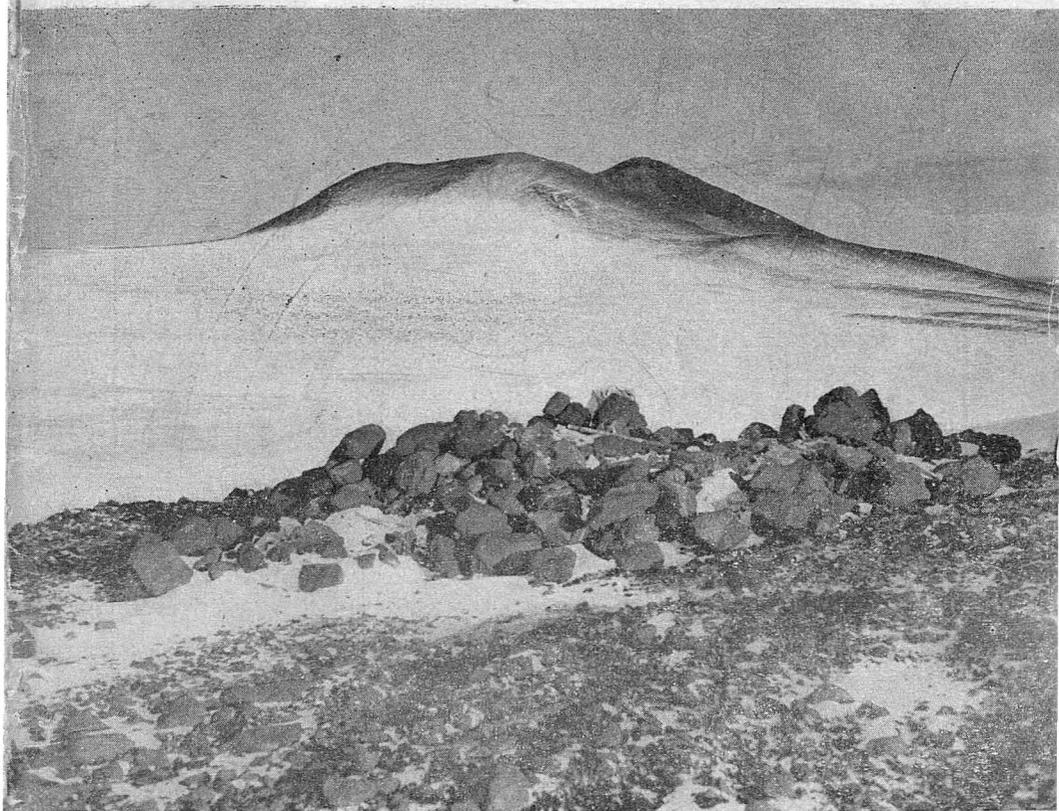


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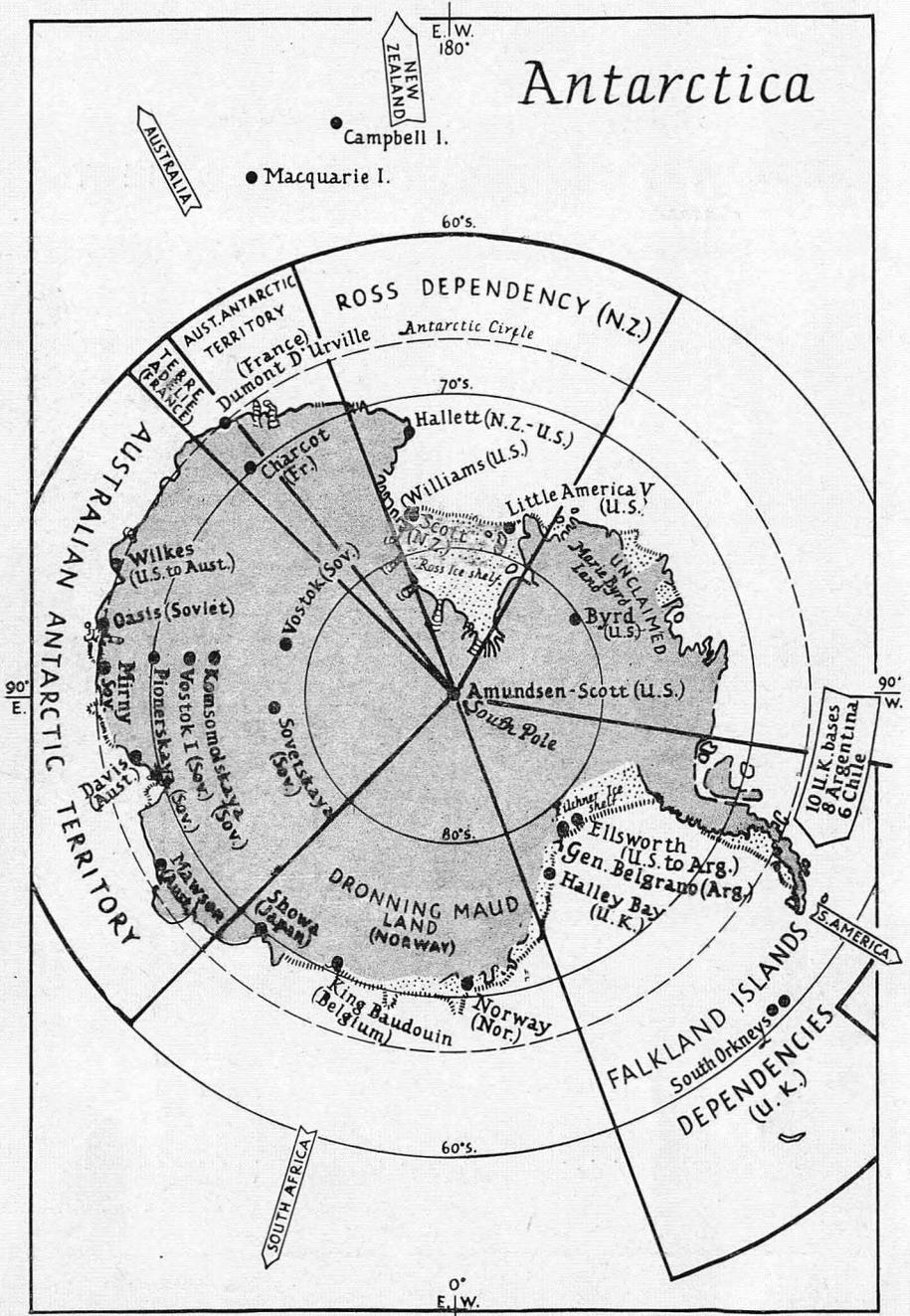


"THE HOUSE THAT CHERRY BUILT"

Looking slightly north of east towards The Knoll, above Cape Crozier, Ross Island. In the foreground is the stone igloo erected in July, 1911, by Wilson, Bowers and Cherry-Garrard during "The Worst Journey in the World."

—Photo: H. J. Harrington.

Antarctica



"ANTARCTIC"

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N.Z. Team Settles In for Winter at Scott Base

The new party at Scott Base has been strengthened by the addition of two members of the N.Z. Geological and Survey Expedition who will now winter-over with Rod Hewitt's team. They are:

A. J. HEINE (33) of Wellington, Engineer Glaciologist. Mr. Heine has spent three consecutive summers in the Antarctic. He remained at Scott Base when the other members of Dr. Harrington's expedition returned to New Zealand.

K. C. WISE (28), who was Mountaineer Assistant and Radio Officer with the Geological and Survey Expedition. Mr. Wise came back to New Zealand, but returned to Scott Base on "Staten Island" on February 22.

Mr. J. G. Weihaupt, the American glaciologist who was to winter at Scott Base, suffered a spinal injury and had to be brought out.

Mr. P. LeQuerne of Napier, an Electronic Technician employed by the P. & T. Department at 2CB, Auckland, was an additional member of the summer party at Scott Base.

ANTARCTIC FLIGHT

The R.N.Z.A.F. is to start an Antarctic flying training squad at Wigram, Christchurch, in April. The flight will go south next December and will carry out flying from January to March, 1960.

The new flight will be made up of three pilots and five ground crew and two planes will be used, an Auster and a Beaver.

The Beaver is scheduled to fly some 250 hours in support of ground parties carrying out mapping and geological surveys in the Beardmore Glacier area. The Auster is expected to log some 100 hours in a similar role.

The personnel of the flight will not remain at Scott Base for the winter, but will return to New Zealand at the end of the summer and go back in time to carry out supporting flights from Scott Base between November, 1960 and February, 1961.

The selected ground crew will begin training immediately and the aircrew in April. This will be followed by Antarctic-type training in the Southern Alps from June to September.

ALPINE CLUB PLANS

Sir Edmund Hillary has declined an invitation from the New Zealand Alpine Club to lead a New Zealand expedition to Antarctica from November, 1959, to February, 1960.

"I have been away so much and cannot afford the time," he said "but I am keen the expedition should go."

His contribution to next year's expedition will be as a member of the five-man planning Sub-committee appointed by the Club.

FOUR NEW ZEALAND PARTIES COMPLETE FIELD WORK

Returning by various American ships and H.M.N.Z.S. "Endeavour", 40 New Zealanders in addition to Endeavour's crew of 33 completed their tours of duty in the Ross Dependency.

Two dog teams and four men left Scott Base on November 25 on a 10 day round trip to Cape Crozier. The team was led by Murray Robb, accompanied by Bob Henderson, Don Thompson, and Graham Caughley. They investigated the Emperor penguin rookery near Cape Crozier.

The party discovered a very large Adelie penguin rookery on the coast north of Cape Crozier, the colony consisting of nearly three quarters of a million birds. A rare southern Fulmar Petrel was seen.

Five different species of lichen were found, including one unidentified moss-like growth.

THE IONOSPHERE

Dr. J. B. Gregory has returned to New Zealand after supervising the installation of equipment at Scott Base for the study of the earth's upper atmosphere by radio waves during the coming winter. The Ross Dependency Research Committee made £5,000 available for the purpose.

The major portion of the installation work was completed before Dr. Gregory left the Antarctic. The machine has given interesting initial results.

Radio reflections from the lower ionosphere were detected immediately. The first significant result is that this shows the existence in polar regions of a feature of the lower regions of the ionosphere, which had been detected previously in experiments in Canterbury.

This feature is located about 55 miles above the earth's surface and is now shown for the first time as existing in polar as well as in temperate latitudes.

RADIO BLACKOUTS

The second significant result concerned polar radio blackouts which played havoc with radio communications. On January 26 significant changes were detected in the lower ionosphere at a height of 40 miles during a partial blackout.

During the coming winter the New Zealand equipment will undoubtedly give additional important information on the whole problem of radio blackout.

The special equipment, comprising the components of an extensive aerial system and the specialised laboratory transmitter and receiver, was taken south in two American vessels, the "Staten Island" and the "Wyandot".

Dr. Gregory states that the installation of the aerials on the rocky undulations a few hundred yards to the eastern side of Scott Base proceeded without a hitch.

Even more pleasing, the intricate electronic equipment, built at Canterbury University, functioned perfectly on assembly. This equipment consists of many thousands of components.

"ENDEAVOUR"

H.M.N.Z.S. "Endeavour" sailed from Wellington on December 20 carrying the relief party for Scott Base.

The crew of H.M.N.Z.S. "Endeavour" had a white Christmas in the midst of a howling gale and surrounded by Antarctic ice.

Conditions during Christmas Day were so bad that celebrations were postponed till Sunday. "Endeavour" was then entering 250 miles of pack ice.

Since the ship left Wellington on December 20 the weather had grown steadily worse till Christmas Day when the wind was measured at 50 knots, forcing her to heave to for 14 hours.

"Endeavour" left the ice pack on December 31 and was reported to be steaming her way toward McMurdo Sound at nine knots.

The ship arrived in the area on January 2 but because of the heavy ice pack could not berth any closer than 12 miles away. The crew worked round the clock in perpetual daylight and completed the stocking of Scott Base and the landing of the winter party on January 4.

OCEANOGRAPHY

"Endeavour" then began a three-week oceanographic programme which will probe the mystery of 24,000 square miles of the Ross Sea.

Two oceanographers, Mr. J. S. Bullivant of Nelson, and Mr. R. K. Dell of Wellington worked with an American marine biologist, Mr. J. Reseck, on a series of 30 "stations," spread over the Ross Sea.

Each station takes about six hours to complete. It includes bathythermograph readings, water samples, temperature and salinity records, from various depths, and graph samples, trawls and plankton surveys.

The depths ranged from 600 to 10,800 feet. At shallow depths underwater cameras were used to photograph the seabed.

All work was done in low temperatures, bitter winds, snow squalls and with few breaks for rest.

Helping the programme was naval scientist, Lieutenant D. A. Christoffel, of New Plymouth, who used special equipment to make deep water soundings and a device of his own design to record variations in the earth's magnetism.

Assistance was given by the ship's company who turned into enthusiastic amateur scientists.

ANTARCTIC CLIMBS

Mount Erebus (13,350 ft.) which was climbed first in 1908 by David, Mawson and McKay of Shackleton's expedition, and secondly by a party under Priestley in 1912, was twice ascended this summer.

On January 4 a party from the New Zealand Geological and Survey Expedition, John Harrison (Leader), Walter Romanes and Alan Beck reached the summit. They left Windless Bight, halfway between Cape Armitage and Cape McKay, on December 30.

The party was dropped by Sno-cat on the Ross Ice Shelf 15 miles east of Scott Base and set out to climb Erebus by a new route on its southern side. After three days of heavy work, partly in conditions of cloud and bad visibility, a base camp was pitched at 3,000 feet. Leaving this camp at 12.15 p.m. on January 4, the party climbed on skis to 8,000 feet, and on crampons to the summit in calm and perfect weather.

An hour was spent at the summit examining, sketching and photographing the interior of the crater, before descending to the base camp at 11.50 a.m. The party returned by man-hauling down the south-west side of Erebus and along the crest of the Hut Point peninsula, arriving at Scott Base at 10 p.m. on January 6.

The crater measures about 2,000 ft. by 1,500 ft. and has the shape of an ellipse. The interior walls are vertical and covered with yellow and white efflorescences deposited from steam vents issuing from the crater walls. In the crater floor, 800 feet below the rim, is another pit 500 feet deep containing on its flat floor five crater pits, from which yellowish-brown steam issues in strong jets. Red hot rock was seen in one pit.

FRIENDLY RIVALS

Two Americans, Hugh Anderson, a cosmic ray researcher, and Hudson Holloway, a seaman, reached the summit of Erebus on January 6, a few days after the New Zealand party.

Seaman Holloway and Mr. Anderson left two other members of their party about five miles below the top to set up a base camp. They went on alone, travelling at times in conditions of zero visibility.

At one point, Seaman Holloway said, "My feet were sweaty when I went to bed and when I woke up they were frozen together."

They reported battling stiff winds and cold that prevented sleep when they reached the 11,500 foot level.

SNOW PENETRATES TENT

"The snow was drifting up and coming through the seams of the tent," they said. "You could hardly take off your gloves long enough to tie a knot or tie up the tent without your hands freezing."

Despite the raw weather they decided to put concentrated meat in their pockets and try for the peak without other supplies. The final dash took two hours.

It took about 11 hours to get back to the base camp after 10 minutes at the top. The entire party was evacuated by Navy helicopter.

FIRST UP TERROR

Mount Terror (11,400 ft.) was climbed for the first time in the week commencing January 11 by Bruce Alexander, Jim Wilson and Michael White, of the same New Zealand expedition.

They spent an hour at the top while Alexander did "a round of angles" to pinpoint the position of the mountain and the surrounding coastline.

The view from the peak was reported as magnificent. The ascent was made from Cape Crozier in two stages with a second camp at the 5,000 ft. level.

After their return from the climb the survey party were joined at Cape Crozier by Mr. Linden Martin and Dr. Larry Harrington and the geological survey of the Crozier area was then carried out.

WILSON'S HUT FOUND

(See cover picture)

A stone hut used 50 years ago by Dr. Edward Wilson and his two companions on their famous winter journey was found again during this survey.

The hut was well drifted up with snow and inside were relics of Dr. Wilson's occupation—Emperor penguin skins, socks, gloves and sledge harnesses.

Save for a few special items in Wilson's scientific box, brought to the Dominion Museum in Wellington, the igloo was left as it was found. "The Emperor penguin skins collected by Wilson's party, some of his collecting bottles, bamboo poles, remnants of the canvas roof and other items are still there," writes Dr. Harrington. "It is hoped that they will remain there permanently."

