching their destination on account of rising wind and drifting snow coming out of Ellis Fjord.

Flying at Davis will be a bigger hazard than ever since the erection of yet another aerial. The radio reception, however, is now better still.

The leader at Davis, Steiger, reported on July 25, "We are no longer eight bearded men at Davis but only seven plus one clean-shaven, disgustingly civilised looking gentleman."

### AND NO BEACON

On June 14, four men went to Turner Island by tractor and sledge to inspect the beacon erected there for navigational purposes when the Thala Dan was stuck on the reef. They found the beacon blown over, complete with the 44-gallon drum full of rocks which acted as its foundation.

### FLYING HAZARDS

Piloting a single-engined Beaver on a flight from Mawson to Davis during last summer's operations, Sq. Ldr. Ivan Grove was forced down with engine trouble caused by ice restriction in the engine breather, about 80 miles from the Mawson base. He was flying over badly crevassed terrain, with loose snow being blown across the surface and only fifteen miles south of the open sea.

With great difficulty the plane was secured and next morning when the wind moderated to 35 m.p.h. the crew built a snow-block wind-break on three sides of their tent. Another Mawson Beaver sighted the downed plane and then flew in a mechanic and servicing equipment.

Sgt. Richardson worked without gloves in a  $-5^{\circ}\text{F}$ . temperature and an icy wind blast to locate the trouble. Next morning he had to face the freezing slipstream directly behind the engine while it was run at take-off power, in order to detect any oil leaks or other engine defects. The cause of the engine trouble had not been traced, but Sq. Ldr. Groves weighed the chances and decided to make an effort to fly the crippled plane to a clear sea-ice area 15 miles away, where salvage operations from Mawson would be more practicable. He took off without passengers, escorted by the other plane; and made it.

## AT WILKES

It was reported on July 9 that Hartley R. Robinson, a member of the Australian party at Wilkes, had been killed in a tractor accident.

Mr. Robinson, the senior diesel mechanic at the Wilkes base, was helping to recover acetylene bottles from drift snow when the tractor he had been driving ran over him, killing him instantly.

Mr. Robinson, who was born in South Australia in 1911, joined the Australian Antarctic organisation in 1953, was second in charge of the party at Macquarie Island in 1955, and went to Wilkes last February.

## STORMS AND SQUALLS

May temperatures in degrees F. were: mean 10.5; maximum 28; minimum -24. There was sunshine for 26 hours and precipitation was recorded on 22 days. Storms and squalls were the main feature of the month's weather. The fast ice along the entire coast dispersed on three occasions and with open water conditions along the western horizon Antarctic petrels, giant petrels and snow petrels returned to the vicinity of the base.

Dingle reported on June 2 that dog training was proceeding fairly satisfactorily.

To obtain water at the usual source of supply, it was necessary to blast a hole through seven feet of ice. The water hole now covered a surface area of twelve square feet and was kept open by removing all freshly formed ice at least once every 24 hours.

## PISCATORIAL

Three men—heavily rugged up in an assortment of winter clothing—landed 14 fish classified as belonging to the Genus *Trematomus*. All were rather undersize; the maximum length was 8 inches.

All men during June had ample opportunities to develop and exercise their muscles shovelling mountains of snow from the station corridors and hut approaches.

## JUNE WEATHER

The weather during June was generally fair, apart from storm conditions in the first and fourth weeks. The sea-ice was dispersed on

the 9th, 25th and 30th. Wilkes has weathered a succession of storms without suffering material damage. However, the infiltration of snow into passages and cold porches is a never-ending source of annoyance. The main station and temporary camp were completely drifted in by the end of June and the snow coverage is believed to be the heaviest experienced by a wintering party in the area. Antarctic petrels, giant petrels and snow petrels were occasionally sighted.

Wilkes radio is copying teletype weather broadcasts from AXM Canberra and also working a satisfactory two-way teletype communication with the Americans at McMurdo Sound. The meteorological team is pre-soaking radiosonde balloons in distillate in attempts to increase the height of daily pressure, temperature and humidity soundings. The maximum height recorded in June for radiosonde flights was 89,083 feet. Auroral activity has been observed on nine nights. Twenty earthquakes were recorded. A radio link between the four A.N.A.R.E. stations was arranged for midwinter celebrations and worked well between Davis and Wilkes.

All members participated in a series of tournaments at table tennis, shuffleboard and squash to while away the few leisure hours which the midwinter season offers. Lectures were given on a variety of subjects, e.g., the American South Pole Station, National Television in Australia and Radio Activity and Atomic Energy.

## JULY REPORT

The weather was stormy through the first half of July but conditions were good thereafter, with occasional bursts of sunshine and increasing hours of daylight. The sea ice, nearly three weeks old, extended to the horizon. Groups of giant petrels were frequently observed near the station but only a few snow petrels and Antarctic petrels. The absence of seals caused unexpected dog-feeding problems. Three yearlings and one adult male were finally killed to supplement the almost non-existent stockpile of dog food.

Whilst testing plastic penguin bands in seawater through an ice hole Penney was surprised to discover that the coloured bands had a certain attraction for the local fish. Several specimens were subsequently caught with a hook and line, their destination being the biological lab, not the galley.

Radio communications were most unsatisfactory owing to an eleven-day blackout period in mid-July and marginal conditions for several days thereafter. The blackout was associated with a series of magnetic storms and total ionospheric absorption conditions which began on the tenth and lasted until the 22nd. Auroral activity was observed on 13 nights. Twenty-seven earthquakes were recorded.

The increasing hours of sunshine encouraged the pale-faced residents of Wilkes to go walkabout whenever the opportunity arose.

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During 1960 four U.S. scientists will work with the eleven Australians to carry on projects in auroral investigation, biology, geomagnetism, ionospheric physics, meteorology and seismology.

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#### NEW ANTARCTIC STAMPS

Four new definitive stamps will be added to the Australian Antarctic Territory series in September or October.

The 4d. stamp will picture members of the Shackleton Expedition of 1908-9, the first to reach the South Magnetic Pole. The 7d. design will show an A.N.A.R.E. snow vehicle and team on a map of the Antarctic continent; the one shilling stamp will depict a sled and dog team against an iceberg; and the 2/3 stamp will depict Emperor penguins against a map of Antarctica.

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Dr. F. W. G. White, a New Zealander who came to Australia in 1941, has been appointed Chairman of C.S.I.R.O., the Commonwealth Scientific and Industrial Research Organisation.

#### RELIEF PLANS

The Australian Government has again chartered the Danish Polar ships, "Magga Dan" and "Thala Dan", for the 1959-60 and 1960-61 summer seasons. The ships will be used to relieve Australian stations and to explore further the coast of the Australian Antarctic Territory.

"There will be 73 Australians in the Antarctic next year, the highest we have ever had," said Mr. Law, head of the Antarctic Division. This will put Australia in the same category in the Antarctic as America, Britain and Russia.

The expedition will leave Melbourne in December.

At Wilkes Station, four of the 15 men to winter over will be American scientists.

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#### NEW BASE LEADERS

The leader of the 32-man team at Mawson for next year will be a Dutchman, Mr. H. Geysen. Born in Amsterdam, Mr. Geysen escaped to England from Nazi-occupied Holland at the third attempt in 1943, and came to Australia in 1951. A former executive of the Royal Dutch Airlines, he joined Southern Airlines in 1956 and became general manager in 1957.

Leaders of the other bases will be: Davis: Mr. I. E. Douglas (23), whose father was pilot for Sir Douglas Mawson in 1929-31.

Wilkes: Mr. H. P. Black (40), who was officer-in-charge at Macquarie Island in 1957.

Macquarie Island: Mr. M. C. Taylor (34). Mr. Taylor has previously served for two terms at Macquarie Island, in 1951-53 and 1953-55.

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#### HE-MAN APPETITE

At an A.N.A.R.E. reunion in Adelaide, a veteran of the "Wyatt Earp" recalled the "tremendous" appetite of the German doctor. In the pack, a seal was shot for fresh meat. In a flash Dr. Loewe was over the side tying a rope to the seal's tail.

The skipper came on deck, spotted Dr. Loewe wrestling with the seal, and said to the men on deck:

"Don't waste time with that rope. Toss him the salt and pepper."

