

ANTARCTIC

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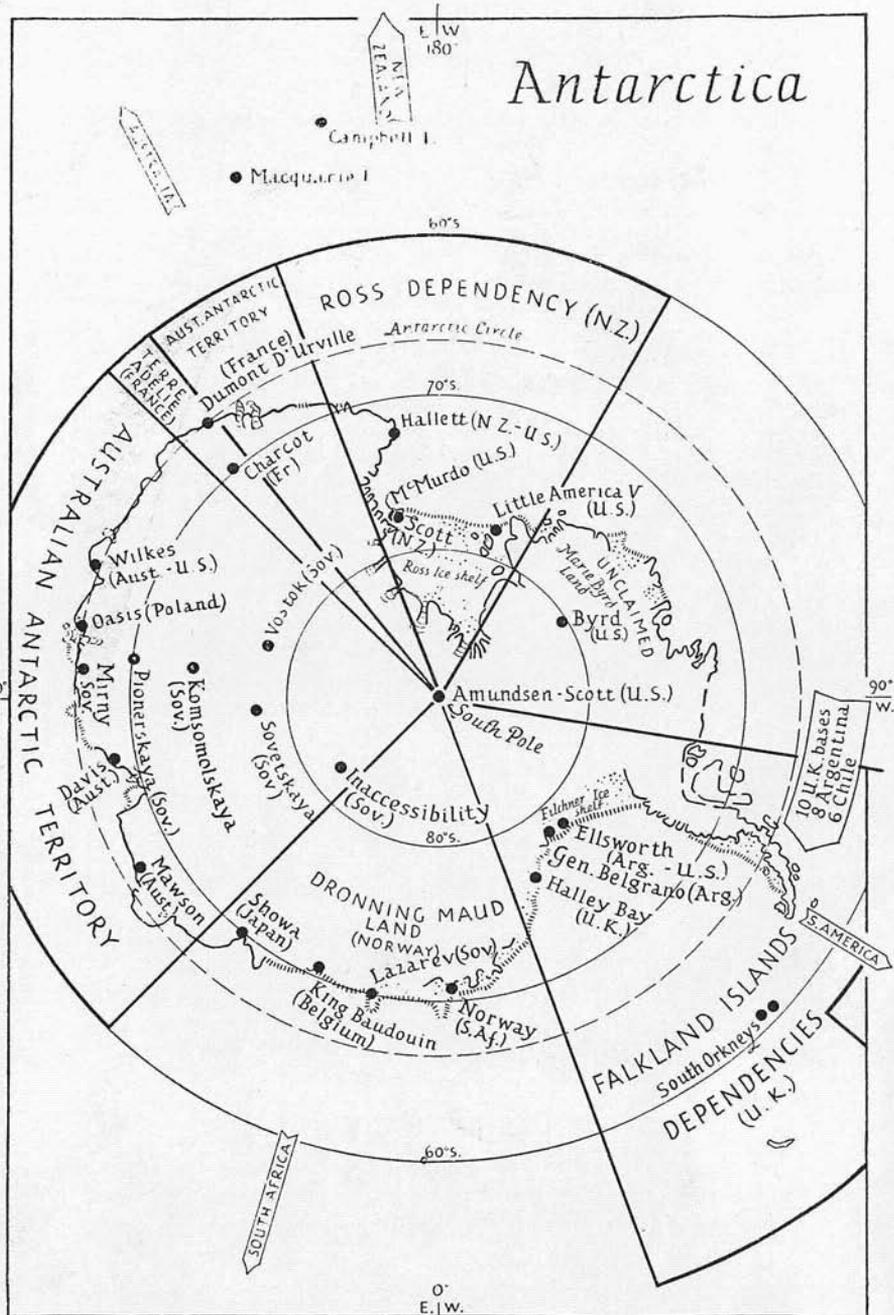


IN UNKNOWN COUNTRY

Biscoe and Cooper of the New Zealand Alpine Club Expedition, 1959-60, sledging on the Hood Glacier, a tributary glacier of the Beardmore, in approx. $83^{\circ} 50' S$. In the background is Mount Bali H'ai, climbed by members of the expedition.