A huge cairn of stones was erected near the hut so that visitors may more easily find this historic spot.

A food depot was left at the foot of the cairn in case of any emergency stop.

MOUNT DISCOVERY

On December 24 H. J. (Larry) Harrington, John Harrison and E. B. Fitzgerald made the first ascent of Mount Discovery (9,090 ft.) at the head of McMurdo Sound.

N.Z. UNIVERSITY EXPEDITION

During seven weeks in the field, a four-man expedition under the auspices of the Victoria University of Wellington mapped 2,000 miles of the dry valley area of Victoria Land, carried out a gravity survey from the coast 50 miles inland, and examined the geology of the area.

We shall publish in our next issue a report of this expedition written specially for "Antarctic" by its leader, Dr. C. B. Bull.

The Year at Scott Base

By L. H. Martin

(Lin Martin, leader of the 1958 party at New Zealand's Antarctic outpost, sends us this account of the year's work.)

An Antarctic year is over for the eleven men of the New Zealand 2nd Year Expedition at Scott Base. Noon on January 1 saw the last observations taken for the I.G.Y., an occasion that was duly celebrated, for it marked the virtual end of a very successful expedition.

The planned programme of scientific observations in the fields of geomagnetism, aurora, seismology, meteorology, ionospheric physics and radio propagation phenomena had been carried through with 100% success. In addition the team managed to find time to carry out important research projects not envisaged in the original programme.

To achieve this happy result the scientists of the expedition worked magnificently. Greatest credit is due to the support personnel: the cook, Maurice Speary; the engineers, Murry Robb, "Blue" Duff, Bob Henderson; and the radio operator, Peter Yeates. Without the long hours of hard work of these men, often under most adverse conditions, the full scientific programme could not have been carried through.

The winter months were less difficult than anticipated, though average and minimum temperatures were much lower than those experienced the previous winter. Spirits were high throughout and the fellowship amongst the men much better than was to be expected amongst a group with such wide disparities in interest and temper under the restraint of having to keep continuous company throughout the long period of darkness.

"THE BIG EYE"

The biggest physiological problem

during the winter was "Big Eye". Without the regulating effect of alternate night and day it was difficult to maintain a normal diurnal rhythm of working and sleeping. Regular meal hours and regular working hours where possible helped considerably, even so, the early hours of the winter mornings often found more than half the men congregated in the mess hall enjoying a very late supper or very early breakfast. We shall all recall for a long time to come how we enjoyed ourselves discussing all topics conceivable at this Scott Base "Night-club."

Of the physical problems, the most difficult and the most challenging was that of supplying snow to the snow melters. This was a daily requirement as apart from the everyday needs of washing and cooking many gallons of water were used to develop the film records of the scientific data. The snow was collected from a snow mine some five hundred yards from the base. Large ice blocks were cut from the mine with an ice saw and brought by tractor to the snow melters in the base buildings. Each man took his turn at the job of "snow man" and a large supply of snow blocks were kept stacked outside each snow melter as a reserve supply when blizzard conditions prevented fresh supplies being obtained.

THE SUN RETURNS

With the return of the sun at the end of August these problems of winter living passed and we settled down to enjoy the Antarctic spring. Dog teams were taken for training runs in preparation for later journeys. The Tucker Sno-cats were dug out of

winter drifts and checked over and the area surrounding the buildings cleared of debris that had somehow collected during the months of darkness.

October brought the Globemasters from New Zealand and welcome mail. Not all the mail was welcome however as the first bag was of philatelic mail for stamp collectors in all parts of the world and many hours of tedious work was required to deal with all the requests.

THE VISITORS COME

Air flights from New Zealand also brought visitors. Within the next three months nearly six hundred people visited Scott Base. Many of these were very welcome, especially scientists and others with a genuine interest in the Antarctic and its problems. Such people appreciated our mode of living and respected the fact that we regarded Scott Base as our home.

Many visitors however tended to treat the base as some form of transit camp and there were many times when we longed for the peaceful days of the winter when we were a contented family group without the upsets of uninvited guests at all hours of the day and night. A difficulty of too many visitors is that each hour of work lost in entertaining has to be worked later if the scientific programme is to be kept up to date. The appointment of a Public Relations Officer to care for the tourists during the summer months would be of considerable advantage.

Our year in the Antarctic was enjoyable as well as successful. Our success was due to the magnificent work done by each and every man. Our enjoyment was due to the consideration of the men towards each other and the general good fellowship that prevailed throughout the year. I am proud of the team that accompanied me and New Zealand can be truly proud of the great work completed.

ORGANISATION

The planning of New Zealand's future activities in the Antarctic is under the control of the Minister in Charge of Scientific and Industrial Research, the Hon. P. N. Holloway, who is advised and assisted by the Ross Dependency Research Committee (Chairman Dr. R. G. Simmers, Secretary Mr. G. W. Markham).

Executive action implementing the approved scientific programme rests primarily with the D.S.I.R., assisted by such other authorities as the Royal N.Z. Navy. At present the Department has delegated responsibility to the Geophysics Division, Director Dr. E. I. Robertson, who is assisted by Mr. J. Holmes Miller as Antarctic Executive Officer.

N.Z. ICE MAN

Mr. A. Gow, who was a member of the 10 man American team which carried out drilling operations in the Ross Ice Shelf at Little America last year, is to spend two years in the United States studying the ice-cores which he helped to obtain.

"ANTARCTIC"

Volume 1: 1956-1958

An index to Volume I has been prepared, and may be obtained from the Secretary, P.O. Box 2110, Wellington. Price 2/- postage included.

We are indebted to Mrs. N. W. Faircloth for the compilation of the index.

Readers may have their copies bound in an attractive rexine binding, gold lettered, by forwarding them with the index direct to

Express Binding Service,
121 Thorndon Quay,
Wellington.

The cost for binding is 11/9, which includes return postage.

New Zealand Geologists and Surveyors Cover Wide Field

By courtesy of **Dr. H. J. HARRINGTON**, leader of the N.Z. Geological and Survey Expedition, 1958-59, we are able to give this summarised version of the team's necessarily modified but still noteworthy accomplishment.

The party of 12 sailed from Lyttelton on November 25 on the U.S. ice-breaker "Staten Island". It was intended that the expedition should divide, one party under E. B. Fitzgerald to work on the Priestley Glacier flowing into Terra Nova Bay, the other under Harrington to work on a large un-named glacier known to flow to the Lady Newnes Ice Shelf, north of Wood Bay.

"PENGUIN ISLAND"

Following the discovery by "Glacier" of an Emperor penguin rookery, estimated to contain 33,000 breeding pairs on the west side of Coulman Island, a six man party, comprising U.S. biologists and New Zealanders Harrington and Fitzgerald landed by helicopter on the sea-ice at the rookery at 9 p.m. on December 6. The two New Zealanders made a rapid reconnaissance of the geology of the adjacent cliffs and commenced a survey and population census of the rookery.

A storm developed at "midnight" but the party had survival kit and food and fuel for about a week; and when the storm stopped on December 8 work had recommenced before two helicopters arrived from the ships to take them off.

FRUSTRATED PLANS

"Staten Island" and "Glacier" were now lying a few miles south of Coulman Island. Air reconnaissance showed that the storm had blocked with ice the channel which "Glacier" had followed. As "Glacier's" propellers were badly damaged, and the ship would have to return to New Zealand, no further attempt could be made to

land the New Zealanders at Terra Nova and Wood Bays, at least until later in the season. Captain E. A. Macdonald, Deputy Commander of the Task Force, offered however to land the party at any point of Harrington's choosing within 30 miles of the ships, with supplies and equipment sufficient for three weeks of work. On a reconnaissance flight Harrington decided that it would be unwise to attempt a landing under these circumstances as it would take at least a week to reach the land by man-hauling, they would have at most a week's work before returning to the ice edge, and if relief did not arrive on time they would have no food and fuel reserves.

So the party went on to McMurdo Sound on "Staten Island", arriving at Scott Base on December 15. After discussions with U.S. Navy and Air Force officers, and by radio with New Zealand, it was decided: (1) to visit White Island and other localities by man-hauling as conditions allowed; (2) to seek U.S. assistance to establish ground control for aerial photographs in the McMurdo Sound area, and (3) either to try again in mid-January for Terra Nova Bay and Wood Bay or to travel by U.S. aircraft to "Darwin Depot" and from there to explore by man-hauling the ranges south of Mulock Inlet.

WHITE ISLAND JOURNEY

A party of six under Heine left for White Island, man-hauling, on December 18. They established a survey station on the highest northern summit, and made a geological survey of high-level shell deposits before returning to Scott Base on December 24.

Three Weddell seals in good condition were found living along the tide crack between the island and the Ross Ice Shelf, fifteen miles from the edge of the ice-shelf at McMurdo Sound.

Mosses were found in abundance at lower levels, lichens at all levels, and green algae were collected from melt-water pools.

MOUNT DISCOVERY

On December 22 Harrington, Fitzgerald and Harrison travelled by U.S. helicopter to Minna Bluff and landed on Minna Saddle at a height of about 2,500 feet. Winds of up to 50 knots made survey work very arduous, but eventually three survey stations were established, including one on the top-most rocks of Mt. Discovery, at 8,600 feet, about 1,000 feet below the summit ice-cap. The summit itself was reached at 7 a.m. on the 23rd and the party arrived back at their camp nine miles east of the mountain at 4.50 p.m. on Christmas Eve.

From Mt. Discovery it appeared that the unexplored upper reaches of the Koettlitz Glacier, above Heald Island, are not as rough as the lower portion.

After Christmas dinner next day, Harrison sketched while the other two did geology on, and north of Minna Bluff. On the 26th the party returned to McMurdo by helicopter.

SURVEYORS BUSY

On December 22-27 helicopter and Otter flights were made to locate survey control points on the western side of McMurdo Sound pre-selected by the Americans in Washington from earlier air photographs. During the next few days parties of three landed at Lake Bonney, the Kukri Hills, the Lower Wright Valley, Cape Roberts, Kar Plateau (Granite Harbour) and Cape Chocolate.

The final flight, by Harrington, Fitzgerald and Speden, was to the most distant control point, on the Upper Taylor Glacier. The helicopter landed at 2 p.m. on December 29 on a saddle between the two ridges of the Solitary Rocks. Rounds of bearings, photographs and sketches were made at the

Solitary Rocks Station, and a four foot rock cairn was built before returning to camp at 5.30 a.m. After a snow storm, another survey station was established in a wind of 30 knots on the crest of the northern ridge, and marked by an eight foot cairn.

On New Year's Day the party left for Beacon Height West on the south side of the Taylor Glacier, and next day a station was established at about 8,000 feet. Following a 600 ft. climb to the summit, the party returned to the camp after a day of 32 hours. The helicopter arrived on the afternoon of January 4, carrying Admiral Tyree as a passenger.

FINAL EFFORTS

The closing down of U.S. air operations made further survey work difficult, and it was also found impracticable to make the hoped for attempt to carry out the initial plan of landings at Terra Nova Bay and Wood Bay. So the expedition members now made the climbs of Mounts Erebus and Terror described in a special report on page 3.

The final field trips in January were:

1. By three of the party and three from Scott Base, by tractor, dog team and man-hauling, to Black Island. A week was devoted to biological work. The geological and survey party, owing to bad weather, were only able to work on four of the eleven days they were there. At least 20 mummified seals (crab-eaters, not Weddells) were found scattered among the lower moraines.
2. By a three man party to Brown Island by helicopter for a visit of seven days.

3. By three New Zealanders, including biologist Caughley, and an American geologist to Beaufort Island and to Cape Bird. Caughley studied the large new Adelie penguin rookery discovered by "Northwind". The expedition members returned to New Zealand on "Staten Island", "Northwind", and "Endeavour".

There are now enough control points in the McMurdo Sound area to make possible the production of a satisfactory map.

West in Scott's Footsteps Across Victoria Land

By Dr. TREVOR HATHERTON
(Chief Scientist, N.Z. Antarctic Expedition)

Dr. Hatherton accompanied Mr. A. P. Crary, Chief Scientist of the U.S. Antarctic programme, during the second half of the sno-cat traverse, led by Mr. Crary, from Little America, across the Ross Ice Shelf, up the Skelton Glacier, and west across the Victoria Land plateau.

When New Zealand was considering its I.G.Y. programme, I made a special plea for a geophysical profile across the structural "grain" of the area, from the Ross Ice Shelf, through the Victoria Land Range westwards onto the Plateau. The project was turned down on various grounds. Consequently, when Bert Crary sent a signal last year inviting me to go on precisely such a journey with a U.S. party from Little America, I was delighted.

UP THE SKELTON BY SNO-CAT

I arranged to join Bert for an ambiguous "part of the journey" and flew in to Teall Island at the foot of the Skelton Glacier, relieving "Blue" Duff of Scott Base who had been with the party a month. We gave the Skelton Glacier a thorough examination with "major" stations every five miles, at which seismic depth determinations were carried out, and gravity, magnetic and glaciological studies made. In addition, precise levelling was done from the bottom Skelton depot to the top Skelton depot, a distance of over 100 miles. A notable feature of the Skelton is its roller-coaster topography. I shall not be violating Bert's scientific reporting if I mention that the Skelton Inlet is a very deep fjord, floating ice penetrating into the hills for 30 miles before it grounds.

UNEXPECTED HAZARDS

Just above where the ice grounds is

the most broken part of the glacier, near two bluffs which are known as Twin Rocks. The Trans-Antarctic Expedition stalwarts who had crossed this same stretch during the past two summers, reported that by following their route and sticking closely to Twin Rocks, little trouble would be encountered. It may be that the optimistic frame of mind in which we approached this area contributed to the resultant depression when it took us two days to cross three miles in this region.

Trouble started on Thanksgiving day when we put two of a Sno-cat's pontoons down a crevasse opposite Mt. Tricouni, with the loss, however, of only two newly-opened beers. The following day, in an area where as Bob Miller says "you just set your sights on your objective and go straight for it," we looped our train round crevasse after crevasse. Had it not been for the crevasse detector, functioning excellently on the soft, uniform snow surface, we should have undoubtedly put pontoons through several other bridges; this is an area so riddled with holes that manoeuvring one of the other Sno-cats as a breakdown truck would have been a difficult and tedious operation.

OUT ON THE PLATEAU

Once past this area we had no further trouble from crevasses. On the Plateau as we travelled west, in-

creasingly heavy sastrugi became our major vehicle hazard. We had the usual bad weather at the upper Skelton depot, where however, we managed to carry out a refraction profile to determine the types and thicknesses of the rocks beneath the ice. It was while carrying out this survey that I "happened" to be 10 miles away when the only relief flight of my journey landed at the depot.

THE EARTH BENEATH

On our journey westwards on the Polar Plateau, we followed approximately the 78th parallel—about 10 miles south of the 1903 Scott traverse. An unexpected drop in altitude west of the upper Skelton depot was reversed after 50 miles, and thereafter the altitude climbed steadily to almost 10,000 ft. at our farthest west ($131^{\circ} 45' E.$). On the Plateau, we were discomfited by our inability to get good seismic reflections. Those we did get were mainly an act of faith on the part of the observer. However, we were able to deduce that the rock floor of the Plateau was near sea level for the major part of the western traverse beyond the Skelton.

Refraction profiles of up to 18 kilometres were very successful and limited only by the explosives available. The difference in depth between reflection and refraction horizons suggests that a low velocity layer (sandstone?) persists to our farthest west.

Mean annual temperatures as measured in ten-metre boreholes, decreased from about $-22^{\circ} C.$ on the shelf, to $-48^{\circ} C.$ at the western end. Normal seasonal accumulation layers were impossible to detect on the Plateau.

BACK TO MCMURDO

The return journey was fast in spite of repeat shots and re-survey of ice strain lines and accumulation stakes. Several more crevasses had developed in the flagged route past Twin Rocks. Steve den Hartog had a narrow escape when he plunged through a thin bridge, but managed to hang onto the

detector boom. Bucky Wilson missed being thrown down a crevasse and/or having his leg broken and/or being speared by a piece of 4×4 when a detector pan broke through a thin bridge and fractured the boom on which Bucky was sitting. From the bottom of the Skelton a more leisurely approach to McMurdo filled in more detail of water depth and barrier thickness.

The U.S. traverses have been more productive of scientific results, I would venture to suggest, than any other activity in Antarctica. To this, much has been contributed by the "Crary" cab which is much bigger than the conventional Sno-cat cab, and which allows great comfort in sleeping, dining and working. The apparently unhurried traverses with no paramount geographical objectives, which paradoxically made major geographical discoveries, and the unusual staffing of scientific parties with scientists, led to unparalleled opportunities. This bred great enthusiasm in spite of the endless chores of hole-boring and pit digging.