## IN ADELIE LAND

In May, the French base Dumont d'Urville had 12 days of snow—and 10 of blizzard. The maximum temperature was 24.8 F., the minimum —23.8 F., and the average 1.6 F. July was a "wicked" month. A dense blizzard with a wind-speed of 136 m.p.h. brought the "one winter men" up to the level of the "two-winter men". So there was no chance to raise the tricolour outside on the 14th of July, France's national day: but it decorated the festive table in the gaily-painted living-room. The French believe in colour. The living-room ceiling is painted green, the north wall grey, the south wall beige, and the rest of the room red. The kitchen has also been repainted, but the colour(s) is (are) not specified.

One July morning was made memorable by the appearance of two rainbows rising from the white horizon and encircling the sky.

From May 23 the station was clearly picking up the twice daily radio signals from the Australian automatic weather station on Lewis Island. From June 5 a weekly radio link was maintained with the French expedition in Greenland. From May 11 to 21, however, adverse conditions interrupted absolutely all radio communication, including the otherwise regular links with Mirny and Wilkes.

### NEAR DISASTER

On Midwinter Day, traditional day of rejoicing at all Antarctic bases, Renard and Mazieres set out by weasel to visit the Emperor penguin rookery. For the previous fortnight, bad weather had prevented any journey to the rookery. This year the penguins have assembled to the east of The Nunatak, at the foot of the cliffs bordering the Astrolabe Glacier.

On the return trip, following the customary route, an inoffensive-looking crack, apparently about seven inches wide, gave way under the weight of the weasel which, half a minute later, crashed down 160 feet. The two occupants just had time to get out, one by the door, the other

## BELGIAN BASE

The scientific report for April circulated by the National Centre for Polar Research, now responsible for Belgian activities in the Antarctic, records 4 days of snow, 27 days of blizzard and 3 days of fog at Base Roi Baudouin.

Temperatures in March and April were: Maximum: 28.6 F.; 29.3 F. Minimum: —4 F.; —8.7 F. Average: 13.7 F.; 7.2 F.

It was found practicable to inflate the weather balloons in the open when the wind did not exceed 45 knots, but the balloons could be released only when the wind did not exceed 35 knots. Of 56 releases, 46 were successful. The highest altitude reached was 25,734 gpm (approx. 84,440ft.), at a point where the atmospheric pressure was 19 millibars. This is a record for the Belgian base, and it is thought, probably for the Antarctic.

Three auroras were observed in March and eight in April.

### TRAVERSES

On a 66-mile traverse timed to begin on May 4, it was planned to measure the density and hardness

by the escape hatch. Below the narrow crack the crevasse, probably under the influence of the glacier 200 yards away, was fifteen to twenty feet wide.

### THE SNO-CAT JIBBED

A fruitless attempt was made to extricate the sno-cat which on the return from The Nunatak left the sea-ice all right but refused to climb more than a few yards up the island on which the base is built.

Charcot Station has been closed down completely. Any re-opening is quite indefinite.

The "Bulletin d'Information" of Expéditions Polaires Françaises dated July 3 says that at that date three quarters of the men for the tenth French Antarctic Expedition had been selected. The team will comprise 14 men in all. The "Norsel" is due to leave le Havre on October 17 and should reach Terre Adélie by Christmas.

of the snow crystals, to study the micro-relief and to record the temperature every four kilometres. Stakes have been set up to measure snow accumulation, including a line of stakes across the Gunnestad Glacier.

A gravimetric profile as far as Mt. Romnoes with measurements every four kilometres seems to indicate that the ice-shelf rests on a rocky bed ten miles from the base. A further traverse to the north by sledge will extend the profile as far as the coast and determine the extent of ice-shelf movement.

In preparation for the 1959-60 summer traverse the traverse party examined the western section of the Sor Rondane massif and they crossed it from west to east as far as Byrdbreen. This is a particularly interesting region geologically.

#### THE FUTURE

The Belgians are committed to a 10-year programme in the Antarctic, and when the small (658-ton) sealer "Polarhav" went south last November she carried 350 tons of stores. Readers will recall that the vessel did not reach the Roi Baudouin base, being trapped in the ice on Christmas Eve while still some 40 miles away. "Polarhav" was freed by the U.S. icebreaker "Glacier" on February 4, and "Glacier" transported stores and personnel to the base later in the month.

### Norway Station

The "Polarbjorn" reached Norway again on March 6. The chief meteorologist of the expedition, Mr. Jarl Tonnesen, and the glaciologist, Mr. Torbjorn Lunde, have both set about working up their respective data from Dronning Maud Land. Computation of determinations of point and triangulation net as preparatory work for the maps from 0° to 30° 30' E. long. are under way.

The Norwegian Government has now decided that no relief expedition will be sent south for the Antarctic winter 1960.

## United Kingdom Bases

### F.I.D.S.

All of the eight bases of the Falkland Islands Dependencies Survey at present in operation have reported the continuation of routine work but otherwise little news has been received from them.

### DEATH IN CREVASSE

On July 26, meteorologist Dennis Bell was killed when he fell down a crevasse whilst out sledging from the base at Admiralty Bay, King George Island, in the South Shetlands.

We also record with regret that F.I.D.S. chief glaciologist Jeremy Smith was killed in a climbing accident on Mont Blanc at the beginning of August. Smith had carried out two years' field work at South Georgia as part of the F.I.D.S. contribution to the I.G.Y., and was in the process of writing up his results.

### SHIPS' MOVEMENTS

The two relief ships arrived back at Southampton in June—the "John Biscoe" on the 12th and the "Shackleton" on the 26th. The "Shackleton" returned via Tristan da Cunha and St. Helena and palaeomagnetic specimens were collected at Tristan.

Next season, the "Shackleton" will relieve the northern bases and then concentrate on hydrographic survey and magnetic runs across the Scotia Arc. The "Biscoe" will relieve Halley Bay. The "Kista Dan" has been chartered for the re-establishment of Base E (Stonington Island) and will be sailing from Southampton at the end of December; she will be carrying two aircraft—an Otter and a Beaver—which will be used in the Marguerite Bay area.

### BRITISH AIR BASE

For the first permanent air base to be set up in the British sector of the Antarctic, says the "Evening Standard", a steel hangar is being taken out to lonely Stonington Island, the furthest south of the 11 bases in British Graham Land, aboard the research ship John Biscoe.

A three-man construction crew is going to prepare the hangar, and a

## FOR SHOWA

In Japan, preparations are well in hand for the despatch of the expedition to carry out the relief of Showa Base. The National Antarctic Committee has announced the names of the 36 members of the expedition. The wintering party numbering 13 will be led by Dr. Tetsuya Torii. The summer support group of 21 will be led by Dr. Tatsuo Tatsumi, associate professor of geology at Tokyo University, who was deputy leader of the first wintering team in 1957. Only 13 of the expedition members have had previous Antarctic experience.

### WORK PLANNED

The work of the forthcoming expedition will differ from that of its predecessor in that the new wintering party will carry on research chiefly in the earth sciences: geomorphology, geology, glaciology and seismic soundings. Last year the stress was on aerology. Some inland journeys with over-snow vehicles and dog sledges are proposed. There has been some opposition to the use of dogs following the tragedy in 1958, when several dogs had to be left at the Base, and only two survived. However, six or seven Japanese huskies will be added to the five now at Showa. It is reported, unofficially, that the two dogs surviving of the original group, Taro and Jiro, seem unwilling to place confidence in their masters.

Mr. Masami Murayama and his men, who have wintered at Showa, are reported "all well", and are busy preparing for the inland journeys scheduled for the spring. On these trips Dr. Sadanori Murauchi, chief scientist, will carry out seismic sounding work.

new base hut for aircrew and mechanics by the end of next year. Two amphibious aircraft will be taken to the base.

A spokesman for the Falkland Islands Dependencies said: "We have got as far south as we can by using ships. The aircraft will fly survey, weather and geological teams into Alexander Island."

## The Climate Varies

Climatic variations at a number of Antarctic stations, given in meteorological statistics for May, will surprise many whose knowledge of Antarctic conditions is not first-hand.

Average temperatures for the month ranged from +10.6° F. at Wilkes, on the coast, to -28.5° F. at Byrd and -69.5° F. at the South Pole.