—N.Z. Alpine Club photo.

Antarctica



"ANTARCTIC"

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IMPORTANT BACK NUMBERS

Owing to unexpectedly heavy demands, the New Zealand Antarctic Society regrettably intimates that stocks of the following issues of "ANTARCTIC" are almost exhausted, and the Society is unable to supply individual copies:

Vol. 1, No. 1, March, 1956.

Vol. 2, No. 2, June, 1959.

Vol. 2, No. 4, December, 1959.

A very limited number of **COMPLETE SETS** (Vol. 1, No. 1, to Vol. 2, No. 4) is available. Price for the 16 issues, 1956-1959, including postage, £4.

Copies of other issues may be purchased at 4/- per copy while stocks last.

AN APPEAL

If any members of the Society are holding copies of the above issues (March, 1956, June or December, 1959) which they do not require, the Secretary would greatly appreciate receiving them. There is a keen and steady demand for back issues which we should like to meet if possible. Copies of the "ANTARCTIC NEWS BULLETIN", Nos. 1, 2, 3, 4, 7, 10, 11, 12, 17, 18, would also be welcome.

JUST THE THING

For over two months in the field, the N.Z. University party were unable to wash either themselves or their clothes.

Two members of the party learnt on their return to Scott Base that they had won first prize in a raffle 'back home'. The prize was—a washing machine.

RADIOMAN GUEST

A recent visitor to Antarctica at the invitation of Rear Admiral Tyree, was 19-year-old Julius Madey from New Jersey. Julius, or Jules as he is called by men of Operation Deepfreeze, is an electronics engineering student from Rutgers University. To Deepfreeze personnel, however, he is the amateur radio operator who has kept them in constant touch with their families in the United States, as well as the outside world in general.

When the married men of McMurdo become new fathers, it is Jules who transmits pictures of their offspring by amateur radio facsimile. He keeps the men up to date on football and baseball scores and at Christmas he relays orders for thousands of dollars worth of flowers for the families of 'Deepfreeze' men. He has also conducted a 'hamletter service' by amateur radio teletype which provided a mail service for wintering-over personnel during 'Deepfreeze IV'.

His station, K2KGJ, is reported to have transmitted more than 12,000 messages and phone dispatches for the Navy men in the past five years. In addition he keeps regular radio schedules with all the other United States Antarctic stations. He is believed to have the strongest signal sent by any amateur to the Antarctic. For his contribution to Antarctic communications, Jules was presented the Edison Radio Amateur Award from the General Electric Company in 1958.

NEW ZEALAND'S SUMMER ACTIVITIES COVER A WIDE FIELD

With the ever-ready assistance of United States personnel, ships and aircraft to supplement the limited carrying capacity of H.M.N.Z.S. "Endeavour", over 100 New Zealanders went south this season either to winter over or to engage in the wide programme of summer activities approved by the Ross Dependency Research Committee and implemented by the Antarctic Division, D.S.I.R.

Several changes have taken place in the wintering-over party at Scott Base. The cook will now be

J. A. WARREN (40) of Timaru. Born in England, he served in the Merchant Navy and came to New Zealand in 1945. He worked as a hotel chef, and then joined the Civil Aviation Administration and served as cook at Raoul Island for ten months and at Campbell Island in the sub-Antarctic for eighteen months.

The Base carpenter will be **R. G. COLLINS** (23). A New Zealander, Collins' home is at Upper Hutt. He was educated at the Hutt Valley Technical College and served his time as a surveyor before taking up carpentry.

C. W. S. Kennedy has had to return to New Zealand and has been replaced by

CORPORAL C. N. JOHNSTONE (23) of the Antarctic Flight. Born in Hawera, Corp. Johnstone joined the R.N.Z.A.F. as a boy-entrant in 1953. His home town is Taihape.