The close and generous support by planes of VX-6 squadron of the U.S. Navy produced a certain peace of mind new to Antarctic exploration. With examples like this as well as the highly intelligent Australian operation, one feels that at last we are reaching a millenium envisaged by Cherry Garrad. "Specially built ships and enough of them; specially engined trucks and aeroplanes; specially trained men and plenty of them, will all be needed if the work (of Antarctic exploration) is to be done in any sort of humane and civilised fashion."

[The "Crary" traverse started from Little America on October 15. Dr. Hatherton joined the party in November, replacing his fellow New Zealander Sgt. Duff. There were five Americans in the team. In all, the traverse party covered 1,629 miles in 109 days, arriving at McMurdo on January 31.—Ed.]

OUR YEAR AT HALLETT

By K. J. SALMON
(Scientific Leader, Hallett Station, 1958)

We were all excited when Cape Hallett Station came into view on the evening of January 13, 1958. Not that there is anything particularly exciting about spending a year cooped up in one spot—far away from home comforts, taking routine measurements—but this was the Antarctic; the Antarctic of Scott, Amundsen, Shackleton and Mawson, and that made all the difference.

The station looked awfully small, even against the tiny spit on which it was built, let alone the gigantic headland of Cape Hallett itself. The magnificent peaks of the rugged Admiralty Range surrounding Hallett on three sides further emphasised the smallness of the station.

So this was Hallett: 72° 18' S., 170° 18' E.: this was the place which Bull in "The Cruise of the 'Antarctic'" mentioned he had seen in 1895 and suggested would be a good place to winter over. He had Borchgrevink with him then. Five years later Borchgrevink led an expedition which made camp at Cape Adare, some 70 miles further north, the first scientific party to winter-over on the Antarctic continent.

We got ashore around 10 p.m. landing on the beach from Mike boats similar to those used for seaborne invasions in wartime. The first thing we did was, of course, to renew acquaintance with the chaps we were relieving, especially the New Zealanders, Bill Ingham, John Humphries and Mike Langavad.

After two-and-a-half hectic days of unloading stores and getting to know the scientific equipment we saw the ships depart and were left on our own to carry on. Life for the next 12 months was to be pretty much routine, highlighted only by special events. The first such event was talking home to our families after

having got our radio-telephone transmitter on the air.

Dr. Larry Harrington, with his Geological Survey Party, was still out back of Hallett somewhere on the Tucker Glacier, where we were passing weather information to him daily. The return of Larry and his men, and the wonderful party which preceded their departure on the U.S.S. "Glacier" on February 19, was an occasion we shall all remember.

DOWN TO WORK

On March 16 we saw our first auroral display. It was not an impressive display but we were all very interested, especially Geoff King and myself, as we, particularly, hoped to correlate the aurora with geomagnetic and ionospheric activity.

The following day was Saint Patrick's Day. Many of the Americans at the station were of Irish descent, so it was quite a party we had! The whole dining hall was decked out in green, and to cap it all a large bowl of beer—dyed green—was available to all.

During March Ken Bargh was busy getting his seismographs recording properly. He had the U.S. Navy, with their powerful machines, excavate a hole down as far as the permafrost. He then cast a pier in quick-setting concrete which he firmly anchored to the permafrost. The seismograph hut was then re-erected in the hole, over the pier, and the earth replaced so as to almost bury the hut. By this means he obtained not only a good solid foundation and freedom from the effects of the wind, but also was able to have his seismometers working under conditions of fairly stable temperature. All of this served to produce very much better recording of earthquakes.

WINTER CLOSES IN

Before March was out all the Adelie penguins, with whom we had shared the spit (and our camp, too!), had left us. We had also had our last visit from a ship. In fact, we were on our own till the following spring.

The months were passing. May was notable for the amount of aurora that was seen, and also for the fact that on May 13 we saw the sun go down—not to be seen again till August. It was getting much colder. The sea, which had begun to freeze over in April, was now well and truly solid as far as the eye could see. What was of great interest was how well, during May especially, the New Zealand broadcast stations came in. Many times during morning aurora watch I listened to ZZB coming in almost as clearly as I used to hear it in Wellington.

June was an especially bad month for blizzards. Norman Benes, the American meteorologic scientist, had a hard job at times getting his weather balloons into the air. Sometimes it was well nigh impossible to get from building to building with the wind blowing blinding snow at over 90 m.p.h. There were no tunnels as at Scott Base, so we rigged lines twixt buildings, and by holding on to these it was possible to clamber blindly over steep drifts knowing that one would eventually strike another building, providing a good grip was kept on the line.

Queen's Birthday was declared a holiday, and in the evening Dr. R. C. Bornmann Lt. U.S.N.R. (the Military Commander) invited all the scientists into his surgery and, after pouring drinks, proposed a toast to Her Majesty. We New Zealanders all considered this to be a very fine gesture.

About this time Ken Bargh started classes in Morse Code, mostly for the benefit of the naval personnel, who were very enthusiastic.

At the height of one of the storms a young naval mechanic, Leyland Brown, had his thumb slammed in the

door of the dining hall. He, and those assisting him, had a hard job in finding the Doc's surgery in the blizzard. That he still has a thumb, he owes to Doc's excellent needlework.

CELEBRATIONS

June 22nd was, of course, a wonderfully happy day. It was Midwinter's Day—the halfway mark. We at Hallett received messages of good wishes from almost all the other Antarctic stations. The international goodwill, regardless of ideology, was most heartwarming. I doubt if we sent out as many messages as we received, although we tried not to forget anybody. Midwinter's Day is a great turning point in the ordeal of the long winter night!

July opened with Independence Day celebrations for the American stations in the Antarctic. Hallett was no exception. We sent out congratulations from the New Zealand contingent at Hallett to all the other American stations, and we all entered into the holiday spirit. The naval cook baked a 100 lb. cake, all beautifully iced in glorious technicolour.

On July 8 and 21 we experienced magnetic storms during which we observed some very fine auroral displays. After the display of July 8 a brilliant red glow persisted in the sky for many hours. The aurora of the 21st July was shorter in duration but exhibited colours from red through to violet. During both these displays the auroral spectrograph recorded some very interesting spectra in which the bands and lines of molecular and atomic nitrogen, and the lines of oxygen, sodium and hydrogen were recorded. The spectograph showed that, without doubt, the red glow was due to emission from excited oxygen atoms.

THE SUN RETURNS

The arrival of August should have brought with it the return of the sun on the very first day (according to my calculations) but weather conditions were so poor that we were unable to

tell whether the sun had risen or not. In fact, we did not see the sun until August 6, so the friendly disagreement between the scientists (only a matter of one day) over the date the sun was due back was never settled. That it came back was the important thing—and with it returned our joy of living! The dazzling brilliance of the sky astounded me as I walked from the Science Building to the Dining Hall for lunch. The return of the sun is far more dramatic than its departure.

During August we at Hallett made something of a discovery. Our auroral spectrograph recorded a line which we were unable to recognise as part of the normal aurora or airglow spectrum. We reported this line to Washington on August 23 and succeeded in giving Hallett a world first in the reporting of this line. Later collaboration with Dr. Gadsden, at Auroral Station, Invercargill, has led to joint publication of details of this line which we think is due to excited lithium atoms in the upper atmosphere emitting red light on a wavelength of 6707.8 angstroms. The spectral line was recorded only during the morning and evening twilights, proving that the emitting material was solar excited. It appears likely that the lithium came from nuclear bombs exploded in the ionosphere early in August.

In September we built an amplifier and erected an antenna in the hope of hearing a special type of low-frequency atmospheric known as a "Whistler". Contrary to expectation those whistlers had been heard at Scott Base, and Lin Martin, Leader at Scott Base and Deputy Chief Scientist N.Z. Antarctic Programme, wished to ascertain whether they could also be heard at Hallett, which was even more unlikely. It was not until December 20, after we had built a new amplifier, that we heard them, and made a tape recording of them as proof.

EXCITEMENT

October was a month we shall always remember. On October 9 our

first penguin returned and this, in itself, would have been enough excitement for one day. However, the arrival of the penguin was completely eclipsed by five aircraft being forced to land on our ice runway, which had been marked out only a few days earlier. An R4D (Dakota) landed first, and, with the aid of its radar, the four gigantic Globemasters followed in. We had something like 65 people to feed and accommodate (as against our normal 16), nevertheless, they were all fixed up, although some had to sleep in some peculiar places.

The following day Admiral Dufek flew in to congratulate the station, and soon afterwards the planes all departed and we were back on our own once more.

The auroral season finished about this time. This was quite a relief, as we had been observing during all dark hours ever since March. It was good to be able to sleep at regular hours again.

TRAGEDY

Morale was never higher than at this time—Hallett was really on the map at last, and the sun was getting higher in the sky every day. It was, therefore, extremely saddening to us all when we learnt, on October 16, that a Globemaster, on its way into Hallett to make us an air-drop, had crashed, killing six of the occupants. The weather was deteriorating and until it improved there was no hope of getting a rescuing helicopter up from McMurdo. A surface search party, led by Dr. Bornmann and including Geoff King and myself, set out to try to effect a rescue. Norm Benes and Ken Bargh (the other two scientists) stayed behind, and were continuously occupied throughout the next 24 hours, supplying weather information and helping with communications. The weather gradually improved and the rescue of the survivors was ultimately made by helicopter. The plane had apparently crashed 35 miles north of the station on a snow covered mountain side some

2,600 ft. above sea level. The survivors were flown in to Hallet and given medical attention. Later on they were flown to New Zealand.

BACK TO NORMAL

It was almost a fortnight before the station returned to something like normal. By this time the majority of the penguin colony had returned and there were about 100,000 of them busily engaged in nest building. By November 9th most of the penguin nests had one egg, and some had two. Towards the end of the month the temperature had risen and the areas around the buildings had begun to get slushy. A few small leads in the ice of Moubay Bay were visible from the hill.

During the second week of December penguin chicks began to hatch out and the air became filled with the sound of their high pitched squeaking.

At this time Geoff King and I, collaborating in attempting to correlate ionospheric and geomagnetic activity with the aurora, produced some very fine series of recordings which showed quite convincingly their interdependence.

We celebrated Christmas with all the trimmings including a decorated tree—not a real one, of course! The messages of good cheer came in from the other Antarctic stations, and the spirit of Christmas abounded. We Kiwis listened enthusiastically to the Christmas broadcast from Radio New Zealand.

Then, of course, came New Year celebrations and 1959.

The U.S.S. "Arneb" arrived on January 11 with our relief, Charles Roberts (U.S.A.) Station Scientific Leader and meteorologist, Lew Jones (N.Z.) seismology and geomagnetism, Brian Reid (N.Z.) biology and aurora, and Alex Black (N.Z.) ionosphere.

GOODBYE TO HALLETT

We departed Hallett on January 16. Hallett Inlet, and most of Moubay, was still frozen over, and we followed closely behind an ice-breaker as we

slowly made our way towards the open sea.

It was three weeks later before we at long last reached New Zealand. We first had a Ross Sea cruise, calling in at Little America and McMurdo. We were fortunate in being put ashore at Shackleton's camp at Cape Royds and Scott's camp at Cape Evans, whilst waiting for the ice-breakers to cut a path into McMurdo. This made it well worthwhile going home the "long way round". We were also able to visit Scott Base and to note what a fine station it is.

So, after a farewell party at Scott Base, we were joined on the U.S.S. "Arneb" by Lin Martin and those who had wintered over with him at Scott Base. Together we all returned to our homeland.

Veteran Returns

Sir Raymond Priestley, Chairman of the U.K. National Committee for Antarctic Research, and a veteran of Shackleton's 1907-09 expedition and Scott's last expedition, on both of which he did outstanding work, has returned after two months in the Antarctic as an honoured guest of the American Navy.

Sir Raymond (now 72), visited the old huts at Cape Royds and Cape Evans. Travelling on the icebreaker "Staten Island" he took a very active part in the scientific work in progress, and was with a party which landed on the rarely visited Balleny Islands. He also saw the bases at Cape Hallett, Little America, and Wilkes; and "sampled most modern forms of polar transport", including Sno-cat and Snokitten. He says he "enjoyed every minute of it."

His American hosts were delighted to be able to give Sir Raymond the news that the Queen had approved the award to him, of the Royal Geographical Society's Founder's Medal.

Sir Raymond represented Great Britain at the S.C.A.R. meeting in Canberra.

IN ADELIE LAND

With the ending of the International Geophysical Year, the French expedition in Adelie Land again comes entirely under the direction of Expeditions Polaires Francaises.

As the French Government did not finally decide until July 4 to continue activity in Adelie Land, the recruitment of personnel was rather hurried, but a strong team was gathered in time to leave Le Havre on the Norwegian ship "Norsel" (Captain Torgersen) on October 24.

The expedition (the ninth French Antarctic expedition in Adelie Land, 1958-1960) comprises 12 men under Rene Merle, who wintered-over with the 1957 expedition.

M. Paul Emile Victor, Director of Expeditions Polaires Francaises, joined the ship at Melbourne to supervise the change-over.

"Norsel" carried a helicopter group of two Djinn helicopters and a crew of five under Major Ch. Petitjean, who was with the expeditions of 1956-57 and 1957-58. The helicopters facilitated the transference of stores from "Norsel" to the barren rocky island on which the Dumont d'Urville base is built, and also the dropping of supplies in otherwise inaccessible areas.

DEATH IN BLIZZARD

A member of last year's wintering-over party Andre Prudhomme, France's leading specialist in Antarctic meteorology, lost his life on January 7. He disappeared during a blizzard when inspecting a weather installation near the base, and search parties were unable to find his body. M. Prudhomme had also been a member of the 1951 wintering party at Port Martin, Adelie Land. He was 39.

M. Prudhomme was to have read a paper, detailing his theories on wind phenomena in Adelie Land, at the Melbourne meteorological conference. His paper was read by another French meteorologist, Bernard Volat, on February 18.

Charcot Station, 270 miles inland on the ice-cap, will not be manned this winter, owing to lack of funds. It is hoped to re-occupy Charcot in 1960. Last year's French team in Adelie Land numbered 24.

At Dumont d'Urville it is proposed to carry out a special study of the physics of the upper atmosphere and to continue the studies on the Emperor penguin. The scientific programme in meteorology, geomagnetism, aurora, ionosphere, oceanography, seismology and human physiology will be continued, but on a necessarily limited scale.

MORE MOUNTAINS

Charles Rouillon, leader of the returning party, said in Hobart that the French programme for the International Geophysical Year had been completely fulfilled. It had been determined that there was a row of parallel mountains under the Adelie Land ice running north-west to south-east. The valley between the ranges was below sea-level.

During the change-over period a party which visited the late Sir Douglas Mawson's 1913 base at Cape Dennison followed the map left by Mawson and discovered almost everything marked on it. In a bound box at the foot of a flagpole they found a chart proclaiming British sovereignty. M. Victor rebound the box and placed it back in its original position.

Matches found in the hut lit readily. The Frenchmen dined on rhubarb left by Mawson's party, and found it "excellent."

The Chilean Railways have proposed a tourist trip to the Antarctic, via the Beagle Canal, Cape Horn and other points of interest. The vessel was to leave for the Chilean bases in February, but very little comment has been made, and it may be that the response of the public has not been sufficient. The vessel proposed was a passenger boat on the Valparaiso-Punta Arenas service.

WILKES BECOMES AN AUSTRALIAN BASE

The Australian expedition to take over the American station Wilkes, left Melbourne on January 6 on the Danish vessel "Magga Dan" (Captain H. M. Pedersen).

The expedition was led by Philip Law, Director of the Antarctic Division. In addition to the 16 men to man Wilkes during the winter, the ship's passengers included a three-man R.A.A.F. team under Sqd.-Ldr. D. Leckie and a number of scientists.

Exactly one week after sailing from Melbourne "Magga Dan" entered the pack ice off Wilkes Land, north of Davis Bay, and began to push through to the automatic weather station on Lewis Island (66° S., 134° 30' E.). In grey, misty conditions the ship weaved its way through ice floes twenty yards wide and five to fifteen feet thick.

The first icebergs loomed out of the mist and by 3 p.m. a great accumulation of giant bergs became visible on the port bow, cemented together by fast ice and dense pack. This was Dibble Tongue, which projects 50 miles out to sea from just east of Lewis Island and forms an impassable barrier to ships.