The highest temperature for the month was +25.7° F. at Ellsworth (Weddell Sea). The lowest was -90.9° F. at the Pole, Byrd Station running it close with -65.9° F.

Surprisingly to most, the highest amount of rain fell was at Hallett, a precipitation of 4.37 inches, while at the Pole and other far south stations the precipitation was recorded as "trace" only, or nil.

Hallett had the fiercest gust of wind, 89 m.p.h. The strongest gust at the Pole was only 25 m.p.h.

At the Pole in May there were no fewer than 24 clear days and only one really cloudy day; but Ellsworth had only three clear days, and Wilkes only two.

And what about snow? Well, there were 14 inches at Ellsworth, 12 at Wilkes, four at Hallett, two and a half at McMurdo, one at Byrd; and at the Pole? A trace.

### WHALES AND WEATHER

The South African Weather Bureau makes awards to Antarctic whaling vessels which co-operate helpfully with the bureau by forwarding meteorological reports.

"Friendly, enthusiastic, bearded" Captain L. Farstad of the Norwegian tanker "Astarte", a supply vessel for the Norwegian Antarctic whaling fleet, was delighted at receiving an "excellent" award in 1957-58 for forwarding 205 radio weather messages. He promised the Cape Town weather-man, Mr. A. B. Crawford, that he would do even better in 1958-59, and by March 3 he had sent in over 240 messages.

## MORE NEWS OF EVENTS AT ARGENTINE BASES

We have received, by the courtesy of the Director of the Argentine Antarctic Institute in Buenos Aires, further particulars of the rescue of crashed airmen on Robertson Island, and of the acceptance by the Argentine Republic of responsibility for the former United States Ellsworth Station.

On December 6 last, a Beechcraft plane crashed when attempting to land in the vicinity of Robertson Island in north-east Graham Land. On board the wrecked aircraft were Major Lassiter, Lieutenant Garrido, and two other members of Lassiter's team, Merrit and Hicks. They were carrying out a scientific mission.

As soon as news of the crash was received, the transport "Bahia Aguirre" immediately made for Cape Longing, a rocky promontory which forms the southern end of a large ice-covered cape at the entrance to Prince Gustav Channel. From here, a rescue unit set out under Captain Ignacio Carro, leader at the Argentine station Esperanza on Hope Bay. The party, which comprised seven men, was equipped with a weasel and complete survival equipment. During the hurried journey to the scene of the accident contact was maintained with the ship by radio.

### WEASEL IN TROUBLE

Unfortunately, the weasel crashed into a shallow crevasse and the rescue party had to split into two sections. One party went on foot to the scene of the crash while the remainder made camp on the ice. On December 8 the first party reached the wrecked aircraft. After a short stay at the site, they began the return journey on the 9th.

The march proved hazardous. Strong winds and poor visibility hindered the advance. The men were all very tired and food was running short. There was no major change on the 10th; but the condition of Lassiter and Hicks was causing anxiety. They were exhausted and their feet were frost-bitten. On the 11th they were hardly able to walk and violent winds made progress very diffi-

cult for all. But at 11 a.m. they came in sight of the mainland and of the ship. The two components of the rescue party were reunited. With considerable difficulty the weasel was extracted from the crevasse.

On the 13th the "Bahia Aguirre", which had to leave on the 14th to carry out another urgent mission, sent personnel to assist in the rescue operations. Next day the ship sailed, carrying the members of the rescued team.

### ELLSWORTH STATION

Ellsworth Station, 77° 44' S., 41° 07' W., was established by the United States during January and February, 1957, on the edge of the Filchner Ice Shelf, as part of the American contribution to the programme of the International Geophysical Year. During the IGY the Argentine Republic also operated a base, General Belgrano, only some 25 miles from Ellsworth Station.

The programme of scientific investigations as required for the I.G.Y. was not completed at the conclusion of the "Year", so it was agreed that the United States and Argentina should collaborate as from the 15th of July, 1958, by carrying on scientific work at Ellsworth, scientists of both countries participating, as well, possibly, as scientists from other countries.

The station was to be jointly administered until the United States Government should be able to transfer the base installations and this was agreed to by the Argentine Government. By a decree of the Argentine Government dated September 17, 1958, executive control was entrusted to the Instituto Antartico Argentino, and the base was named Estacion Cientifica Ellsworth.

The wintering party for 1959 comprises a leader, deputy leader, a doctor, a biologist, a biological assistant, a meteorologist and two meteorological observers, two radio technicians, operating the ionospheric equipment and recording Whistlers, a cosmic ray observer, five radio telegraphists, two mechanics, a radar specialist, an electrician and four general duty men, a total complement of 24. It was agreed that the meteorologist should be a United States citizen.

The Argentine ice-breaker "General San Martin" left in December, 1958, with the Argentine contingent to relieve the American party. The U.S.S. "Edisto" was scheduled to meet the "General San Martin" to participate in the handing-over ceremony, but operational difficulties made this impracticable and the Argentine vessel had to weigh anchor before the arrival of the "Edisto". The ceremony was held on February 2, 1959, in the presence of both contingents. In the name of the Argentine Republic, Capitan de corbeta Jorge A. Suarez, the new commander, accepted custody of the station.

### ANOTHER FIRE

It is reported that the Argentine station General San Martin, 68° 08' S., 67° 07' W., on the west coast of Graham Land, was destroyed by fire in January. Six men wintered at the station in 1958. It is essentially a meteorological observatory, but glaciological and oceanographical studies are also carried out.

### MISSING PATROL

It was reported from Buenos Aires on June 8 that a six-man army patrol had been missing in the Antarctic since May 5. The men were traveling in a weasel and also had a number of dog sledges.

On June 14 a United States Air Force four-engine rescue plane joined four Argentine planes in the search for the patrol, then lost for 40 days.

The U.S. plane was part of the equipment in Buenos Aires for a

series of stratospheric weather studies. The plane carried 10 American and four Argentine airmen.

The lost army patrol had been on a routine survey outing when it lost radio contact with its base in Hope Bay. Army officers said the patrol was well equipped with food and medicine, and had two dog sleds. The rescue party included a number of paratroop officers.

On the 16th a Navy plane located the six missing men. Supplies were dropped to them by parachute. The pilot reported that all the men seemed to be alive.

### ANTARCTIC SYMPOSIUM

An Antarctic Symposium is to be held at Buenos Aires, Argentina, from November 17 till November 25. The topics to be studied will include geology, oceanography, glaciology, also, probably, biology and other sciences.

## CHILEAN MOVES

The Chilean Navy has appointed Commandant Don Hugo Tirado Barros as leader of the 14th Chilean Antarctic Expedition. Senor Barros is a specialist in navigation.

The ships which will comprise the new expedition are the "Piloto Pardo" and a patrol vessel. The "Piloto Pardo" is the first Chilean ship specially designed for Antarctic work. Built in Holland, the ship arrived at Valparaiso on May 12. Her primary duty will be the annual relief of the Chilean Antarctic bases. When not engaged on this duty she will be employed in servicing light-houses and beacons in southern waters.

"Piloto Pardo" is powered by three diesel engines each of 770 horsepower and 750 revolutions per minute, with a speed of 14 knots. The crew numbers 50 and there is accommodation for 44 passengers.

The name "Piloto Pardo" is of interest. The vessel is named after Lieutenant Luis Pardo Villalon, who in 1917 was in command of the "Yelcho" which rescued Shackleton's men from the "Endurance" who had taken refuge on Elephant Island after their ship had been trapped, crushed and sunk in the Weddell Sea.

# UNITED STATES PLANS FOR DEEP FREEZE 60

The past four United States expeditions were named Operation Deep Freeze I, II, III and IV. The identifying number has now been changed to correspond with the fiscal year, and Deep Freeze 60 is now getting under way.

Eight ships, 36 aircraft and some 3,000 men will be involved in the operation. Summer operations will wind up in early March, 1960, when another group of Americans will remain in Antarctica to winter over. The present wintering personnel total 181, of whom 28 are scientists.

The 17 men who are now wintering over at the South Pole will be relieved in late November and flown out to McMurdo and then to the States. VX-6 planes will evacuate the 23 men now wintering over at Byrd Station and take in their reliefs in late November. Personnel at Hallett Station will be evacuated in late October or early November. All of the 135 men wintering over at McMurdo are scheduled to be flown out by November 15.

## SHIPS AND PLANES

The ships involved in Operation Deep Freeze 60, under the direct command of Capt. Edwin A. McDonald, USN, Deputy Commander for Rear Admiral David M. Tyree, USN, Commander, U.S. Naval Support Force, Antarctica (Task Force 43), are four icebreakers, the USS Glacier (AGB-4), the USS Atka (AGB-3), the USCGC Eastwind (WAGB-279), the USS Burton Island (AGB-1); two cargo ships, the USS Arneb (AKA-56), and the USNS J. R. Towle (TAK-240); one tanker, the USNS Chattahoochee (TAOG-82); and one destroyer escort, the USS Peterson (DE-152).

The planes range from the Navy's ski-equipped R4D Skytrains to the Air Force's giant, wheel-equipped C-124 Globemasters and ski-equipped turbo-prop C-130 Hercules. The C-130s will be used for the first time in Antarctic operation.

The primary mission of Operation Deep Freeze 60 is to continue logis-

tic support of U.S. Antarctic Research Programme (USARP) which is administered by the National Science Foundation.

The four U.S. Stations operated on a year-round basis are: South Pole Station, located at the geographical pole almost 10,000 feet above sea level; Naval Air Facility, McMurdo Sound, principal cargo staging base for the operation as well as a limited scientific station, located on the west coast of the Ross Sea; Byrd Station, in the heart of Marie Byrd Land; and Hallett Station, on Cape Hallett in the Ross Sea, which is jointly supported by New Zealand and the United States.

Two seasonal auxiliary air facilities for summer support of flight and field operations will be set up. One will be at the foot of the Beardmore Glacier (N.A.A.F. Beardmore) and one at the halfway point between N.A.F. McMurdo and Byrd Station (N.A.A.F. Little Rockford) In addition, Little America V, on the edge of the Ross Ice Shelf, will be temporarily activated to salvage equipment.

## PROGRAMME

Planes of the Navy's Air Development Squadron SIX (VX-6), and the Air Force's Ninth Troop Carrier Squadron arrived in Christchurch, N.Z., on September 15 and will commence flying to McMurdo Sound about October 1. Adm. Tyree will be on the first plane in. Personnel flying in will be brought to Christchurch by Military Air Transport Service (MATTS) planes.

Ships of the Task Force will begin their unloading and loading operations in Antarctica on or about December 10. They will all stage through New Zealand ports.

The first American cargo ship bringing supplies to New Zealand for Deep Freeze 60, the "Pioneer Gem," reached Lyttelton on August 20.

### UNFAMILIAR WATERS

With a party of scientists on board, the ice-breakers "Burton Island" and "Glacier" will try to make their way into the treacherous Bellingshausen Sea, which lies between Cape Palmer and the Palmer Peninsula, Western Antarctica.

"If the penetration into these uncertain waters is successful, the sci-

entific party will gather valuable data in a region never before explored," said Dr. Alan Waterman, Director of the National Science Foundation. Scientists aboard the ships will study the biology, geology, cartography, oceanography and glaciology of the region.

"Glacier" is due at Lyttelton, N.Z., on November 30, en route for Little America. "Burton Island" is scheduled to leave U.S. ports in early January, Valparaiso (Chile) on January 27 and to reach the Bellingshausen Sea on February 10, to rendezvous with "Glacier."

## Over Snow Traverses Planned

The United States programme for 1959-60, to be implemented under the direction of the National Science Foundation, includes two over-snow traverses which will extend considerably the area covered by previous traverses.

### INTO VICTORIA LAND

One traverse party of seven or eight scientists will climb the Skelton Glacier from McMurdo Sound, traversed by Hillary in 1957-58 and by Crary last summer. Starting in October, the new party will spend three months exploring the desolate, ice-capped expanse of Victoria Land. Seismic soundings and gravity, magnetic and glaciological studies will be made along the route, as well as geological investigations in the Skelton and Hallett areas.

The traverse party will penetrate into the interior of the plateau to about 74° S., 140° E., and then to the Hallett Station area.

The group will consist of five United States scientists and a New Zealand glaciologist, Arnold Heine, who is a member of the present New Zealand wintering party at Scott Base. The party leader will be a Netherlands geophysicist, Frans G. van der Hoeven, who has been wintering over with the New Zealanders at Scott Base.

The traverse will be supported by a Navy R4D (DC-3) air-supplied fuel cache at the top of Skelton Glacier, and will receive a parachute supply drop from a C-124 (Globemaster) about December 1. Vehicles will be left at the top of Tucker Glacier near Hallett Station for later use, and

the party will return to McMurdo by air.

### TO AMUNDSEN SEA

Another traverse party of seven men, under Scottish glaciologist John Pirrit, will set out from Byrd Station in October and travel for 1200 miles across Marie Byrd Land towards the Amundsen Sea. This group will carry out geological and geodetic work in the Executive Committee Range and the Hal Flood Range, both bordering the coast. The party will then travel south to the "Army-Navy Drive", the tractor train supply trail from Little America to Byrd Station, and follow it back to Byrd. The party will receive support from R4Ds.

The geophysical and geological investigations of this traverse party should add greatly to man's knowledge of this little-known area.

### IS THERE A TROUGH?

In addition there will be a further air-borne traverse put into the field by the University of Wisconsin. Dr. Edward C. Thiel and two assistants will be landed at eight to twelve points along the meridian of 88° W. between the Horlick Mountains far to the south (85° S.) and the Sentinel Mountains in approximately 78° S.

They will carry out seismic, gravity and magnetic observations in an attempt to settle the long-argued question whether there is a trough connecting the Ross and Weddell Seas.

Traverses in 1958-59 lent considerable support to the theory. It had previously been discovered that the Filchner Ice Shelf at the head of the Weddell Sea extends much farther inland than had been thought. Seismic soundings revealed that a deep trough beneath the ice continued as far as 300 miles inland from the front of the shelf. A U.S. air-borne traverse party last summer followed a path at right angles to the possible "through" trough. They made seven landings along meridian 130° W., i.e., roughly parallel with the eastern border of the Ross Ice Shelf, and covered some 400 miles, between the Harold Byrd Mountains in the south and the Executive Committee Range in the north.

The seismic programme carried out indicated that the ice is grounded at all seven stations, so that there appears to be virtually no possibility of water interchange between the two seas. But the profile does not appear to support the thesis of a down-warped, ice-filled trough connecting the two seas. At every one of the seven stations the rock level beneath the ice was shown to be below sea level.

The over-snow traverse south, east and north-west from Byrd Station to some extent confirmed the air-borne traverse party's findings: the first leg showed ice resting on a rock surface below sea level. But on the south part of the third leg there was only a 40-mile below sea level stretch. Here, though, the rock descended to over 3000 feet below sea level.

Byrd Station itself is built on ice which rests on rock 3000 feet below sea level (not 5000 as at first thought). So the trough, if it exists, must pass either through or near Byrd Station or else through the 40-mile gap mentioned above.

The air-borne traverse this coming summer will cross the hypothetical trough at the area considered to be the most likely position for a pos-

sible land bridge breaking the trough.

While the Ross Sea-Weddell Sea connection, therefore, remains in doubt, the series of traverses in Marie Byrd Land last summer seem to indicate that a connection between the Ross Sea and the Bellingshausen Sea is likely. The summing-up of a report in the "I.G.Y. Bulletin" of the U.S. National Academy of Sciences for July 1959 reads, "Thus, present evidence seems to indicate the division of Marie Byrd Land into two land areas separated by what would be, if the ice were removed, an area of open water running from the Ross to the Bellingshausen Sea."

## U.S. STATION PLANS

### POLE STATION

Air Force Globemasters will begin air-dropping 650 tons of equipment, drummed fuel, aviation gasoline, provisions and other supplies about November 1. The largest item to be air dropped is a 16,000lb. D-4 tractor. The tractor is needed to prepare a runway in February for landing C-130 prop-jet Hercules planes which will bring in new buildings for Pole Station.

Five buildings are scheduled for construction, either to replace existing structures in the case of two T-5 type barracks buildings, or to increase the scientific potential of the station as in the case of two T-5 geomagnetic buildings. Also planned are a garage and an additional emergency living building.