AT LEWIS ISLAND

"Magga Dan" anchored off Lewis Island at 2325 hours on January 13, and an inspection party went ashore early next morning. It was found that this station, which ran unattended for four months, then failed only because two of the three aerial masts were blown down. The steel structures sheered off at the base and collapsed. All guy wires were still intact, the wind generator was still working and the batteries fully charged. The hut was in good condition and the master clock was still operating. It was decided to use a Duwk instead of a pontoon for land-

ing stores. This meant offloading the Auster aircraft into the water alongside before the Duwk could be unloaded.

The men then carried heavy cases and heavier batteries a quarter of a mile uphill over ice and rocks to the hut. Then the repair team moved in. Aerials were dismantled, wind generator replaced, new batteries installed, etc.

AT WILKES STATION

"Magga Dan" now headed west for Wilkes Station and Captain Pedersen brought his ship to anchor in a small inlet half a mile off Wilkes Station on the evening of January 24. The approach was easy for most of the time. Ice conditions were not dangerous, and the weather was sunny and calm. Photographers had a field day as the ship pushed slowly under full power through floes up to 50 yards wide and five to ten feet thick covering seven eighths of the sea surface. At Nelly Islet, the cairn which had been erected there in 1956 stood out clearly on the 800-foot-high summit.

The first party ashore in a Duwk included Dr. John Boda, who took materials for research investigation into common colds in the Antarctic. After a quick inspection of the comfortably appointed station the party returned on board the "Magga Dan" with a number of new American friends from Wilkes Station.

Next day the party continued unloading operations which involved man-handling drums of fuel over snow and rocks up to the camp. Squadron Leader Leckie found fast ice attached to the coast one mile south of Wilkes

where he considered the Auster aircraft could be landed from a rubber pontoon and flown on skis to the continental airfield behind the station. In spite of the dubious strength of rotten fast ice six inches thick, this operation was safely performed, and aircraft operated rapidly, simply and effectively for reconnaissance and for transport of personnel to and from the satellite glaciology station 50 miles inland on the plateau.

THE CHANGE OVER

On February 4, Mr. Phillip Law, on behalf of the Australian Government officially accepted custody of U.S. Wilkes Station from Commander Price Lewis, U.S.N.R. Captain of icebreaker "Staten Island", representing the U.S. Government. A colourful handover ceremony was held in brilliant sunshine in the open air space near the centre of the station.

The Australian party moved in to take over full responsibility of all station activities and Americans moved out with personal baggage to "Staten Island". An interesting link with the past was provided by the presence of Sir Raymond Priestley, 72-year-old official U.K. observer on board "Staten Island" who was a member of Shackleton's 1907-08 and Scott's 1911-13 expeditions.

Next day the "Magga Dan" sailed, leaving Dingle's 17-man party to man the base for twelve months.

ROBOT WORKING AGAIN

Back at Lewis Island, A.N.A.R.E. men on February 9 spent 14 hours erecting new radio masts to replace those blown down last year and fitting new components and making adjustments to radio transmitters. From now on the station will transmit on two different frequencies: 6910 and 9815 kilocycles four times daily at 0530, 1245, 1800, 2400 hours G.M.T., plus or minus five minutes. Broadcasts are under call sign VNX and give coded letters representing barometric pressure, temperature and wind velocity.

"Magga Dan" left Lewis Island the same evening, and the unattended Robot Observer will it is hoped maintain its lonely schedules through the long Antarctic winter. It will not be revisited until January 1960.

In perfect weather "Magga Dan" now sailed eastwards to explore the unknown coast of Oates Land. In the late afternoon the ship sailed past a magnificent tabular berg 25 miles long, 8 miles wide and 120 feet high, while blue whales and humpbacks surfaced and blew.

BATTLES WITH ICE

The first attempt to break through to Oates Land failed. On February 12 the expedition entered pack-ice at 149° E., and began pushing south. A small pool was found alongside an iceberg. Leckie flew Law for a 60-mile flight and discovered improved conditions ahead, west of a huge accumulation of icebergs grounded on a shallow bank. Captain Pedersen found a lead south but impenetrable ice was then encountered and snow and bad visibility prevented flying.

On February 14 the barometer plunged almost off the chart to 958 millibars and in a storm Law decided to withdraw. However, strong wind had packed previously loose floes, and by noon only two miles were gained. The ship became jammed with broken slabs and heavy floes wedged beneath the hull. Three hours work, with all hands in a snowstorm using picks, shovels, axes, poles, ice anchor and ship's winch, cleared the ice wedges and permitted the ship to resume backing and charging. Laboriously slow progress, 10 yards in an hour, with no visibility was stopped at midnight.

At 3 a.m. on February 15 the weather cleared and "Magga Dan" reached more open ice. The ship now made good progress back along her track but at noon snow showers and heavy ice again slowed her to a crawl.

Open water was now about six miles ahead, and Law decided to move 250

miles east on the 16th and then probe south again.

THE WILSON HILLS

On February 17 "Magga Dan" turned south from 65° S. along the 158th meridian, just west of the Ross Dependency, and that evening met pack-ice. Next morning at 3 a.m. the Australians pushed on through very heavy hard icefloes before later running into thinner pack which permitted better progress. By 9.30 p.m. they had reached within 18 miles of the coast, but had run into impenetrable pack-ice, bad fog and a 35-knot gale from the south-east. On the 19th the snow showers cleared to show the Wilson Hills, discovered and named by Pennell on "Terra Nova" in February, 1911. This was the only time this Oates Land coastline has been approached.

The Wilson Hills are really mountain ranges rising to 3,000 feet and a glacier tongue extends from them 20 miles seawards. In fog the vessel had approached the coast to the east of this tongue.

At 8 a.m. the ice came under pressure due to wind and tide and gripped "Magga Dan" immoveably. Law became apprehensive as, trapped in heavy ice, they drifted towards a 60 foot wall of the ice tongue. At 2.30 p.m. Captain Pedersen managed to move the ship and slowly fought northwards, backing and charging, gaining a few yards each time. By 5 p.m. they had drifted to within one mile of the tongue, but by 7 p.m. had fought clear of its northern point.

On February 20 they continued to retreat slowly northwards until they reached an open pool in the ice. Law now decided on aerial reconnaissance and photography of the coast. Leckie flew 30 miles over the pack-ice to the coast, where in good visibility Law photographed from the air the mountains and other features of interest. On their return they could not find the ship amongst a confetti pattern of myriads of icefloes and spent an

anxious half hour before landing safely.

COAST REACHED

This flight enabled Law to direct Captain Pedersen through weaker ice to the west side of the glacier tongue. Here they reached the coast and anchored at 6 p.m. against fast-ice one mile from the junction of mountains and tongue.

In 20 miles of magnificent coastal scenery, jagged black peaks rise from the ice plateau and plunge almost vertically into the sea. Crevassed glaciers sweep down between them to a broad valley glacier, from which the glacier tongue extends 20 miles into the sea. Numerous Emperor penguins indicate the presence of a rookery nearby in winter.

On the night of the 20th Burnside obtained a star astrofix of the position of a nearby peak. The Auster was changed from floats to skis so that fast-ice could be used as an airstrip. Next morning Leckie flew Law 70 miles westwards over a viciously rough ice coast until more than 80 miles in the distance they could see Horn Bluff. This means that the whole coastline of Australian Antarctic Territory has at last been observed.

LANDING MADE

While they were absent, the first landing on the Oates Land coast was made. Geologists, zoologist and glaciologist examined the region and a cairn was erected on an 800-foot peak from which the Australian flag waved.

On his return flight Law had noticed that the pack-ice on the eastern side of the tongue had relaxed, and as the weather was calm he decided to attempt a coastal survey of that side. "Magga Dan" left her anchorage at noon. Burnside ran depth soundings around the tongue and from close inshore on the other side photographed, surveyed and sounded the coast for six miles to the end of the mountain area. The ship then returned to her anchorage on the west side to avoid being trapped as

previously. On the morning of February 22 "Magga Dan" left for Macquarie Island on the voyage home.

BEFORE THE TRANSFER

American reports before the hand-over took place say that in December, about 23,000 penguins were counted in the area surrounding Wilkes Station, and even then some rookeries were uncounted. Six Emperors were seen one day early in the month just north of the station.

Six men spent over a week at Browning Island, thus completing the topographical and geological reconnaissance of the islands and nunataks in the Windmill group. An oyster-type shell was found on raised beaches at Peterson Island. 88 seals were counted on a small islet east of Herring Island.

With the rapid melting of ice about New Year's Day, some men tried swimming and sun-bathing, and boat trips were made as far north as North Island and as far south as Midgley Island.

Protestant and Catholic church services were held in the Chapel on Christmas Day, as well as carol-singing.

FIRE

A fire in the workshop caused considerable damage early in the New Year. It was brought under control within an hour, and the Americans hoped to have the workshop repaired in time for the handover to the Australians. No one was injured.

Three of the scientists went in a skiff to Chappel Island in mid-January and had a rough journey home, all being soaked by waves. They counted 9,000 penguins on the large islet, bringing the total Adelie penguins counted in the Windmill Islands area to 81,000.

WHO SNEEZED?

Dr. R. Goldsmith found 50 volunteers on the "Staten Island" for his

"Operation Snuffles" (see "Antarctic" No. 12, p. 325).

Nose and throat swabs taken each day revealed what types of viruses the ship was carrying. When the ship arrived at Wilkes Station, he hoped to take swabs from the men who wintered over there in complete isolation, and to get blood samples to find out what antibodies they have in their blood.

"Then", says the good doctor, "we hope they will catch cold."

A report dated January 28 mentioned that the wintering-over men had been invited on to the ship for a "party", and added, "Common cold symptoms are beginning in some men."

(A Melbourne newsman headed his report of Dr. Goldsmith's experiment "Swab!")

New U.K. Committee

The first meeting of the newly formed British National Committee on Antarctic Research was held on January 27 in the rooms of the Royal Society. The Committee will co-ordinate British Antarctic activities in relation to the scientific programme at present being considered by S.C.A.R. It is hoped that the Committee will be able to arrange for greater participation by scientific workers from the United Kingdom in Antarctic research activities.

A Colonial Office draft estimate calls for the expenditure of £500,000, twice as much as was granted for last year's operations.

The Chairman of N.C.A.R. is the veteran Antarctic explorer and scientist, Sir Raymond Priestley. The Committee comprises nine Royal Society members and thirteen others representing the Royal Geographical Society, the Scott Polar Research Institute, Falkland Islands Dependencies Survey, and other organisations.

FOURTH SOVIET EXPEDITION NOW IN ANTARCTIC

The diesel electric vessel "Ob" and the liner "Mikhail Kalinin" have this summer effected personnel changes, re-supplied the existing coastal bases, and helped in the establishment of a new base in Queen Maud Land.

"Ob" reinforced Mirny on December 22 and called at Mawson en route from Mirny to establish the new base Lazarev in the Queen Maud Land coast. The Australians warmly welcomed the Soviet explorers and helped them to unload petrol and stores for the expedition to Lazarev. Australians were also given a cordial reception on board the "Ob".

The Australians report that the Russians requested and have been accorded facilities for refuelling their planes at Mawson in transit from Mirny to their new base.

LAZAREV ESTABLISHED

"Ob" penetrated to the Princess Astrid coast of Queen Maud Land on February 9. Lazarev Station was established at 69° 56' S., 12° 58' E., where shelf-tongues and the coast form a large bay. The station is about half a mile from the edge of a glacier tongue projecting into this bay. Some 900 tons of cargo has been unloaded about four miles from the base site, where "Ob" has carved out a dock in the coastal ice.

Soon after the landing a group led by Prof. Mikhail Ravich flew to the Wohlthat Mountains (71° 30' S., 11° 30' E.), a precipitous range discovered by Ritscher's German Antarctic Expedition of 1938-1939 from the air. Ravich's party is surveying the range, which lies across the proposed route of the Russian trans-continental trek, and will probably be one of the main obstacles to the crossing.

POLE OF INACCESSIBILITY

A party of 18 in four snow-tractors left Mirny on December 3 headed for the Pole of Relative Inaccessibility, a 1,366 mile journey. Travelling at about 100 miles a day, the caravan reached the projected destination, 88° 6' S., 55° E., on December 14, and set up an observation station at an altitude of 11,495 feet.

Over a small building the Soviet flag was raised and a bust of Lenin erected. Temperatures down to -76 F. were encountered.

The tractor party was given air support. A Soviet plane landed at the Pole of Inaccessibility a few days after the tractor team and flew back to Mirny, via Mawson, with four members of the tractor party.

Near the Inaccessibility Pole the Russians discovered a pyramid-shaped peak rising 10,000 feet above sea-level. Only half the peak was snow-covered.

A SUMMER STATION

It is not intended that there should be a party wintering over at "Inaccessibility". During the summer period observations will be made in glaciology and actinometry, and seismic soundings will also be made. The station may also serve as a staging-post during the projected 3,000 mile Antarctic crossing next year from Mirny to Lazarev.

The expedition arrived back at Mirny on January 18, after leaving the Pole of Inaccessibility on December 26.

Another tractor train reached Mirny late in December after completing a 1,864 mile exploration and supply mission.

ALL MOD-CONS

A report from Cape Town, where the "Ob" called on the voyage south, says that the vessel carried three 99 ton 500 h.p. Sno-cats, each equipped with bathroom, bunks for eight men, a small but well furnished mess, and a galley.

The liner "Mikhail Kalinin" reached Cape Town on the return voyage to Russia on February 8 with 160 returning expedition members.

A Moscow message dated February 11 says that a 12 man tractor party had left Mirny for Komsomolskaya, 550 miles inland.

On returning to Mirny from a flight to the Pole of Relative Inaccessibility on December 8 an IL-12 plane, on a new route discovered mountain ranges and ice cupolas previously unknown.

SHAPE OF ANTARCTICA

Data received from the expedition which has reached the Pole of Relative Inaccessibility, says a Moscow report, give grounds for believing that there is a deep under-ice depression to the south of Pionerskaya and that subsequently, as far as Komsomolskaya the bed of the ice is approximately at sea level. One report speaks of a deep wide depression 280 miles from the coast going down about 2,600 feet (presumably from the general rock level) to 3,280 feet below sea level. The depression is covered, it is stated, by 12,400 feet of ice.

The mountain relief between the Komsomolskaya and Sovietskaya stations and also towards the Pole of Inaccessibility is very intricate. Measurements indicate that the maximum thickness of the ice there reaches 12,300 feet.

Evgeny Tolstikov, head of the Third Soviet Expedition, states that it is now possible to draw the conclusion that the Antarctic is a continent. Additional research is still necessary to fully confirm the fact.

When the seismic method was used to study the thickness of the Antarctic ice, many cases were recorded

when the very foundation of the ice shield was found to be below sea level. This gave rise to the theory that the Antarctic is an archipelago. The latest research, however, which has been conducted far into the mainland, has shown that the ice foundation there lies above sea level.

Stanislav Kalesnik, Vice-President of the U.S.S.R. Geographical Society, says that this makes it possible to declare that the Antarctic is a continent bordered by islands soldered to it by the ice.

ANTARCTIC MUMMIES

Yevgeny Korotkevich, a Soviet geographer, has completed a study of the Antarctic mummies—bodies of animals and birds preserved from decomposition in natural conditions.

He found them on iceless patches of the eastern coast of the continent. In Bunger and Grirsson oases he saw carcasses of seals and penguins lying on the surface.

Of particular interest were the finds on the Ingrid Christensen Coast. There, in "Death Valley", the banks of lakes with heavily salinated water were scattered for a dozen kilometres with well-preserved carcasses of sea elephants, seals, giant stormy petrels and penguins and other birds.

Explaining this mummification, Korotkevich points out that, in winter-time, it is done by frosts. In summer, when the temperature rises considerably, the process of conservation is maintained owing to the dryness of the air.

ATOMIC ICEBREAKER

The world's first atomic surface ship, the Soviet icebreaker "Lenin", is nearing completion at Leningrad and is scheduled to begin mooring trials in the spring.

The "Lenin" (16,000 tons) is 440 feet in length, has a 90 foot beam, and a 30 foot draft. Launched on December 5, 1957, 16 months after its keel was laid, it will be the most powerful icebreaker ever built. Its three nuclear

reactors produce the power for engines developing 44,000 horsepower, twice as much as the most powerful ice-breaker now afloat. The reactors will use "only a teaspoonful" of uranium a day, and will not need recharging for several years.

The "Lenin's" range, therefore, will be limited only by the endurance of the crew and the capacity of its store-rooms, which are large enough to provide for a voyage of a year's duration.

The hull is made of a new high-grade steel, specially designed to give it greater strength in ice.

"Lenin's" top speed will be 18 knots under normal conditions, and it is expected to plow through ice nearly eight feet thick at a steady speed of two knots. The design of its bows enables the ship to ride up over the edge of an icefield and break a way through by its own weight.

Soviet scientists say that it will be able to cut its way directly to the North Pole. Two helicopters will be carried to reconnoitre ice conditions ahead.

A report that "Lenin" might be used to drive a channel through the ice to the site of the new station, Lazarev, was evidently without foundation.

NEW TYPE TREE

A report from Mawson says that a Christmas tree was made by sticking paper packing on wire "branches" attached to dowelling, and spraying the whole "tree" with green ink from a throat spray. Decorated with a string of small lights it "looked most impressive" on the Christmas dinner table.

CAN'T KEEP AWAY

Ken Blaiklock, leader of the advance party which wintered in a packing case at Shackleton in 1956, and a member of the crossing party, is wintering again in the Antarctic, this time with the Belgian expedition.

Poles at Oasis

A group of Polish scientists are to take over the Soviet "Oasis" station (66° 7' S., 100° 56' E.). They travelled south on the "Mikhail Kalinin", from Gdynia in December.

"Oasis", established in 1956, is situated in an ice-free area called the Bunger Oasis, near the western end of Knox Coast, some 224 miles from Mirny. It has been operated as a sub-station to the main Soviet stations and has been of special interest for micro-climatological studies.

There are six Poles in the party, led by Eng. W. Krzeminski. The scientific work will include gravity, geomagnetism, earth-tides, seismology, the CO₂ content of the air, and atmospheric radio-activity. Next year another group of eight or ten scientists will make "Oasis" a base for ionospheric and meteorological studies.

American scientists, says a report in the "New York Times", have proposed a broadened exchange programme with Soviet Antarctic stations. During the I.G.Y. an American observer was stationed at Mirny and a Russian at Little America. The Americans now suggest an exchange of glaciologists and of oceanographic observers for 1959-60.

"Further suggestions for exchange will also be welcomed," says the American message.

RE ENERGY . . .

Sir Vivian Fuchs has revealed that tests of energy expenditure measured at his base by an I.M.P. (Integrating Motor Pneumotachograph) revealed the following expenditures:

Sleeping: 1 calorie a minute.

Walking darts: 1.18 calories.

Walking outdoors: 6.25 calories.

Digging outdoors in a 15-knot wind at a temperature of -43°: 9.3 calories.

Australians Extend Field Work at Mawson Station

While eagerly awaiting the arrival of the relief ship "Thala Dan", the Australian party at Mawson not only carried out routine work at base, but completed several major field trips of particular interest.

On November 9 Grove flew 460 miles south-east from Mawson to land geologist McLeod and surveyor Knuckey beside a group of new mountains first seen in 1956 by Seaton when flying over the Lambert Glacier 150 miles to the west.

Grove landed at an intermediate depot at Beaver Lake 200 miles south-east of Mawson.

Flying eastwards beyond the Lambert Glacier the pilot picked up the mountains and landed on the antarctic plateau alongside, at an altitude of 6,000 feet. Th outcropping mountain peaks were found to cover an area about 20 miles by 30 miles. While McLeod collected geological specimens Knuckey made astronomical observations which placed the peaks in the position 73° S.

After four hours on the ground the aircraft took off again and flew back to Mawson, refuelling again at Beaver Lake on the way.

FIRE

Fire broke out in the newly-completed geophysics hut at 2 a.m. on November 29.

Quick action by Fire Officer Trost prevented the destruction of the building. Holes were bored in the wall and carbon dioxide extinguishers discharged into the hut to bring the fire under control.

Damage was done to the building and a small quantity of seismic records were lost, but early discovery of the fire saved thousands of pounds worth of valuable equipment.

SEISMIC FIELD PARTY

Ian Adams, the New Zealander in charge of Mawson Base last year and Leader of the five-man tractor-train party doing seismic work in the Prince Charles Mountains, tells of the party's experiences in a despatch dated December 17.

"It is now 2½ months since we originally left Mawson and mainly through our excellent living conditions none of us is showing any ill effects from our experiences. Because we departed several weeks earlier in the season than usual the type of weather and surface conditions inland could only be surmised. From Mawson we followed an established route through the coastal mountains but soon found that winter snow was masking large crevasses that were previously visible, so a new and we hope safe route was surveyed.

LIKE A FROZEN SEA

"Once past this barrier and for the next 100 miles our progress was hindered only by several periods of heavy drifting snow. Through this section we travelled over a series of steep ridges and many ice domes were passed, their sides gashed with ugly crevasses indicating that rock peaks were not far below. The snow surface was broken by dunes surmounted by sastrugi running in long lines down wind. In appearance this surface looked like a stormy sea frozen into immobility. The two tractor trains travelled along the relatively smooth hard snow at the base of the dunes with the tops in places rising 10 to 12 feet on each side.

"After climbing to almost 8,000 feet we had six days on end when temperatures dropped to below the Mawson winter level despite 24 hours of sunshine. During this period it was impossible to start any vehicles. Since then we have had several falls of soft snow that all but immobilised the tractor trains.

JOURNEY HOME

"We are now travelling northwards on the way back to Mawson. Recent seismic soundings made when over 20 miles inland showed that we were travelling on approximately 8,500 feet of snow and ice which places the rock surface at 400 feet below sea level.

"Christmas is only one week ahead and though we will all miss our families and friends a small hoarding of luxury supplies will enable us to celebrate in festive style."

The party returned to Mawson on January 17 after a journey of more than 1,000 miles. The main purpose of the journey was to make further measurements of the thickness of the ice cap.

COMBINED OPERATION

In late November the Mawson party carried out a combined air-lift and dog-sledge operation in the mass of mountains behind Amundsen Bay in Enderby Land, 350 miles west of Mawson.

In a series of flights on November 19-27, five men were flown to Amundsen Bay, sledges and dogs were also flown in, and survey flights were made in the area. Some delays were caused by clouding, and a dog fight occurred in one aircraft on the 27th, when King was bitten on the arm while trying to separate the dogs.

On November 28 Knuckey, McLeod and King began their sledge journey back to Mawson.

On November 29 the party crossed an area of crevasses without incident and climbed to a height of 2,000 feet through soft snow. On December 1 they halted to carry out a geological

survey and make an astro-fix, continuing the following two days through an area of ice-domes and crevasses.

They stopped again on December 4 at 67° S., 52° E. and carried out another astro-fix.

They were now held up for a few days by bad weather and met a bad patch of wind ridges three feet high when they turned south. They reached their first air depot which they had named the Wanti Depot, on December 9. (Wanti is aboriginal for "no name".)

Wanti Depot, which is 107 miles from Amundsen Bay was established by air earlier in the year. The men and dogs here enjoyed a welcome change of diet from pemmican and tinned dog food to fresh seal meat which had been preserved by the Antarctic ice, since it was dropped by air more than a month before.

LATE FOR CHRISTMAS

Christmas Day found the three men five miles short of their Christmas dinner—chicken for men and seal for dogs—which awaited them at Leckie Depot. They were encouraged by the fact that they had passed the halfway mark to Mawson, and that the dogs were running well.

Five or six days were spent immobilised by bad weather. Obstacles met included badly crevassed areas, regions of soft snow and heavy cloud and "whiteout" at an altitude of 7,000 feet. However, the dogs performed well and the men arrived at the depot at Leckie Range on December 27. There the dogs once again enjoyed seal meat and the men feasted on the small selection of Christmas delicacies especially left there. They then packed up and departed on their last 200-mile stage to Mawson. They obtained four valuable astrofixes and collected geological specimens at various mountain peaks which they passed.

On December 28 they radioed that in 19 days they had travelled 216 miles.

On New Year's Day the cloud broke to allow survey work, including a

climb to the top of the Leckie Range.

In the latter stages of their trek, the party ran into a fine-day blizzard which left a thick carpet of snow up to the men's knees and the 13 dogs found the going difficult. However, as the party ran east, conditions improved and they made good mileage over the final stage, arriving back at Mawson on January 18. Their trek covered a total of about 465 miles of which only the last 20 miles had been covered previously.

WORK AT DAVIS

Temperatures for November at Davis were: Maximum 32.3° F., Minimum 05.9° F. The average humidity was 59 per cent.

Visits were paid to a number of off-shore islands to check the bird life during the nesting season. Most of the islands have many thousands of nesting penguins, zealously guarding their two eggs against raiding skuas. Egg laying commenced on November 8, the same date as last year.

December was a busy month. As soon as snow drifts receded enough, outside painting began. A large snow drift covering the road from the beach worried the four men and the only solution was four shovels and lots of sweat.

"Christmas was celebrated as usual with too much to eat," reports Triggwell, "when we enjoyed the last of our fresh meat, a leg of pork which had been saved together with curried crab, ham, plum pudding and brandy sauce garnished with a bottle of sauturne." The New Year was traditionally welcomed with a toast and Auld Lang Syne on the gramophone, after exchanging good wishes with the field party dog team and Mawson via the radio.

December was mostly overcast with above average wind. Maximum temperature 44° F., Minimum 24° F.

RELIEF OPERATIONS

"Thala Dan" (Captain H. C. Petersen) left Melbourne on December 26

to relieve the parties at Davis and Mawson. The expedition was led by Mr. D. F. Styles, Assistant Director of A.N.A.R.E. The vessel carried a Beaver aircraft and two Army Dukw (amphibious) vehicles.

DANGER AT DAVIS

"Thala Dan" went aground on a submerged rock about three miles from Davis on January 16 and was refloated at high tide at 8 p.m. next day. She was then anchored in the safest position nearby between islands and the edge of fast ice so that the damage could be surveyed.

The survey showed that a plate at the foot of the ship's stem had been crumpled and torn over a length of three feet. The tear began about a foot forward of the number one hold forward bulkhead.

The ship's crew placed a canvas sheet around the stem and pumped out and cleaned the deep tank. They then plugged the damaged section, which is near the keel and well below the water line, with wood and concrete.

"Thala Dan" managed to progress one and a quarter miles towards Davis Station before being stopped by a blizzard about half a mile short of the anchorage. Several men passed between ship and shore on skis so that the winter and relief parties established contact.

ON TO MAWSON

The relief at Mawson was carried out under the most unfavourable possible conditions. "Thala Dan" made her Mawson landfall on February 4. Last winter's ice had not broken out for some miles off shore and refreezing had begun but "Thala Dan" was able to break a path into the harbour and tie up to rocks inshore.

PERILOUS LANDING

New fast ice close to the rocks proved incapable of bearing mechanical vehicles but was too thick for amphibious Dukws to force a passage between ship and shore. A Weasel

made several journeys on the harbour ice, then suddenly broke through and sank. The driver, Gardner, leapt to safety and the Weasel was recovered after Sgt. Richardson, R.A.A.F., donned an immersion suit and affixed a cable to a towing hook, enabling caterpillar tractors on shore to haul the Weasel on to the rocks. The vehicle was later virtually restored to running order.

The problem of unloading further cargo was solved by rigging an endless cable on winches between ship and shore, and towing cargo sledges over thin new ice. One broke through, and some radio mast sections had to be recovered through the ice with grappling hooks. Hundreds of sledge loads were successfully towed ashore, sixty tons of bulk fuel pumped through pipes laid over the ice, and many thousands of gallons of aviation spirit in 44-gallon drums rolled over the ice by processions of expedition men.

More than sixty men, in addition to the ship's crew, worked fourteen hours each day.

On February 9 a party of ten made a round trip of 36 miles by caterpillar tractor and Weasel over the ice plateau, testing the newly designed heavyweight caravan, offering special facilities for the inland scientific programme. Various types of ice surface as far as Masson range were inspected as possible emergency or routine landing areas for aircraft.

On the 12th a blizzard obliterated the scene with drift snow, making traffic over the ice impossible. The 1959 party, was still living on "Thala Dan" after seven weeks. The ship's damaged stem was holding well under repairs.

SEA ICE BENDS

"The big tractor was got safely ashore on February 13 in accordance with carefully calculated but rather risky plans.

"We spread its weight as widely as possible over 400 square feet of not very tough sea ice only one foot

Argentines Rescued

Five men stranded in January on Robertson Island (65° 10' S., 59° 40' W.) off the east coast of Graham Land were rescued by the Argentinian ice-breaker "San Martin".

The men are described as "members of Lassiter's team". Major James Lassiter, a reserve officer of the United States Air Force, is said to be in Buenos Aires acting in an advisory capacity for Argentine activities. The five men are themselves believed to be Argentines. They had supplies to last them for a year.

The "San Martin" reached Robertson Island to rescue the men only a few hours before the arrival off the island of the U.S.S. "Glacier". The Argentine Government had requested United States aid, and "Glacier" was diverted while en route from Lyttelton to McMurdo Sound. She arrived at Robertson Island after a 5,000 mile dash, on January 27. In the meantime it was found feasible for "San Martin" to pick the men up.

Visitors to Little America used to smile at a notice board outside an engineers' camp alongside the snow-trail between the ice edge and the main base: "Camp Coldbottom".

thick," reported Mr. Styles. "The ice bent six inches and cracked loudly under the seven ton total load.

"However, the tractor winch ashore kept the whole structure of tractor beams and four sledges moving just fast enough to reach the shore without the ice failing completely."

The Beaver aircraft, a two ton sample of Antarctic rock of an unusual type for the Royal Society, and four husky dogs for the Davis station were then loaded and the vessel left for Davis en route to Melbourne on February 14, after ten days of solid work.

Japanese Expedition Returns to Showa Base

The Japanese, who were unable last summer because of severe sea conditions to re-occupy Showa Base on the northern coast of Ongul Island, Prince Harald coast, have succeeded in re-occupying the station originally established there.

The Japanese Antarctic Research Expedition III (1958-59) left Tokyo on November 12 on "Soya", which had been somewhat reconstructed to act as an aircraft carrier. The ice conditions were so bad, as in 1957-58, that the "Soya" again could not approach the "Showa" Station. So the transshipping was carried out from the air by two large helicopters (Sikorsky S-58) from miles north of the station.

A six-man advance party was flown from the ship "Soya" on January 14. From then till February 5, 58 flights were made, and 57 metric tons of equipment and stores were carried in besides the wintering team of 14 men and three dogs. This party includes eight scientists (meteorology, geomagnetism, aurora and night airglow, cosmic ray, ionosphere, seismology, human biology), with Mr. M. Murayama as Leader.

ALL IN ORDER

To the great joy of the new party, all the huts were found in perfect condition, and two of the 15 sledge dogs had survived in a healthy condition. The dogs had remained there when all the first wintering party withdrew in February, 1958.

The "Soya" will continue oceanographic investigations for a few days and will return to Tokyo late in April.

At one stage it seemed that help would be needed to free "Soya" from the ice and the U.S.S. "Glacier" was ready to go to her assistance, but "Soya" was not close in shore and she was able to reach the open sea without ice-breaker assistance.

The news of the survival of two

dogs, Taro and Jiro, caused great excitement and delight in Japan.

"Two Dogs Survive!" headlined Tokyo's big dailies in type normally reserved for the outbreak of war and similar events.

Radios blared the news hourly. Newspapers, radio stations and news agencies were flooded with calls for more information. There was as much rejoicing as there had been protest when the dogs were left behind last February.

The expedition Leader, Mr. Murayama, radioed that when the advance party landed the two dogs came bounding up wagging their tails in greeting. There was no sign of the other thirteen. Either they had fallen down crevasses, been frozen, been carried to sea on ice breaking from the coast or been eaten by the survivors.

The 15 sledge dogs, members of the vanishing Japanese Karafuto breed, were left behind when heavy ice kept the "Soya" from reaching the base to restock it for the Antarctic winter. Bad weather halted flying after removal of the 11 Japanese scientists who had staffed the base and nine other dogs.

Abandonment of the dogs had brought nation-wide demands that they be saved. Some appealed to President Eisenhower to help. Memorial services were held in various Japanese cities, and a statue of the 15 was erected in Osaka.

Dr. E. Nishibori, one of the expedition which had to leave the dogs behind, said that apparently the two dogs had lived on dried fish.

BELGIAN EXPEDITION NARROWLY ESCAPES DISASTERS

After a plane crash in January involving four members of the winter party, and the trapping of the supply ship "Polarhav" in pack-ice 30 miles off the coast in February, the Belgian expedition only escaped disaster through the splendid assistance rendered by the Russian and American expeditions.