The new Pole wintering party will be flown in by planes of VX-6 which will also carry items of equipment considered too delicate to airdrop.

The wintering over group will include nine scientists, who will carry out investigations in aurora, geomagnetism, glaciology, ionospheric physics and seismology. In addition to standard programmes, the meteorological operations will include special studies on solar radiation, ozone measurements, carbon dioxide, and nuclear radiation.

Ten naval personnel will "manage" the station under the command of a medical officer.

## BYRD STATION

Globemasters will begin the air-drop at Byrd in mid-October and will drop approximately 800 tons of supplies, fuel and provisions. In late December a tractor-train from Little America will arrive at Byrd with heavy equipment and two new buildings. In February Air Force C-130s will deliver two more buildings. These will include a powerhouse and two generators for it, a maintenance building and two barracks buildings.

Eleven scientists will winter at Byrd pursuing studies in atmospheric noise, aurora, geomagnetism, glaciology, ionospheric physics, meteorology and seismology. A transport engineer will be occupied in readying vehicles and trail equipment for the traverses in the following (1960-61) summer. A naval detachment of 10, including a medical officer, will operate the station.

## N.A.F. McMURDO

Navy Seabees will again prepare a runway 6000 feet long on the bay ice of McMurdo Sound. The 90-ton Globemasters will load cargo on this strip for the airdrops at Pole and Byrd Stations. The Seabees will also prepare an emergency runway on the ice in the Marble Point area prior to the season's operations.

"Atka" will arrive at McMurdo on December 10 and will commence preparing a channel and off-loading site. The cargo ship "Arneb", after picking up heavy vehicles at Little America (which is not now maintained as a year-round station) will arrive at McMurdo about December 15 in company with "Glacier", and will begin off-loading.

A major construction programme is planned for McMurdo this year. It is planned to set up three 250,000 gallon fuel storage tanks, four barracks buildings, a hangar foundation, two communications buildings, a garage, three storage buildings, a fire house, two scientific buildings and three general purpose buildings.

During the 1960 winter, four scientists will investigate cosmic rays, conduct glaciological measurements, perform seismic soundings and operate the biological laboratory.

## BIOLOGICAL LABORATORY IN FULL OPERATION

Fishing through holes blasted in the ice and using spotlights to aid in the collection of fish and marine invertebrates are among the methods used by scientists working at the recently-completed U.S. Antarctic Biological Research Laboratory. The laboratory was built and equipped through a National Science Foundation grant of 82,000 dollars made to the Arctic Institute of North America.

Located at the Naval Air Facility, McMurdo, the laboratory now provides the most complete biological research facilities in Antarctica. Work currently being performed by two biologists spending the winter there includes research in entomology, microbiology, and marine taxonomy.

"Operation Snuffles", a continuation of the summer research into incidence of respiratory infections among the wintering-over party, is being carried on with the laboratory facilities. It is under the direction of Lt. Jack W. Potter, M.C., U.S.N., for personnel of the Johns Hopkins University and the National Institutes of Health.

## LATEST EQUIPMENT

Facilities available at the laboratory for this work include a walk-in refrigerator for maintaining constant temperature for stored specimens, a centrifuge for preparing blood serum for studies of antibodies and special freezers for preserving nose and throat swabs used to prepare cultures.

In addition to a wide variety of laboratory equipment, biological supplies, and culture media, the building has a library of standard references, special texts, scientific reports of past Antarctic expeditions, and current research publications pertinent to Antarctic research. Aquaria will be used to permit observation of live biological specimens.

An extensive survey of land invertebrates is now being conducted by Madison E. Pryor of the University of Tennessee, Station Scientific Leader. Objectives of the research

are to determine the kinds and numbers of the region's invertebrates, the relationships and dependencies between plants and animals, and methods by which invertebrates have adapted to the extremes of climate.

### FISH STUDIES

A Stanford University project is studying the population characteristics of Antarctic fishes, their growth rates and metabolic rates, and the identity, distribution, abundance, and ecology of inshore marine invertebrates. This project is under the direction of Dr. Donald E. Wohl-schlag, who was in the Antarctic last summer to start the work. John H. Dearborn, the overwintering field worker, is investigating fish specimens gathered by various fishing methods, with particular reference to the physiological properties of blood and anatomical adaptations to feeding habits and habitat.

Present plans call for extensive field work to be performed at the laboratory during the coming summer. The programme will be expanded to include additional work in pathology and microbiology.

### TRAIL OPERATIONS

In late September, Seabees now wintering over at McMurdo will search out a safe trail for heavy equipment between McMurdo Base and Marble Point, on the Victoria Land coast. They will locate and mark a suitable site for an emergency runway on sea-ice in the Marble Point area. They will return to McMurdo equipment and supplies left at Marble Point last year by a reconnaissance unit which was studying the feasibility of building a permanent, year-round airstrip at Marble Point.

On or about December 15 a tractor train will leave Little America for Byrd Station. Carrying supplies, fuel and equipment to make itself sustaining, the train is a means of getting heavy equipment to Byrd for use in recovering air-dropped supplies and for levelling a runway. One of the train's D-8 tractors will be left at Little Rockford on the way out. Personnel of the train will be flown back to McMurdo.

### AIR OPERATIONS

The main tasks of the 21-plane VX-6 squadron under Captain William H. Munson, U.S.N., will be to air-lift personnel and light cargo to the various stations and to carry supplies to tractor trains and scientific traverse parties. The planes will also make reconnaissance flights ahead of tractor and traverse parties to locate rough terrain and dangerous crevassed areas. The squadron's long-range planes will fly photographic missions over previously un-mapped areas. The squadron will also be responsible for search and rescue operations.

Except for SAR requirements, plans of VX-6 will not fly into the Antarctic until the Air Force has completed most of its airdrops, because of the crowded conditions at McMurdo. The wheel equipped R7V-1 (Super Constellation) will however ferry passengers and cargo between New Zealand and McMurdo.

The 10 Globemasters of the Ninth Troop Carrier Squadron, wheel equipped, will air-lift personnel and priority cargo from New Zealand to McMurdo. Operating from a runway built on the bay-ice of McMurdo Sound, they will make round trips to Pole and Byrd Stations, dropping upward of 10 tons of cargo per trip. They will also support tractor and traverse parties as needed. Airdrop operations are scheduled to be completed by December 1.

The two Rescuemasters of the squadron will stand by in Christchurch for SAR operations between New Zealand and Antarctica.

### THE HERCULES

Four Air Force Hercules will make their Antarctic debut in February. Developed by the Air Force for use in Arctic regions, the Hercules can carry the payload of a Globemaster (10 tons) and has the added capability of landing on skis on snow runways. These turbo-prop planes are being called in to transport to Byrd and Pole Stations buildings and material which will not arrive in Antarctica until after the normal flying season for wheel-eared aircraft.

## AT U.S. BASES

### McMURDO

A "trio of isolationists" are the men responsible for the frequency shifting and maintenance of the radio transmitters at McMurdo. Two of them have been living at the transmitter shack, a mile from the base camp, since last September, with an occasional trip to the supply department during weather breaks. The third man is rotated from the main radio each month. In addition to their routine work they repair and check the transmitter antennas in weather ranging from winds of gale force to temperatures of 50 below zero.

Four of the seven U.S. Antarctic-based aircraft were in cold storage during the winter near Scott Base and each day, weather permitting, one member of the VX-6 detachment had to check on the security of these aircraft: not, presumably, because of their proximity to the New Zealand base.

On August 6 the last of the four planes was hauled on to the ice parking area on the frozen Ross Sea near the NAF, McMurdo, hangar. The other three had arrived on August 3. These planes will now be completely checked to ensure their readiness for flying operations, due to resume about August 17. Major tasks were digging the aircraft out of snowdrifts and hauling them by D-4 tractors and weasel in sub-zero temperatures to the camp. The darkness of the winter night proved troublesome to the drivers of the tractors. During the three mile trip, they could find no visible landmarks until finally sighting a light from Scott Base. They had driven nearly 30 yards off the "main road"—normally a slight distance but one which in Antarctica might have serious results.

During the trip the vehicles had to pass over three cracks in the ice four feet in width.