On December 5 de Ligne and Huls-hagen left Depot D3 by plane for a photographic reconnaissance in the Crystal Mountains, where Gerlache and Loodts were already working.

Next day on the usual 9 a.m. radio schedule Vanderheyden at Depot D3 (125 miles from King Baudouin Base and 75 miles from the mountains) reported that the plane had not returned there. As previously instructed by Gerlache, he set out by tractor to contact the party. He was stopped by a zone of crevasses a few miles from D3, so made for D2, 62 miles west of D3. Here he hoped to intercept Picciotto and Giot, who were dog-sledging in the mountains and expected to pass through D2 about this time.

RELIEF EFFORTS

Vanderheyden succeeded in this effort, and the three men returned to D3 on the 10th after a journey made very difficult by extensive crevassing and blizzard conditions. The tractor and two heavy sledges were lost in crevasses en route.

As the four missing men had enough food only to last them until December 20, and it was obvious that a surface rescue would involve grave risks, it was decided to seek air-assistance from other expeditions. The Russians at Mirny, 1,860 miles to the east, at once offered help, and as soon as the blizzard died down to 40 m.p.h. on the 12th, an LI-2 aircraft set off from Mirny at 9 a.m. and touched down at Mawson at 6 p.m. Next day soon after mid-day the Russian plane piloted by Viktor Perov, reached the Belgian base.

A first rescue flight on the 13th was stopped by bad weather conditions. Setting out again on January 14 with a crew of five Russians, an interpreter and two Belgians (the acting base Leader de Maere and Dr. van Gompel) the aircraft flew over D3 and on to D4, east of the Crystal Mountains.

NO TRACE OF MEN

Here there was no sign of life, but at 11.30 a.m. the crashed Auster was sighted, 18 miles from D4. The rescue plane landed on a glacier 3 miles from the wreckage, at 1.30 p.m. The plane was lying on its side with one ski smashed. A note from Gerlache was found in the cockpit, advising that the Belgians had decided, if no help had arrived by the 10th to make for D3, 74 miles away, on foot. But a search of the area between D4 and D3 revealed no sign of the missing men, and the aircraft returned to the Belgian base to refuel.

For five hours the aircraft now flew a zig-zag course 3 miles wide over 25 miles of the route between D4 and D3, again without result, although visibility was excellent.

On the 15th, nine days after the crash, on a further search flight a red tent was sighted about mid-day at the foot of peak D4. The plane touched down. A light sledge, scattered equipment, but no sign of life. Evidently the missing men had decided to travel as lightly as possible. The zig-zag search over the route they had taken was recommenced.

FUEL RUNNING OUT

The Soviet aircraft now had barely sufficient fuel to make the long journey

back to Mirny. The Russian authorities, however, ordered a continuation of the search "to the last drop of oil", and sent the "Ob" to Leopold Bay with supplies of fuel.

The air-search therefore went on, and at 10.50 p.m. de Maere noticed "a little orange dot" on the snow, and as the plane circled low, the four men.

They had advanced in short stages since the 10th, and very fortunately had missed the blizzard on January 13. All were in good shape and were immediately flown back to King Boudouin Base.

During the two days the Russian aircraft had flown for 20 hours, covering a distance of 2,480 miles.

During the rescue operation the Australian base, Mawson, was continually on the air, relaying reports from the aircraft to Mirny.

SHIP TRAPPED

On December 29 it was reported from Brussels that the Norwegian sealer "Polarhav", carrying 22 Belgians on their way to relieve the 16-man team which had wintered in Queen Maud Land, was trapped in pack-ice 30 miles from the expedition's base.

By mid-January "Polarhav" had drifted 70 miles further from the base during the 20 days in which she had been held by the ice.

On January 30 the United States ice-breaker "Glacier" en route from Lyttelton, New Zealand, to the Ross Sea, was ordered to the beset ship's aid. By this time "Polarhav" was nearly out of fuel. The intention at this stage was that "Glacier" should escort "Polarhav" the 130 miles into the base, assist with her helicopter in the transfer of men and supplies, and bring "Polarhav" out of the ice again.

Reaching the edge of the pack, "Glacier" inched her way through the cement-hard ice to within 22 miles of the little red and light-brown sealer. Then rocket flares and a helicopter reconnaissance established contact.

"I HAVE FOUND THEE"

On February 4 "Glacier's" Com-

mander signalled "Proverbs 7: 15" ("I have found thee"). The American ice-breaker had broken through 70 miles of heavy ice fairly easily. But when only eight miles separated the vessels the battle became grim. Time and time again "Glacier" was sent riding up on six to 12 foot thick floes before crashing down through the ice and beginning a new onslaught. The ice-breaker's maximum power (10 engines producing 21,000 h.p.) was insufficient to smash through the rafted pressure ice sometimes piled 20 feet thick, and only "Glacier's" heeling system, which produces an artificial roll of 10 degrees, prevented the ice-breaker herself from being ice-bound.

A whole day's effort brought "Glacier" only five miles nearer. At this stage Belgians from "Polarhav" walked the three or four miles between the ships to watch the ice-breaking operations.

SHIPS MEET

Two and a half days of relentless fighting brought the 8,000 ton ice-breaker alongside the 658 ton sealer, and "Glacier" led "Polarhav" out to open water. The two ships now set out together towards the longitude of Breid Bay.

After only half a day of slow progress a storm, with winds of 40 knots, caused the ice floes to jam together so tightly that both ships were forced to lie-to awaiting a change of wind. They drifted, together, another 40 miles westward in the slowly moving pack.

By the 12th "Glacier" could have broken her own way through to open water but the ice was still too heavy for "Polarhav". The loss of the helicopter (see page 39) added to the problem, but "Glacier" began transferring cargo from "Polarhav".

By the time a second U.S. ice-breaker "Edisto" was standing by outside the beset ships, and one of "Edisto's" helicopters was transferred to "Glacier".

UNLOADING BEGINS

"Glacier" made for the Belgian base and on February 15 approached the small embayment which the Belgians used for unloading operations. Now came a further disappointment: the bay ice had broken out a few hours before. A Belgian Sno-cat parked two miles out on this bay ice for identification purposes had to move hurriedly to a headland on the ice shelf. The depth of water where the Sno-cat had been parked was 160 fathoms.

"Glacier" tried to moor directly to the ice-shelf but high winds soon pulled out all the "dead-men" (ice anchors) and "Glacier" moved to a small bay to westward where she broke a channel through the bay ice. Winds of over 40 knots held up unloading operations until the morning of February 18.

The ice-breaker was about four miles from the dump established on the ice-shelf. Sno-cats shuttled to and fro with sledge-loads of fuel, food and equipment.

After a ceremony in which Captain Felix Bastin of the Belgian Air Force relieved Commandant Gaston de Gerlache as Leader of the Expedition, last year's wintering-over party embarked on "Glacier" on February 23 for transport to "Polarhav".

AT KING BAUDOIN BASE

November temperatures ranged from 1.8° F. to 33.6° F. and December from 1.4° F. to 37.4° F. The wind average was 14 knots in November and 10 knots in December. There were heavy snow falls on three days in November and the snow level rose four inches.

In the field, magnetic measurements were carried out on the surrounding ice-plain and also on the mountains and glaciers to the south and south-east of the base. Nineteen stations were established over some 155 miles to the east of 24° 18' as far as 27° 30' E., 71° 51' S. Geological examination of the area between Byrd-breen and Agjellbreen disclosed no trace of minerals. There were un-

mistakable signs of glaciation on the highest peaks of the range, which rose 3,250 feet above the ice level on the north slope.

December was noteworthy for the absence of blizzard and precipitation, exceptional visibility and little wind or cloud.

NEW MOUNTAINS

The mountain range situated in 72° 30' S. between 30° 45' E. and 31° 40' E. has been provisionally named Belgica Mountains: after the famous vessel of the Gerlache Expedition, of 1897.

Giot and Picciotto made a geological reconnaissance of the Sor Rondare range: 18 days travelling, 14 days work, and 19 days immobilised by blizzard conditions. Further work was prevented by the circumstances narrated above. The Sor Rondare area is easily accessible from the north with little crevassing. On the east and west there are heavily crevassed areas. Access to the plateau towards the south by the great glaciers appears everywhere to be difficult.

Considerable aerial photography of the mountain areas was carried out before the crash of the Auster aircraft.

POLAR BID

It is reported that Captain Bastin is to lead a party of nine men including Ken Blaiklock, who will leave the Belgian King Baudouin Station on September 15 and strike south in hopes of reaching the South Pole, a distance of 1,200 miles.

A reconnaissance party will leave on March 1 to search out a possible route through the Sor Rondare mountain and establish advance supply depots. The party will make seismic soundings and topographical observations, and expects to return on April 30.

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SEE PAGE 6.

NORWAY STATION

The m.v. "Polarbjorn" left Oslo on November 1st and reached the barrier at Norway Station on December 21. On board were five new members of the wintering party 1959-60: K. Odegaard, Wireless Operator; K. Hansen and J. P. Madsen, Meteorological Clerks; A. Ernstsen, Meteorological Assistant; R. Johnson, Steward.

Two Otter planes, with a personnel of nine, are placed at the disposal of Norsk Polarinstittutt by the Royal Norwegian Air Force, under the command of Major Gudmund Odden.

Leader of the aerial mapping expedition was Bernhard Luncke, topographer with Norsk Polarinstittutt. Under his supervision cameras were installed in both planes. Besides Luncke, Sigurd Svindland has been acting as aerial photographer. Further Thore Winsnes, geologist with Norsk Polarinstittutt, has taken part in the expedition. His task was to measure base lines by means of a recently supplied tellurometer.

A house was erected near the shore, and a runway made by means of a Muskeg tractor, and on December 25 the two planes had their first flight.

On November 7 Lunde and Hochlin left Norway Station with dog teams, to continue glaciological work in the mountain region south-east of the base. The Otters also brought the triangulation parties into the field, and Helle continued work from the previous year.

The topographical work in the field went on till January 26, the planes then having finished the photography of the mountains from 0° eastward to Sor Rondane in 30° 30' E. This was rather to be hoped than expected.

"Polarbjorn" left Norway Station on January 31, and took only 24 hours to reach open water.

Of the 14 members who wintered at Norway Station, 10 went home with "Polarbjorn", whereas Sigurd Helle wished to stay a third winter as leader of the wintering party. Torgny Vinje will be in charge of the meteor-

CHILE ACTIVE

The return of the Chilean garrisons from the four Antarctic bases was successfully completed. The last men were brought back by the tender "Lautaro" and arrived at Punta Arenas on January 31. The flagship of the relief squadron of three ships was the transport "Maipo".

Pack ice has, however, hindered the ferrying between the two continents, and the frigate "Iquique", which endeavoured to reach the Chilean bases about the end of January, had to return and take refuge in Puerto Williams. It eventually reached its destination with the help of a Chilean Airforce aeroplane, which directed its passage through the ice.

On February 5 an accident occurred in the engine room of the tender "Lientur", in Puerto Covadonga. The explosion set the petroleum on fire, and the crew was only able, after two hours, to extinguish the flames, with the aid of the Argentine tender "Chiriguano". The "Lientur" was afterwards towed to the Prat base. The accident caused two deaths, electrician Segundo Armando Munoz and seaman first-class Jorge Venegas Bravo. It is not yet known what caused the accident.

On January 12 the final group of officers and men who will man the new Antarctic vessel "Piloto Pardo" which has been built in Holland, left Chile for Europe, under the command of Lieut. Carlos Aquire. "Piloto Pardo" was expected to leave for Chile during the second half of January and to arrive at Valparaiso in mid-February.

Still living in Concepcion, Chile, is Senor Max van Rysselbergue, who was an engineer on the Belgian expedition ship "Belgica" under Adrian de Gerlache during its Antarctic voyage and drift in 1898-99, the "first Antarctic night".

ological work. Also John Snuggerud will stay a third year, and Henry Bjerke will be wintering a second year.

These nine men will go on with the I.G.Y. programme.

Reliefs of F.I.D.S. Bases Held Up by Thick Ice

Bad weather hampered work at Falkland Islands Dependencies Survey Bases in the latter part of last year and heavy pack-ice interfered with relief operations.

All bases reported gales in the first half of October, which hampered field work and caused minor damage to base huts and installations. At Admiralty Bay, the living hut roof and balloon hut were damaged and aërials were blown down. At Base O (Danco Coast) field work in Paradise Harbour was held up by rough seas and was not completed until early in November, and it was impossible to reach Cape Willems. At the Argentine Islands the sea ice broke up preventing further sledge travel between the islands. The sea ice also broke up in the vicinity of Base J (Graham Coast).

In most areas down the west coast of Graham Land, however, the ice is very thick this year and has persisted late into the season. As a result, the four southernmost bases had still not been relieved by mid-February.

SHIPS MOVEMENTS

R.R.S. "Shackleton" arrived at Stanley on 5th November and sailed for the bases ten days later.

Base H, Signy Island, was relieved on the 17th, but a few more days were spent in the South Orkneys to enable Professor David Linton, who is on board, to carry out a preliminary physiographical survey. The ship also called at Coronation Island to collect seal meat for the bases. Hope Bay (Base D) was relieved on November 23 and Admiralty Bay (Base C) on the 28th. She was beset in Admiralty Bay and her rudder damaged, but northerly gales broke up the ice and she was able to drift out on December 6. Course was then set for Deception Island and though delayed en route by heavy pack ice, the ship eventually

arrived there on 10th December. Repairs were carried out and she then sailed south, relieving Danco Coast (Base O) on December 21 and Port Lockroy (Base A) on the 23rd and returned to Hope Bay on the 28th.

R.R.S. "John Biscoe" meanwhile left Stanley on 24th November and arrived at South Georgia five days later. Three weeks were spent there carrying out hydrographic survey and she returned to Stanley on December 22. She then sailed for the southern bases, but having relieved Base F (Argentine Islands) was held up for approximately fifteen days by fast ice at the entrance to Grandidier Channel. Unable to proceed further south she returned to Stanley to refuel on February 10.

Latest reports are that with "John Biscoe" in difficulties two U.S. ice-breakers had gone to her assistance, but "Biscoe" broke free before their arrival.

AT THE BASES

All routine work was continued. In addition, at Hope Bay survey was continued in the View Point area and glaciology in the Mount Bransfield area on the Victory and East Russell Glaciers. A pup-training programme was also carried out.

At Base E, Marguerite Bay, a depot was established on Mushroom Island at the beginning of October, and later in the month geologists worked in Neny Fjord and on Pyrox Islet. This work was continued in November and December but was delayed by bad weather. Geologists also visited the Rhyolite Islets and Mt. Guernsey near

the entrance to King George VI Sound. Two men from Base E visited Base Y in November and again in early January, and two Base Y men paid a one-day visit to Base E at the end of December. Two Base W (Loubet Coast) men visited Base E in mid-December.

Also in December, geologists and surveyors from Base Y carried out work at Square Bay and in the Pourquoi Pas Island locality.

In October, field work was carried out in Lallemand Fjord by a number of small parties from Base W, and the work at the southern end of the fjord and on Detaille Islet was completed although hampered by bad weather. Further work was carried out on the plateau, in Hanusse Bay and in Laubeuf Fjord.

Further north, survey work was continued in the vicinity of Base J (Graham Coast). Field work was carried out in Paradise Harbour and Andvord Bay by men from Base O (Danco Coast) and parties also visited Useful Islet and Neko Harbour.

In the South Shetlands, Base G personnel worked in Ezcurra Inlet, Admiralty Bay, and completed the triangulation of the neighbouring Nelson Island. The survey of Livingston Island has also been continued.

HALLEY BAY

The m.v. "Tottan" left Southampton on November 21 and Stanley on December 26, with the third party of scientists and technicians to occupy Royal Society Base at Halley Bay, Coats Land. The party numbered eleven, the Leader being Lieut. G. R. Lush, M.B.E., R.N., aged 39. Two members have been seconded by the South African Weather Bureau. Another meteorologist, J. A. Smith, who has already spent a year at the base, has been invited to remain there during 1959. Lush and D. Limbert were members of the original advance party which established the Halley Bay base.

The base was successfully relieved on January 10, but "Tottan" was

ANTARCTIC METEOROLOGY

Representatives of ten countries gathered at Melbourne from 18 to 25 February, at the invitation of the Australian Academy of Science, to attend a Symposium on Antarctic Meteorology arranged by the Australian Bureau of Meteorology.