Two of the planes had suffered minor damage during a storm with 75-knot winds in late June.

Aviation electronics mate Jack Shaffer was briefly known as "the Antarctic farmer", until one night when the power was turned off for

two hours for repairs to generators. The sudden frost destroyed Shaffer's entire crop. He is not sure whether he can claim government crop insurance.

### POLE STATION

A South Pole jibe at the dwellers in the "Banana Belt", Hallett Station:

"The boys at Hallett claim to have seen the sun first in Antarctica this year, but we had the fastest sun to come over the Antarctic pass over us at 90-minute intervals—Discoverer II."

### SUN-BATHING AT -79°

A gigantic steam bath and a sun parlour have made their appearance at Pole Station. "Now," says a report from the Pole, "in addition to treatment for almost daily frostbite, we have to worry about sunburn and heat prostration. No one seems to complain, though, and to see a smile on a bearded face sticking out from a hole in a steam cabinet and another bearded buddy sprawled under the glow of sunlamps does one's heart good . . . in this region where man wasn't even intended to intrude."

The Pole men have been praying for snow or a blizzard. Their snow-melter requires winds of over 20 knots to fill the small snow storage area next to the melter with snow for fresh water. In spite of the fact that the station sits on 8000 feet of ice, the men would rather go out into the darkness and cold to dig their snow than cut blocks in the relative -65° F. warmth of the snow mine inside the station.

The temperature fell to -100° F. on July 7 for the first time this winter.

### BYRD STATION

Temperatures went from one extreme to the other at Byrd Station during June. From a low of -68° F. the thermometer soared to a pleasantly surprising +10° F. In July there was an all-time July "high"—zero. Parkas were being traded in for woollen shirts.

Little America III, built in 1939 near the Bay of Whales, is now buried under 40 feet of snow.

# Life in the Sub-Antarctic

## MACQUARIE ISLAND

(Australia)

A large proportion of the wild life migrated in May. The penguins then departed for the open sea to return in September. Early in June there were still a few seals resting on the isthmus beaches, but skuas and giant petrels were infrequent. The isthmus grasses remained green though the plateau flora was turning brown.

By the beginning of August the station was a hive of activity. As station leader Horwood puts it: "Above the quiet rolling of the sea can be heard the tapping of hammers as Adrian and Deryk work on the balloon-filling hut and glass house. Rod with his cylindrical "Mystery Box" under his arm heads from the Variometer hut on the isthmus to the Seismic hut on Wireless Hill where his seismometer is recording earthquakes as distant as Siberia or Formosa. Stefan and Ortwin set off to count sea elephants, sea leopards or sea lions while George attempts to tame his 47th wildcat. A few yards west of the Isthmus Road silhouetted against a cobweb of wires can be seen Clive erecting a receiver aerial or redirecting a new transmitting aerial on Sydney, N.Z. or Antarctica. Ian clings precariously 20 feet up painting the Dynes Anemometer which records wind speed and direction, Ted is working at a compost heap for an outdoor gardening experiment. In the radio hut amongst an array of knobs and dials Keith and Dave are contacting Sydney, Awarua, Antarctic or Alaska.

"Perched on a large rock ten feet high is the small auroral observatory housing Phil's All-Sky camera, which he made from bits and pieces after the fire destroyed the original hut. Phil records auroral displays at night with the aid of the theodolite and camera. Assisted by George remains at Hurd Point 22 miles south maintaining the auroral radar. At the main camp John O. in his white apron walks through the sand drifts towards the kitchen carrying a box-

## CAMPBELL ISLAND

(New Zealand)

(The Civil Aviation Administration kindly supplies us with the following notes.—Ed.)

With the worst of the winter period behind them the team at Campbell Island has been extremely busy attending to the many outside jobs which could not be dealt with because of wet and heavy winter conditions.

Under the leadership of P. G. Poppleton everyone has coped exceptionally well with this difficult period and morale, which has been excellent throughout, is rising higher still. The atmosphere of excitement at the approaching annual servicing can be felt even as far north as Head Office.

No visitors, other than whales and sea birds, have been reported during the past two months. Unfortunately, it was not possible to arrange the air drop referred to in the previous issue of "Antarctic", and the general disappointment of the expedition can be fully understood. In spite of this, however, there have been no complaints.

### ANNUAL SERVICING

All being well, we hope M.V. "Holmglen" will nose her way into Perseverance Harbour on October 22.

The new expedition members who are already preparing for the voyage are: D. M. Suter, Senior Ionosphere Observer; A. G. Dodds, Ionosphere Observer; A. G. Doran, Mechanic/Handyman; I. P. Johnston, Radio Technician; E. L. Clague, Senior Meteorological Observer; J. P. Squibb, Meteorological Observer; G. H. Cousins, Meteorological Observer.

This will be E. L. Clague's second tour of duty at Campbell Island and

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ful of rations from the food store to satisfy the eager appetites of the party. Harry in blue overalls is always on the go maintaining and repairing the station's generating plant and other equipment."

his choice is a very popular one.

The leader for 1960 will be P. G. Poppleton, who has been granted an extended tour for this purpose. He has done an excellent job and is considered the right man for a responsibility such as this.

The most important member of the expedition—the cook—is yet to be selected.

Recruitment this year has been very satisfactory and it is hoped that the excellent response to advertisements is a good indication of future recruitment for this station.

### WEATHER SUMMARY

Wintry conditions prevailed in July, particularly during the earlier part of the month. Persisting snow showers from 7th to 10th resulted in frozen pipes and cold temperatures especially on the 8th when the screen temperature averaged 26.5°. From the 21st on, improved easterly elements were evident. These resulted from a slow moving and intensified anticyclone.

Maximum temperature, 45.5° on 2nd; minimum temperature, 21.5° on 9th. The brightest day of sunshine was 2.3 hours on the 31st. The greatest rainfall in one day, 0.83 inches ending 9 a.m. on the 19th. Hail fell on 14 days; snow on 11 days. Rainfall for the month totalled 5.29 inches and fell on 28 days. Hours of sunshine, 19.6 hours.

A further 17 Royal albatross chicks have been banded, bringing the total to 35. A mob of lion seals about 50 in number has taken possession of Shoal Point.

The first lamb of the season was sighted on July 26.

The daily average of eggs has been maintained. Two fowls were caught eating their eggs. These were duly tried, sentenced, executed, and consigned to the pot.

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### NEW ZEALANDER JOINS F.I.D.S.

A young Ashburton man, Robert Harkness, is one of four men selected from 40 applicants for replacements in the staff of the Falkland Islands Dependencies Survey. Mr. Harkness will serve as a diesel engineer and his term may extend to as long as two years, nine months.

## BOUVET ISLAND

(Norway)

When the Norwegian vessel "Polarbjorn" called at Cape Town in November en route to relieve Norway Station, the South African Weather Bureau made arrangements for the Norwegians to examine possible sites for a meteorological station on Bouvet Island, during the vessel's journey south. Copies of photographs taken by helicopter from the U.S. Coastguard ship "Westwind" were supplied. No landing could be made, but "Polarbjorn" reported favourably on a site just south of Cape Circumcision. A report was to be sent to the Weather Bureau on the vessel's return to Norway.

Dr. Silvio Zavatti has given some further particulars of his landing on the island. The small Italian expedition left Cape Town on March 16 and reached Bouvet Island on the 21st. The weather was stormy throughout and the Island was enveloped in a very dense fog. After three attempts Zavatti and Costanzo succeeded in landing on Lars Island, where they stayed two days and made meteorological observations. On the return, a landing was effected to the south of Cape Norvegia. Dr. Zavatti remained for six hours in a little bay with a rocky shore. While he believes that the equipment for a scientific station could be landed, he doubts the practicability of establishing a station here. Photographs sent to Dr. Zavatti from Norway suggest that this beach is the same as that found previously by the Norwegians.

## THE VETERANS

C. F. LASERON

Charles Francis Laseron was one of Mawson's men, 1911-14. As the 25-year-old assistant biologist, he spent the 1912 winter in King George V. Land and took part in sledging journeys to the south and east of Winter Quarters. In World War I he was wounded at Gallipoli. He published several books on geology and conchology, and, in 1947, "South With Mawson," a delightful personal story of the last great expedition of the heroic age.

# New Zealander Accompanies Veteran Explorer to Old Camp, Cape Adare

By D. C. THOMPSON

The first men to set foot on the Antarctic Continent, at least in the Ross Sea area, and the first to spend a winter on Antarctic land, did so at Cape Adare, the north-eastern tip of Victoria Land. To the west of Cape Adare lies Robertson Bay. [See cover picture.]

In late January last the ice-breaker U.S.S. "Staten Island" called in to Robertson Bay to establish oceanographic and marine biological stations. On board were two New Zealanders, myself and Murray Robb of Timaru, returning home after a year spent at Scott Base. Since the ship was required to remain close inshore for some hours the opportunity was taken to send a small party ashore on Ridley Beach.

This beach is perhaps one of the most historic spots in Antarctica, for it was here on January 25, 1895, that Henrick Johan Bull became the first man to set foot on the Antarctic continent. With him was Carstens Egeberg Borchgrevink, a Norwegian who had been working as a schoolteacher in Australia, and who a few years later was to return to lead the first expedition to spend a winter on the Antarctic mainland.

## FIRST RESIDENTS

Borchgrevink arrived at Cape Adare in the "Southern Cross" on February 16, 1899, after a difficult passage through the pack from Hobart. Two huts were erected for the wintering party of ten men, and stores and 70 dogs were landed. On March 2, the Union Jack was raised. During the winter regular meteorological and magnetic observations were made by the Australia scientist Louis Bernacchi. Some exploration in the Robertson Bay area was attempted, but the party were constantly hampered by fierce blizzards and low temperatures. Tragedy occurred in October when Hanson, the zoologist, died of an internal disorder. After an uneasy period of

waiting the "Southern Cross" returned on January 28, 1900. Heading south, important surveying and magnetic work was carried out down the Victoria Land coast and along the Barrier as far as the Bay of Whales.

## SCOTT'S NORTHERN PARTY

In 1911 another party wintered on Ridley Beach. This was Scott's "Northern Party", led by Lt. V. L. A. Campbell. Landed by the "Terra Nova", the six men established their camp in Borchgrevink's huts. In addition a third hut was erected. The expedition was embarked in January, 1912, after ten very stormy months. The story of their subsequent winter in an ice cave at Terra Nova Bay is well known.

In our party from the "Staten Island" we were privileged to have a member of Campbell's party, Sir Raymond Priestley, who was British observer as a guest of the U.S. Navy. Naturally the revisiting of the old huts was of great interest to Sir Raymond, but his presence was stimulating to all others in the party.

The Cape Adare area is similar in many ways to Cape Hallett. The cape itself consists of high cliffs, on the west side of which is the loose gravel beach named by Borchgrevink after his mother. It is occupied by a very large Adelie Penguin colony. In the height of the breeding season this beach must be very crowded, as one could see penguins had been forced to nest right up on the cliffs, but at the time of our visit there were many empty spaces.

## THE OLD HUTS

The three huts stood in line a hundred yards or so from the shore.

The Northern Party's was the first visited. Unfortunately, the weather had taken its toll and only three walls remained of the 20ft. square building. The roof had fallen in and wreckage had been scattered by the wind. The remains of a table and some pots, pans and bottles were visible, together with some decayed articles of clothing. Sir Raymond spent some time fossicking about in the ruins.

The two older huts had endured much better, due to their very strong construction. The wall timbers were interlocked at the corners, log cabin style. One hut was full of snow, but was otherwise in perfect condition, but the other had lost its roof. In the latter further items of kitchenware and an old stove could be seen under the debris. The huts were probably little more than 15ft. square.

### DEBRIS

Many packing cases and the remains of foodstuffs were piled around the buildings. The food had completely deteriorated, for example what had once been tinned food was now just cylinders of grey substance with the tins rusted completely away. One interesting find was several cases of Martini-Henry cartridges belonging to Borchgrevink's party. As Sir Raymond pointed out, they were not to know what dangers might be found in a completely unknown land!

Sledges, ski poles and other items of sledging gear were scattered about the vicinity of the huts, together with seal bones, wire cable and dog spars. The bow end of a smashed whale boat lay upside down near the beach. Amongst all this litter roamed groups of Adelie penguins and chicks, the latter a sorry sight as they were in process of losing their fluffy black down coats.

Before boarding our L.C.V.P. for a rough trip back to the "Staten Island", we assisted British scientists W. Sladen and R. Goldsmith band a hundred or more of the chicks with numbered bands for future research and identification.

### AUSTRALIAN MAP

At the S.C.A.R. conference in Canberra the Australian representatives produced a new map of Australian Antarctic Territory. The map shows in detail the latest discoveries, along the coast and inland, of this 2,472,000 square mile sector.

Air surveying of the territory began with Mawson's B.A.N.Z.A.R.E. expedition of 1929-31. During the following ten or fifteen years most of the air-mapping of the area was done from U.S. aircraft of Admiral Byrd's expeditions. Australia has again been active since the establishment of the Mawson Station in 1951, both in the air, with considerable penetration inland, and along the coast. Of recent years Soviet planes and ships have also carried out cartographic surveys. The Russians claim to have air-mapped the whole coast of Australian Antarctic Territory with radio-controlled planes.

Among the striking features incorporated in the new map, to be published next year on the scale of 16 miles to the inch, are the highest known peaks in the territory, Mt. Menzies, 12,000 feet, and the largest glacier system in the world, centering in the Lambert Glacier and stretching over an area of some 10,000 square miles.

### ICE RECONNAISSANCE

For the past three years, Soviet airmen have been conducting an ice reconnaissance of the Davis Sea, flying as far as 450 to 500 miles from the coast. The most favourable conditions for navigation were observed from mid-January to mid-March. In January and February there is a 60-80 mile wide zone of floating ice north of Drygalski Island. It consists of broken ice with a three to six tenths ice cover. The concentration of ice diminishes by March.

In early summer the shore ice presents a serious obstacle for ships approaching the coast. The width of the shore ice is between 12 and 17 miles, and it is up to five feet thick. In July, the edge of the floating ice moves about 120-160 miles to the north, and it remains at a distance of about 380 miles from the coast till September or October.

# Biology in the Antarctic

The ending of the International Geophysical Year has directed attention to aspects of scientific work in the Antarctic which tended to be overlooked when the emphasis was naturally being placed on the earth sciences.

As a result, great interest is being taken in the life sciences in particular, and most of the expeditions setting out this summer plan to pay considerable attention to biology.

This was the case in the earliest attempts to penetrate that part of the Antarctic which is of particular interest to New Zealand, the Ross Dependency. Ross himself, discoverer of Victoria Land and the Ross Sea, had with him several biologists. One subsequently became famous as Sir Joseph Hooker: one volume of his expedition work, "The Botany of the Antarctic Voyage of H.M. Discovery Ships Erebus and Terror in the Years 1839-43," was recently sold at a book auction in Wellington for £40. The first man to be buried on the Antarctic continent was Nicolai Hanson, biologist of the "Southern Cross" expedition of 1899-1900. His grave is on the high headland of Cape Adare (see cover picture): unfortunately many of his notes and carefully, sometimes painfully collected specimens were lost after his death.

So the following notes, selected from recent writings on Antarctic research, may be of interest to those who think of the Antarctic as a vast barren waste where no life is.

## MICROBES AND MEN

The S.C.A.R. meeting at Canberra in March recommended national committees to give adequate consideration to the importance of biological investigation in the Antarctic. Oceanographic biology is one field the importance of which was stressed by the working group on biological studies. The other main field is "Terrestrial Biology and Medical Research," which a writer in "Discovery" points out "embraces all forms of life on the Antarctic continent from microbes to men."

Emphasis was placed on the need to pursue physical and biological

studies side by side. "The Antarctic offers unique opportunities for biological research, much of which is closely related to the human occupation of this region . . . The severe environment has led to high physiological adaptation and relative ecological simplicity, the understanding of which sheds light on conditions elsewhere."

A survey is needed of the diseases already present in Antarctica's fauna, and of their potential threat to man. Also of interest is the survival under Polar conditions of bacteria brought in from outside.