Some forty papers were presented. A number described local effects on the Antarctic Continent. Australian and Soviet scientists in particular have given attention to the structure and explanation of the katabatic winds that sweep so many of the bases.

Of considerable interest were the accounts by K. Hanson, E. Flowers, and R. Taylor (U.S.A.) of more detailed observations of the spectacular spring-time warming of the Antarctic stratosphere than have been available before. The explanation is still something of a puzzle, for it is known that the corresponding warming in the Arctic sometimes occurs before the sun's rays return to the polar stratosphere.

A number of papers dealt with the observed atmospheric circulation patterns in the Antarctic atmosphere and possible interactions with the circulations of lower latitudes. Discussion of the needs of weather forecasting services in middle latitudes emphasised the desirability of improving the observing networks both in low latitudes and over the southern ocean areas. Cdr. W. Lanterman (U.S.N.) described several possible schemes for obtaining information from oceanic areas with floating automatic weather stations and with drifting sounding balloons.

trapped in pack-ice shortly after leaving Halley Bay on January 16 on her return voyage with the men being relieved. Most of these men had been at Halley Bay for over two years. "Tottan" was surrounded by huge floes for five days until the wind shifted. Dynamite was then used to blast a passage through the ice.

AMERICAN ACTIVITY INTENSIFIED AT REMAINING STATIONS

The major changes in control of Antarctic bases forecast in our last issue have been effected. The United States bases now comprise McMurdo (air operating facility), Byrd, and the South Pole, plus the joint U.S.-N.Z. base at Cape Hallett.

At McMurdo the Station Leader for this year is Lt.-Cdr. Andrew Lewiston. Mr. M. E. Pryor will be in charge of the Biological Laboratory.

Future United States operations in the Antarctic will be planned by the Council on Polar Research of the U.S. Academy of Sciences. The Chairman of this Committee is Dr. Laurence M. Gould. The operational side is under the control of the National Science Foundation. Director of the U.S. Antarctic Research Programme is Dr. T. O. Jones.

New Zealand has co-operated with the United States very closely for the whole period, not only at the joint Hallett Station, but in McMurdo Sound, where a mere two miles separate Scott Base and McMurdo Station, and on the supply route for all three U.S. stations, based on Christchurch, New Zealand.

CHRISTCHURCH H.Q.

The United States has now decided to build a permanent headquarters at Christchurch Airport, Harewood. \$250,000 has been allocated to the U.S. Navy for the reconstruction necessary, and the U.S. is paying £6,000 a year to the Christchurch City Council for the use of the buildings.

Work on the first section, the administrative block, began on February 2. The old headquarters, a disused brewery in Kilmore Street, has to be vacated at the end of March. The renovation of other buildings at Harewood for use as a mess hall, recreation building, sick bay and stores buildings will follow. These will have to be ready by the time the

U.S.A.F. squadron arrives in late August or early September.

Contracts have been let to Christchurch firms, especially F. C. Cole & Co. Ltd., for £111,000.

The United States Government could be asked to spend as much as \$64,000,000 on scientific and support projects in the Antarctic in the near future, according to figures given in Auckland on January 16 by Rear-Admiral David Tyree.

But the scientists would first have to put up their projects to the National Science Foundation, a Government organisation, then the money, plus Admiral Tyree's support estimates, would have to be appropriated by Congress.

More icebreakers of the capability of the U.S.S. "Glacier"—"The first of a new class, and the most powerful thing of its kind in the world"—are expected to be built, said Admiral Dufek in a filmed interview in Wellington in January.

"Whether we will go to nuclear power or not I don't know. The 'Glacier' has a large fuel capacity and an immense range as it is," he said.

FATAL CRASH AT MARBLE POINT

A U.S. Navy Otter aircraft crashed at Marble Point, 50 miles across McMurdo Sound from the main U.S. base, at 3.13 p.m. on January 4. The two pilots were killed and three men injured. All were American servicemen.

The Otter was on a supply flight to the Navy engineers who are making a survey preparatory to the construc-

tion of an air-strip at Marble Point. The plane had just taken off on the return flight from the present gravel air-strip when a cross wind caught the port wing and tipped the plane into a hillside.

The co-pilot was killed outright. The pilot and the injured men were taken by helicopter to McMurdo Station, but the pilot died four hours later.

A Skymaster was sent from Christchurch with a doctor and a medical orderly, who accompanied the injured men on the return flight. They were admitted to the Christchurch Public Hospital on January 6 and are all reported to be recovering.

The officers killed were Lieutenants H. Gardner and L. J. Farrell. Seventeen Americans have lost their lives in accidents in the Antarctic, since the expedition began in 1955-56.

LITTLE AMERICA NOW A GHOST TOWN

The snow-shrouded settlement of Little America V, built near Kainan Bay on the Ross Ice Shelf in 1956, is now deserted. It was the fifth of a series of Little Americas. The first was built by Admiral Byrd some 40 miles away to the west in 1929. Little America V had a winter population of about 75, which swelled during the summer months to 200 or more.

The evacuation began on December 31, when the ice-breakers "Staten Island" and "Northwind" began ferrying priority cargo the 450 miles to McMurdo Sound. It had been intended to evacuate the station by a trail across the ice-shelf, but this route proved too dangerous (see "Antarctic" No. 12).

"Staten Island" returned on January 4 to load salvageable equipment and stores for transfer to other bases, and the flag was lowered for the last time on January 6.

The small party then left behind was evacuated by the cargo ship "Arneb" on January 19. These nine men, scientists and military personnel,

included Mr. M. J. Gow of Wellington, New Zealand. "Staten Island" acted as the escort ice-breaker. This ice-breaker's helicopter flew out the last cargo to the waiting ships: ice cores which will be taken by refrigerated transport to the United States for examination.

EMERGENCY CAMP

Most of the equipment in and around the station will be left till late next year—or possibly forever.

Lieut.-Com. Thomas Thompson, the base commander, said he would be lucky to get out 30 per cent. The things transferred include radio and equipment parts needed at other stations.

The Navy left something behind for the benefit of men who might be caught defenceless in the area. A camp has been set up that could accommodate 15 men. It is stocked with supplies they would need for a year. The facilities will be available in the event of an air or trail party being stranded in the vicinity or if another station had a disaster like a fire and needed shelter.

The emergency camp (consolidated in one section of the base) is equipped with radio. Any party coming in could have heat and water the first night.

The material left behind has been cached and flagged so that it can be more readily located for future recovery. About 85 per cent. of the stores and equipment has been left behind, the other 15 per cent. having been transferred to McMurdo or Scott Base. This is mostly scientific equipment.

BELOW THE BASE

Glaciologists from Little America report that their ice drill reached 836 feet, just short of the water under the Ross Ice Shelf. There was no sea ice in the core brought up from that depth, indicating that there is no substance to the theory that the Ross Ice Shelf grows from the bottom owing to the freezing of the ocean underneath.

Little America was found to be resting on 1,200 years of accumulated snow pressed into ice. This was an accumulation of about eight inches of water-equivalent a year in an 850-foot-thick shelf.

Little America, as the Antarctic weather centre, received weather data from 40 Antarctic stations and 152 stations outside the Antarctic circle.

The data was analysed as received each day and a summary was sent to all stations.

FROM THE FRIDGE

Towards the end of the occupation of Little America V, the men's supply of fresh meat ran out. It was decided to make use of the meat stored in Little America III, the station some 40 miles away which was the U.S. base in 1939-40. In chambers and tunnels 30 feet under the present snow level a generous stock of frozen food has lain untouched for 18 years: hams, veal, steaks, chicken and turkeys.

The meat was fresh and juicy. In one room the searchers noticed some pin-ups. There were four of Bette Davis and one of Claudette Colbert.

BYRD TRAVERSE

The progress of the six-man traverse party under Dr. C. R. Bentley inching its way across the untracked icecap from Byrd Station to the Horlick Mountains, 300 miles from the South Pole, was slowed by storm, crevasse and breakdowns.

After working south from Byrd Station for 320 miles, the party was within sight of the purplish battlements of the Horlick Mountains when attempts to thread the three Sno-cats between crevasses to the foot of the unexplored range failed. Late in November the party nearly lost a sledge in a bottomless crevasse.

HORLICK MOUNTAINS CLIMBED

The party's two glaciologists, Darling and Long, both mountain climbers, set off on foot to investigate the mysteries of these flat-topped mountains and bring back rock samples.

On December 8 a party of four climbed 4,000 feet to the top of the range, 10,066 feet above sea level. Their findings indicated that 6,000 feet of rock was below the level of the ice.

The group spent nineteen hours in the mountains, which were found to be composed of sedimentary rock overlying granite basement rock. They reported finding petrified trees, leaf fossils, seashells and coal beds, giving further evidence that Antarctica was once a lush forest.

SNO-CAT TROUBLE

Meanwhile, a plane from Little America arrived with parts requested by radio, a new spring for one Sno-cat and a "fifth wheel" for another. The "fifth wheel" is a metal plate on which the vehicles' tracked pontoons turn.

The group pushed along the edge of the Horlicks for several hundred miles in an easterly direction and then turned north again for the homeward run to Byrd Station.

By the end of December the party was on the final leg of the triangular traverse.

AIRBORNE TRAVERSE

The air-borne traverse group (see "Antarctic", Vol. I, No. 12) made seven ski landings along a 550-mile stretch, starting from the south. The traverse has shown that from the Harold Byrd Mountains in the south to the Executive Committee range in the North the bed rock under the ice sheet ranges from 1,000 to 2,500 feet below sea level.

The findings of the traverse were reported at McMurdo on January 3 by Dr. Edward Thiel, the traverse leader and chief seismologist.

Dr. Thiel said that in the south the elevation was 2,000 feet. It rose slowly going northward until it was 5,000 feet at the seventh and final station.

Seismic soundings by means of explosive shots determined that in the south the ice thickness was 4,500 feet

and in the north 6,000 feet. By simple subtraction the bedrock in the south was found to be 2,500 feet below sea level and in the north 1,000 feet below sea level.

Dr. Thiel commented that the soundings proved that there was no water connection between the Ross and Weddell seas, although there might be an ice-filled channel.

THE UNKNOWN QUANTITY

An area between 60° and 90° W. in Marie Byrd Land, is the gap, the unknown quantity.

"Because nunataks have been picked up visually and by radar from aircraft in this area," said Dr. Thiel, "it's possible that the trough pinches out just here."

More aerial surveys and a surface traverse may be necessary to confirm the existence of the nunataks.

The party also made gravity and magnetic studies. Dr. Thiel said he was satisfied that the feasibility of the airborne traverse had been proved.

THAT TROUGH

The airborne traverse's findings give further support to the theory that there is a deep trough, ice-filled, linking the Ross and Weddell Seas.

A known trough runs from the Weddell Sea "inland" for about 350 miles to 82° S. In addition, a traverse party, this season, the last of the International Geophysical Year, found the deepest water yet discovered under the Ross Ice Shelf in the Ross Sea, 4,400 feet.

Thus, three points in an approximate straight line have been found to bear out the theory that a trough exists from the Ross Sea to the Weddell Sea.

BYRD STATION MORE ISOLATED

Now that Little America has been closed down, Byrd Station, 600 miles away by the famous Army-Navy Trail, will be more isolated than ever. Nearest neighbour throughout the long

winter night will be McMurdo Air Facility, some 1,000 miles away.

The Navy Leader at Byrd this year will be Lieut. A. H. Bridgeman and the Scientific Leader, Mr. John Pirrit.

One feature of Byrd is a six-foot square pit dug seventy feet into ice. It is the work of two glaciologists, William E. Long, and Frederic L. Darling.

The pit reaches down to ice formed from snow that fell perhaps in the latter part of Queen Victoria's reign. The walls of the pit have been studied for stratification, ice temperatures and ice character.

In 1960 the feasibility of a 10,000 ft. hole will be tested by the Snow, Ice and Permafrost Research Establishment of the Army Corps of Engineers. The proposed hole may be dug by means of an electric coil that would melt the ice around a drill core.

N.A.A.F. ROCKFORD

Ten Navy men left Little America on December 29 with a tractor train of three D-8 tractors pulling sledges and wanigans for the Naval Auxiliary Air Facility Rockford, 160 miles away on the trail to Byrd Station.

The trip was made to complete Rockford, commissioned by Rear-Admiral Dufek in November, 1958. It was used during the summer operations as an advance weather station and alternative landing field for flights between McMurdo Sound and Byrd Station.

Rockford in summer comprises living and messing quarters for up to ten men. Wanigans (box-car-like buildings mounted on 10-ton sledges) not only serve as quarters for the men but house electric power equipment, communications and air operation facilities, rawin tower for tracking weather balloons, and hydrogen gas generator. Some of the equipment and wanigans for Rockford were left there when the last Little America-Byrd tractor journey was made in September and October, 1958.

POLLEN IN THE ICE AT POLE STATION

Navy Leader at Pole Station for 1959-60 is Lieut. S. Tolchin, and Scientific Leader, Mr. J. W. Posey.

Mario Giovinetto, an Argentinian, who wintered at the South Pole, reports having found pollen in ice that was formed as far back as a century ago. The pollen will be examined by biologists in the United States.

The ice hole at the South Pole Station was 165 feet deep. By studying yearly layers of ice he estimated that at 90 feet he had reached the year 1650.

He hopes to find volcanic ash in his ice-core, at the 75-year-old level. This would have come from the Krakatoa eruption of 1883 in the Dutch East Indies.

CHAPEL BUILT

An early American-style chapel building was dedicated on Jan. 25 as a permanent addition to the United States Navy Station at the South Pole, the Navy Antarctic Expedition Headquarters in Christchurch announced recently.

Each of the major religions of Protestantism, Catholicism, Judaism, and Buddhism is represented by at least one member of the group at the base.

The chapel is a 16 ft. by 16 ft. gabled roof building with a steeple and a cross located at the front, and has a total height of 10½ feet.

The inside area contains, at the rear, a platform bounded by a railing. An altar set in the wall behind, is adorned with candle holders shelved on the wall on either side, and a reversible Catholic and Protestant Cross inside it on a shelf.

The rear of the altar wall is stained mahogany. White canvas four feet high trimmed with blue cloth covers the other three walls. Open natural wood rafters make up the ceiling. A false window of corrugated fabric glass with religious paintings and lighted from behind is located on either side of the room.

There is a picture of Christ, a plaque with the star of David and a picture of a Buddhist chrysanthemum.

As there is no Chaplain at the base men of different religions will take turns in conducting services.

The Chapel is named "The Chapel of Our Faith". In a message to the Station Leader Admiral Dufek said, "My heartfelt congratulations on the building of a beautiful Church at the South Pole. Faith is what the world needs and it is an inspiration to all of us to know that at the bottom of the world there is a place of worship for all, every hour of the day."

BEARDMORE STATION

The Naval Auxiliary Air Facility at the foot of the Beardmore Glacier, 364 nautical miles from the South Pole, was re-established on September 28, when two R4D Dakotas flew to that site fully loaded from McMurdo Sound. Using Polar navigation techniques the pilots located the site of last year's outpost, which was almost buried under snow.

The station is maintained to furnish additional weather data for operational forecasting and to provide an alternate point of landing for the Pole-bound air-drops and passenger flights.

A senior petty officer and two assistants man this desolate outpost during the flying season. The re-establishment of the base was delayed by a severe blizzard at McMurdo. The two aircraft had departed on two previous occasions, but had to return because of inclement local weather.

Two penguins taken from the Antarctic to Anchorage, Alaska, have died. Unusual gale-force winds swept Anchorage in zero weather a few weeks after their arrival. "I guess they were just a little bit on the stupid side," said an officer of the Arctic Health Research Centre. "They had shelter but they didn't get into it."

U.S. SHIPS AND AIRCRAFT CARRY OUT MASSIVE PROGRAMME

While American planes have piled up fantastic mileages during re-supply and support flights, and cargo vessels have shuttled to and fro to stock the bases for the coming winter, U.S. ice-breakers have provided a magnificent example of that international co-operation which has been one of the most striking features of the International Geophysical Year.

U.S. Navy vessels, some of them now well-known in New Zealand ports, have not come through the season's operations unscathed.

The tanker "Nespelen" called at Port Chalmers in January to fit new propellers and replace damaged plates. Both propellers were broken in heavy pack-ice, one on the trip into McMurdo Sound and the other on the way out.