## LICHENS

On an isolated and barren mountain range, jutting through a mile-thick ice sheet that extends hundreds of miles in all directions, more than sixty species of lichen have been found. These paper-like plants, which often grow on rocks, were on the exposed peaks of the Sentinel Mountains in the Ellsworth Highland, West Antarctica. Their discovery by an American trail party was reported by Dr. George A. Llano, a lichenologist.

## ANTARCTIC PLANT GROWTH

Dr. George A. Llano said in Washington recently that cold is not the major inhibition to plant life and growth in the Antarctic. Vegetation, he said, is dependent on a combination of moisture and insolation, a weathering process in which extreme daily temperature changes result in the cracking of rock surfaces. Apparently insolation is also responsible for building up a shallow layer of heat over the rocks and earth which is quite independent of the surrounding temperature. During summer, therefore, algae, mosses, and lichens, the only plant groups at all widespread in the Antarctic, grow there under conditions not very dissimilar from comparable places in temperate regions.

## THE RICH SEAS

Carl Eklund, experienced Antarctic explorer and now research analyst with the U.S. Army Polar Research Division, says that Antarctic waters are 14 times richer in plankton than the waters in the tropics. Some parts are so rich in phytoplankton that the water is green, and the filter-catch smells like freshly-cut grass. Some areas, on the other hand, are red with Krill, shrimp-like creatures which provide the food of the larger marine animals.

The reason? Mr. Eklund is non-committal. Some scientists think that at the Antarctic Convergence there is a sinking, leaving plankton on the surface. Others argue that an upsurge of water bearing phosphates and nitrates nourishes the green plankton. Both may be true. The slightly lower salt content of the Convergence water, caused by the inflow of fresh water from glacial ice, is another factor.

## FAR FLYERS

A giant petrel banded near Wilkes Station as a nestling on February 4, by Drs. Sladen and Goldsmith, was caught alive on May 9 from a fishing dinghy and released near Kaiteriteri on Tasman Bay, at the northern end of the South Island. The banding point is separated from Tasman Bay, New Zealand, by more than 2500 miles in a north-easterly direction.

An albatross banded by W. L. N. Tickell of F.I.D.S. on South Georgia in February was found dead on the south-eastern coast of South Australia on May 26. It had been dead for one to two weeks. South Australia is almost exactly halfway round the world from South Georgia, a distance of approximately 8000 miles.

## EMPERORS

Prior to the I.G.Y., six Emperor penguin rookeries were known, and another suspected. The total known population was less than 40,000 birds.

During the I.G.Y. eight additional rookeries were discovered, and the total estimated Emperor population is now over 135,000. The largest of the newly-found rookeries is that in 73° S., 169° E., off the Victoria Land

coast about 250 miles north of McMurdo Sound. It was discovered in December, 1958, from a helicopter, and contains an estimated 50,000 birds.

## BINDING: VOLUME I.

The 12 issues of "Antarctic" and index, comprising Volume I may be bound by forwarding to:

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If the index is purchased from the Society (price 2/-) and forwarded with the 12 issues, the price for binding, including return postage, is 11/9. Alternatively, the binders will supply the index. Price for binding and index, 13/9.

## Analysis Centre

Mr. Thomas Gray, U.S. representative at the International Antarctic Analysis Centre in Melbourne, arrived to take up his duties on June 16. Mr. Gray worked in the extended forecast section of the Weather Bureau in Washington and was with the U.S. Antarctic expedition for 13 months.

Ten other nations have been invited to attend the centre, which opened in February.

## ATOM POWERED BASES

Admiral Tyree told a Commonwealth Survey Officers' Conference at Cambridge on August 20 that the United States is planning to beat the polar blizzards by flying three prefabricated atom power stations to Antarctic bases. The first atom furnace, he said, would be installed at McMurdo Sound by the end of next year. The others would take two more years and would be flown in by ski-jet aircraft to Byrd Station and the South Pole.

The three atom stations would not only light and heat the bases but would be used to melt ice for water. They are expected to be of the same type as the atom engines used in U.S. submarines. These are capable of supplying light and heat to a town of 20,000 people.

## BOOKSHELF

### SELECTED MAPS AND CHARTS OF ANTARCTICA

compiled by Richard W. Stephenson, Washington, Library of Congress, 193 pages. \$1.50 from Card Division, Library of Congress, Washington 25, D.C., U.S.A.

This annotated list of nearly 500 maps lists the author of the map, its title, place of publication, date, colour, notation, scale, approximate size, etc., with full notes indicating the general nature of the map and its special features. To indicate the coverage, the N.Z. Lands and Survey Dept.'s map of the Ross Sea region is given 14 lines; and every one of the 20 maps in "The Antarctic Today" is separately noticed and given from three to seven lines. All the maps listed have been published since 1945.

### NEW ZEALAND'S ANTARCTIC ACTIVITIES

#### RECENT PUBLICATIONS

#### A. Published in New Zealand

##### Biology

A Radio-carbon date for Penguin Colonisation of Cape Hallett, Antarctica: H. J. Harrington and I. C. McKellar. (N.Z. Jnl. of Geology and Geophysics, v.1, No. 3, August 1958).

Fishes from the Auckland and Campbell Islands: A. W. Parrott. Decapod Crustacea from sub-Antarctic Seal and Shag Stomachs: J. C. Yaldwyn. (Cape Reports numbers 22 and 23: Records of the Dominion Museum, v. 3 pt. 2).

Checklist of Marine Nemertines from Antarctica: E. W. Dawson. (Royal Society of N.Z.: Antarctic Research Committee: Special Report 22).

Narrative of a visit to the newly-discovered Emperor penguin rookery at Coulman Island, Ross Sea, Antarctica: H. J. Harrington. (Notornis, v. 8, No. 5, July 1959).

##### Geology

Beaufort Island, Remnant of a Quaternary Volcano in the Ross Sea, Antarctica: H. J. Harrington. (N.Z. Jnl. of Geology and Geophysics, v.1, No. 4, Nov. 1958).

Geological Investigations in South Victoria Land, Antarctica: pt. 1—The Geology of Victoria Dry Valley. P. N. Webb and B. C. McKelvey. (N.Z. Jnl. of Geology and Geophysics v.2, No. 1, Feb. 1959).

##### Oceanography

The Antarctic Convergence South of New Zealand: D. M. Garner. (N.Z. Jnl. of Geology and Geophysics, v.1, No. 3, Aug. 1958). The Sub-tropical Convergence in New Zealand Surface Waters: D. M. Garner. (N.Z. Jnl. of Geology and Geophysics, v. 2, No. 2, May 1959).

A Shallow Shelf around Franklin Island in the Ross Sea, Antarctic: J. W. Brodie. (N.Z. Jnl. of Geology and Geophysics, v. 2, No. 1, Feb. 1959).

Sea-level Recordings at Scott Base, Antarctica, 1957: W. J. P. Macdonald and A. L. Burrows. (N.Z. Jnl. of Geology and Geophysics, v. 2, No. 2, May 1959).

##### General

New Zealand Activities in the Antarctic: A. S. Helm. (N.Z. Official Year Book, 1958).

Ferguson Tractors: Sir Edmund Hillary and J. G. Bates. (Ross Sea Committee, Report No. 1).

Man-Hauling Sledging: A. S. Helm. (Ross Sea Committee: Compiled for use of N.Z. Geological Survey Antarctic Expedition, 1957-58).

Symposium on Antarctic Research, Wellington, N.Z., Feb. 18-22, 1958. (N.Z. National Committee for I.G.Y., D.S.I.R.)

The New Zealand Antarctic Research Expeditions, Dec. 1958-Dec. 1959: (Ross Dependency Research Committee).

Provisional Gazetteer of the Ross Dependency: A. S. Helm. (N.Z. Geographic Board).

#### B. To be published by Australian Bureau of Meteorology.

(Papers read at Symposium on Antarctic Meteorology, Melbourne, Feb. 1959.)

An Experiment on the Use of Five-day Mean Sea Level Pressure Maps: I. S. Kerr.

The Heat Balance of the Antarctic Through the Year: J. F. Gabites.

# 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.

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Dunedin: J. H. McGhie, Box 34, Dunedin.

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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).

**Marine Biology** (R. K. Dell).

**Aurora Australis** (I. L. Thomsen).

**The Nations in the Antarctic** (recent Australian, South African, French, etc., exploration by leading experts in the countries concerned).

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

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