"GLACIER'S" GREAT WORK

In mid-December the ice-breakers "Glacier" and "Staten Island" were en route from Terra Nova Bay to McMurdo Sound when rafted pressure ice 20 feet thick was encountered. One blade of "Glacier's" port propeller was lost and the others bent. "Staten Island" took over the lead, while "Glacier" headed for Wellington. While forcing her way north up the Victoria Land coast, "Glacier's" starboard shaft was rendered inoperative by a burned-off pedestal bearing. Only expert seamanship and a continuous helicopter reconnaissance ahead of the ship enabled "Glacier" to reach open water.

When repairs had been effected "Glacier" left again on January 14 headed for Little America. Approximately one day from Lyttelton she was given orders to rendezvous with "Northwind" for transfer of personnel and cargo, and to proceed to Robertson Island on the Graham Land coast, 5,000 miles away and halfway round the Antarctic continent, on a rescue

mission requested by the Argentine Government.

When on arrival off Robertson Island it was found that the Argentines had already been rescued, "Glacier" hurried to the relief of the Belgian ship "Polarhav" on the Princess Ragnhild coast, south of Africa. Arriving here on February 4, "Glacier" had to smash through ice 18 feet thick, and again lost a propeller blade. Her speed was slowed to 300 yards an hour when towing the Belgian ship out of the thick pack-ice.

The ice-breaker "Edisto" which had embarked the Americans returning from Ellsworth station and was heading for Buenos Aires, was ordered to "Glacier's" assistance. Ploughing through the worst storm in her entire Antarctic operation, despite thick fog, driving snow and a heavy head sea "Edisto" found "Glacier" dead ahead. The ships tied up together on February 13 for three hours, and then "Edisto" stood by about 20 miles north of "Glacier" and "Polarhav", outside of heavy pack-ice.

HELICOPTER LOST

Later in the day "Glacier" was again in trouble. Her only helicopter was carrying out a routine test flight after an engine change when, following a sudden engine failure, the helicopter auto-rotated down 300 feet and crashed on rough pack-ice a mile from the ship. No one was injured but the helicopter was a total wreck. One of

Staten Island just over Northwind late season
run to Ross Sea so that let's ship could go to
assistance of John Biscoe
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the "Edisto's" helicopters was transferred to "Glacier" to replace the crashed machine.

Still another U.S. ice - breaker "Staten Island", arrived at Melbourne from the south on February 13, and received orders to proceed at once to the assistance of the other vessels.

"Glacier", however, completed the transference of passengers and stores from "Polarhav" to shore base, then brought out the returning Belgians to the "Polarhav" seventy miles north of the base, made rendezvous with "Edisto" again, and left for the United States on February 23.

"Edisto" now joined forces with the "Northwind" which had left Lyttelton, N.Z., on February 14, and the two ice-breakers sailed in company for Graham Land to assist the British supply ship "John Biscoe".

Improved ice conditions enabled "John Biscoe" to reach the F.I.D.S. base for which she was making. The British vessel was due to rendezvous with "Northwind" on February 25.

NEW DISCOVERIES

Captain Edwin A. McDonald of the "Glacier", who discovered two previously uncharted islands during a helicopter flight on December 1 in the Terra Nova Bay area, has suggested that they should be called the Russell Islands, after the pilot of the helicopter. (Ross in 1841 gave the name Russell Peak to the highest part of the island in the Balleny group which Bernacchi in 1901 wrongly claimed to be independent islands, the Russell Islands.)

"Glacier" confirmed the disappearance of a large portion of the Lady Newnes Ice Shelf. A comparison with charts made in 1912 shows that in the last forty-six years a block of ice 300 feet thick and over 1,000 square miles in area has disappeared.

"Glacier" also reported the discovery of an Emperor penguin rookery in which more than 50,000 penguins were sighted.

The rookery is believed to be the largest of ten known Emperor penguin

rookeries in the Antarctic. It was sighted between Coulman Island and the Lady Newnes Ice Shelf north of Terra Nova Bay.

The cargo ship "Wyandot" had difficulty in reaching McMurdo. Leaving Lyttelton on December 15, the ship was slowed down and at times stopped by ice. On December 22 the ice-breaker "Staten Island" went north to assist the ship, which moored against the bay ice of McMurdo Sound on New Year's Eve.

FLIGHTS END

The last flights to the Pole for this season returned to McMurdo on December 30. In one of the aircraft was Admiral Tyree. Flights were then made to Little America and Byrd stations. The Navy aircraft then concentrated on support of the three traverses and also the New Zealand Geological and Survey expedition. Both wheel and ski-equipped planes made reconnaissance flights ahead of the surface parties to locate rough terrain and dangerously crevassed areas.

By mid-January the sea ice runway used by the heavy Air Force and Navy planes at McMurdo Sound had become unusable. Three Navy machines managed to fly out from the Antarctic off the runway on January 10 before the ice deteriorated rapidly. They were two Neptune bombers and a Dakota, all of which reached Christchurch safely.

A wintering-over party of 27 volunteer officers and men of VX6, the Navy's Antarctic squadron, remained in the south when the summer parties returned home. When all flights in support of scientific and survey parties are completed they will "winterise" the aircraft and prepare planes and equipment for use next spring in Operation Deep Freeze V.

RETIRED

The twin-engined R4D Navy transport plane, "Que Sera Sera", made its final trip as it flew back from Little America to McMurdo Sound, 400 miles

This figure should be checked.

away, on December 4. It will be dismantled and shipped to the United States for reassembly and exhibition.

On October 31, 1956, "Que Sera Sera" became the first plane to land at the South Pole. It carried Admiral Dufek, Commander of Naval support forces in the Antarctic, who thus became the first person to set foot at the Pole since Scott did so in 1912.

The pilot on the historic flight three years ago was Lieut. Comdr. Conrad Shinn and the co-pilot was Capt. William Hawkes.

The name "Que Sera Sera" means "what will be, will be."

The plane, in Navy service since 1943, was firmly secured to a hatch-cover on the "Wyandot" for the voyage to Virginia, with the wings carefully crated in the hold. It is to be placed on display in the new National Air Museum.

Special precautions have been taken to preserve instruments and equipment, as well as external markings etc., so that the plane will retain its Antarctic appearance.

Another plane now on the retired list is "Charlene", an R4D-6 ski-equipped skytrain, which in two and a half years Antarctic service has flown for 4,643 hours. Twenty per cent. of her landings and take-offs were on unprepared snow and ice surfaces, and she was "un-hangered" throughout the whole period. "Charlene's" last duty was to transfer cargo from Little America V to McMurdo. "Charlene" made the journey in two hours fifty-five minutes: the normal time is three hours, ten minutes. "I think", said one of the crew, "that airplane knew that this was her last trip."

The plane was dis-assembled and her salvageable parts will be used in other planes.

Rear-Admiral David Tyree, after a three week "familiarisation tour" of Antarctic bases, formed the opinion that there were some "very tired aircraft" in the Antarctic, and decided that the scrapping of most of the aircraft now in use was a top priority.

SUB-ANTARCTIC ISLANDS

KERGUELEN (France)

The "Norsel" carrying the French party to Adelie Land, called at Port aux Francais, Iles Kerguelen, on December 4. The visitors were impressed by the flourishing livestock, the rearing of trout, the vegetables, enough for the needs of the inhabitants, and the flowers. The 80 Frenchmen living on Kerguelen have certainly changed the face of what were once called "The Isles of Desolation".

The trout industry has a special interest for New Zealanders, as in 1955 an attempt was made to establish trout on the archipelago by eggs flown from New Zealand. Missed air connections ruined the experiment.

A carefully guarded consignment of some 20,000 eggs taken to Kerguelen last year had better success. The consignment reached Kerguelen on April 3 and on May 31 a "census" showed a trout population of 2,200 rainbow trout fry and 2,000 brown trout fry. The last egg hatched on June 5, two months after the first.

M. Rolland has replaced M. X. Richert as Chief Administrator of Terres Australes et Antarctiques Francaises.

The next relief of the island's personnel will take place early in April. As previously, it will be effected by the m.v. "Gallieni", which is scheduled to leave Tamatave, Madagascar, on April 2. There will be only one relief annually in future. In order that this may take place in November at the commencement of the southern summer, the incoming party will have an exceptionally long period of service, from April 1959 till November 1960.

The scientific installations set up at Port aux Francais for the I.G.Y. will henceforth function under the control of the French National Committee for Antarctic and sub-Antarctic Research.

MACQUARIE (Australia)

David Hindle, one of the two Australian scouts who took part in the relief operations at Macquarie in December, gives this account of his first impressions of the island.

"After a surprisingly calm trip the ship anchored at Macquarie Island early on December 1. We awoke and had our first glimpse of Macquarie. The island looked very impressive with its sides rising in ridges almost sheer from the sea. It was covered in coarse grass tussocks and on the narrow dark sandy landing beach hundreds of elephant seals lay in groups.

SCOUTS ASHORE

"Unloading began, using three army Dukws and about mid-morning we scouts went ashore. The camp was on a low isthmus between two very steep hills. The isthmus was covered with elephant seals which lay among the huts and had to be dragged out of the path of the Dukws. Small gentoo penguins swam round the ship and were nesting among the seals on grass tussocks. We saw all stages of penguin growth from egg to chick. The chicks incidentally were as big as the parents. The Rockhopper penguins were a few minutes walk from the camp with their nests high above the sea amongst the rocks. They had strange heads with bristling crew cuts from which a few long orange coloured feathers stuck out. The birds everywhere were unafraid of men. They flew around the camp getting scraps and could be photographed without trouble.

"Late in the afternoon a mist gathered round the plateau and the wind rose bringing penetrating cold from the Antarctic mainland to our south. The next day it snowed lightly and the wind sang and whistled eerily in the radio wires of the station reaching gusts of 50 knots."

David sat his matriculation exam. on the voyage. We wish him luck.

BETTER LANDINGS

A helicopter supplied by Trans-Australia Airlines, was used for the first time since the base was established ten years ago. It facilitated the transfer of incomers to the Hurd Point auroral observatory 20 miles from the base, the landing of biologists at penguin rookeries and seal beaches, and the survey of the island's eastern coast.

High winds frequently interfered with the helicopter operations, and several parties had to be landed by sealing boat, carrying the heavy electronic equipment up precipitous slopes to the survey points.

16 men returned to Melbourne in "Thala Dan" on December 18.

A report dated January 4 says that field activities till then had included biological trips for a seal census around North Head and the isthmus area, a trip to Green Gorge to repair the store hut there, and shooting, photographic and climbing excursions.

The mean temperature in January was 44° F., and there was rain on 24 days. Two men spent three weeks at Hurd Point installing a concrete block and carrying out repairs. 800 Royal penguin chicks were banded, and 400 one-year-olds.

CAMPBELL ISLAND (New Zealand)

Since the annual servicing in November 1958 the expedition members have settled in to their new life most satisfactorily.

Christmas celebrations were of a high order and particular tribute was due to the excellent contribution made by the station's new cook, Bob Rae.

STAFF

Some recruitment difficulties were experienced last year and the full team was not finally selected until mid-January 1959. The following bring the party up to full strength.

Ionosphere Observer—J. B. Shaw of Christchurch.

Senior Meteorological Observer—
G. S. M. Smith of Invercargill.

Mr. Smith replaced Mr. E. L. Clague who was repatriated for medical reasons. Mr. Clague now completely fit, is available to return when required.

The isolation usually associated with Campbell Island hardly seems to apply now. Since m.v. "Holmglen" disembarked the new party in November, several visits from U.S.S. "Brough" have been made. H.M.N.Z.S. "Kanierie" paid a fleeting visit, much to the delight of the inhabitants. U.S.S. "Staten Island" was the most recent visitor and the generosity of the Americans towards our expedition was a wonderful stimulant to the general morale of the station staff.

WORKS PROGRAMME

Generally the conditions for outside work have been fair—on Campbell Island standards—and progress on the completion of the new construction programme is very good.

Meteorological and Ionosphere Observers are hard at it and their full scientific programme will keep them extremely busy for the rest of this year.

NOTES FROM MONTHLY REPORT

The dogs have been dosed with Aer. Hydrobromide, and are in good health. Flash Augustus suffered a deep laceration in one pad (front left paw). Nature was left to do its work and it is now healed, although he obviously enjoyed the sympathy he received at the time.

Four fowls have been used for the table. Laying has been maintained at an average of nine eggs per day. Since the arrival of U.S.S. "Brough" all local eggs have been used in our preserving programme.

Fresh vegetables were taken for the first time on the 27th. With reasonable use our garden should keep us supplied for up to two months.

The time is rapidly approaching for our ewe to wander, and to save us

the trouble of bringing her back as mutton, both lambs are destined for the pot in February.

WILD LIFE

1/1/59: Sooty chick on Beaman hatched.

7/1/59: Fur seals in large numbers seen on rocks below Mt. Azimuth, also large colonies of penguins observed here, and along the coast to Courrejoles Point. One colony of 15 larger birds that did not appear to be nesting were assumed to have been King Penguins.

Mollymawk rookery visited, and one area of 70 new nests counted of which 34 were deserted. Mortality among chicks to this date appeared to be 50%. Numerous skuas were in attendance and these took two chicks and one egg while under observation.

10/1/59: Cattle, North West Bay area. 16 mature beasts and two yearlings. Other observations made in this area disclosed 30 sea lions, one sea bear, hundreds of elephant seals hauled out for coat shedding. Numerous yellow-eyed penguins with chicks were seen.

Moubray Hill area: three wandering albatross chicks, all in stages prior to leave the nest. 13 Sooty albatross observed nesting in cliffs in the outer harbour, some within 15 feet of the water.

A raft of nine Sooty albatross fishing in same manner as shags. Upland meadow east of Moubray literally covered with re-growth of P. Hookerii.

A start has been made to introduce local flora, collected on hikes, to the rock garden by the domestic building.

When Sir Douglas Mawson was buried at Adelaide the coffin was draped with the Australian flag which the great explorer used to proclaim British sovereignty over the areas he discovered during the "B.A.N.Z.A.R.E." expedition of 1929-31.

WHALING TURMOIL

The five major whaling countries began talks in London on November 20 at a conference called by the British Ministry of Agriculture. Representatives attended from Britain, Holland, Japan, Norway and Russia.

The purpose of the talks was to conserve the stocks of whales in Antarctic waters, threatened with extinction under present conditions.

The importance attached to the meeting can be gauged by the fact that Japan, Russia, and Norway were represented by Ministers, Holland by a high official of the Ministry of Fisheries, and Britain by the Parliamentary Secretary to the Ministry concerned.

Deep concern is being felt in world whaling industries about the increasing number of expeditions being fitted out now and projected for the future, especially by Japan and Russia.

This concern arises from the fact that while the International Whaling Commission established under the 1956 convention set the number of whales which may be caught in a season it does not set the number of expeditions that may hunt and kill them.

This means that an ever-increasing number of expeditions is hunting a fixed or even decreasing number of whales, and unless some agreement is reached the situation must shortly arise where Antarctic whaling will become uneconomical.

At the conference a quota system was in principle agreed upon. Russia was awarded 20 per cent. and further discussions were arranged to try to settle the quotas for the other whaling countries.

In January Norway and Holland announced their decision to withdraw from the International Whaling Convention if agreement were not reached by June 30. On February 5 Japan also withdrew "conditionally" stating

that she is willing to rejoin if Holland and Norway do also.

BRITAIN STAYS IN

Britain however decided not to withdraw from the Convention. The Government decided after careful consideration that "the objectives of proper conservation of the whale stocks and the rational co-ordination of Antarctic whaling would best be served" if Britain stayed in the Convention. This decision greatly disappointed the whaling industry, which had urged the Government to follow the Dutch and Norwegian lead in withdrawing unless agreement was reached before July.

The outcome of these decisions is that unless agreement is still reached, Norway, Holland and Japan will be free to catch as many whales as they like, but Britain and Russia will be bound by the Convention limits.

CURRENT SEASON

As States must give six months notice of their intention to withdraw, these decisions do not affect the current season, which opened on January 7, and is due to close not later than April 7. 20 "expeditions" are at present engaged in pelagic whaling in Antarctic waters, nine Norwegian, six Japanese, three British, one Dutch and one Russian. The current catch ceiling is 14,500 blue whale units, a blue whale unit being defined as one blue, two fins, two and a half humpbacks or six sei whales. The closing date is decided by the Committee of International Whaling Statistics in Sandefjord, Norway.

This competition gives point to reports of increased Russian whaling-power. A new bigger-and-better Russian factory ship is under construction at the Nosenka ship building yards. She is the "Sovietskaya Ukraina".

Two whaling ships have been assigned the task of training harpoonists so that next year they will have sufficient experience to man it.

The New Zealand Antarctic Society

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

You are invited to become a member.

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