"ENDEAVOUR"

H.M.N.Z.S. "Endeavour", now under the command of a New Zealander, Commander R. H. L. Humby, left Wellington on December 27. For the first time the vessel carried sails—a large mizzen sail and a foresail—to help stabilise the ship when halted during oceanographic survey work.

The first iceberg was sighted on January 3, and on the 4th in foggy conditions the ship edged her way into the first layers of brash ice. Scott Island was sighted but an attempt to land was thwarted by a heavy swell and the roughness of the landing place, a beach appar-

ently formed from an open crater. The island otherwise rises steeply and is covered with ice.

Thick pack-ice was encountered near Beaufort Island but U.S.S. "Atka" broke a passage for "Endeavour" to within seven miles of Scott Base. Despite four hours' further effort by the ice-breaker only half a mile more was gained, and unloading began. This was completed by January 16, but "Endeavour" was now fast in ice three to eight inches thick, extending south from Cape Royds. She was freed by U.S.S. "Atka" and proceeded with the planned oceanographic programme as far as time and the weather permitted: in the southern Ross Sea area January 20-25, and across the Pennell Bank January 30-February 9.

Conditions were now bad but the ship got within three miles of Hut Point with great difficulty in a zero temperature. All cargo was loaded and passengers embarked by February 16, and with the help of U.S.S. "Eastwind" the vessel broke clear of the ice and headed for New Zealand, reaching Bluff on February 27. A call was made at Campbell Island to pick up a sick man.

SCOTT BASE TRAIL

Two Scott Base Ferguson tractors each drawing a six-ton load on two sledges began the transport of supplies to the base. Soon, however, the tractors were bogged down in soft snow, and a United States D4 tractor came to the rescue, hauling four loaded sledges while one Ferguson towed the other. Eventually an American D4 tractor with two ten-ton sledges completed the haulage to Scott Base.

SUMMER WORKING PARTY

The following men formed the party which carried out the building programme at Scott Base during the summer: R. M. Heke, foreman, F. Tod, P. J. Brown, Sgt. P. Crowther, Corp. L. A. Frith, L/C H. Selby, Spr. T. G. W. King, Spr. W. G. W. Williams, Spr. E. Baillie and Spr. N. E. Bristow.

The team worked a 14-hour day in an effort to get various construction jobs completed in the shortest possible time, and all the planned projects were completed before the last members of the team left for home.

The builders usually started work at 8 a.m. and, taking advantage of the permanent sunshine, worked till 10.30 p.m. with only two short breaks. At one stage they were working a day and night shift.

Mr. Frank Ponder, architect to the Ministry of Works, visited Scott Base for a few days in late November to advise on the building problems encountered.

Tod, Crowther and Bristow stayed behind when the remainder of the working-party left on "Endeavour", in order to complete the cable-laying for the Auroral Radar station.

The Auster plane is now stored in the new hangar for the winter. The space not required now that the Beaver has been written off will probably be used to winter American Otter aircraft.

VX6

With Our Thanks

When he was in the Antarctic in January, Mr. G. W. Markham, Superintendent of the Antarctic Division, D.S.I.R., presented to Captain W. J. Munson, Commanding Officer, VX6 Squadron, a carved kauri plaque, a replica of a typical facial carving on the entrance gate to a Maori pah. A plate reads:

"VX6 Squadron U.S. Naval Support Force, Antarctica, from your New Zealand Antarctic companions. Our grateful thanks for memorable friendship and assistance readily given."

OCEAN STUDIES

The oceanographic work planned by the New Zealand Oceanographic Institute to be carried out from H.M.N.Z.S. "Endeavour" by the party of six under Lieut. R. Adams was considerably curtailed by adverse conditions, a possibility which had not been unforeseen.

Nevertheless, much useful work was done. After the off-loading at the ice-edge, "Endeavour" made two cruises, one from January 20 to 25 in the McMurdo Sound area, where six seismic stations were made, and one from January 30 to February 9 across the Pennell Bank in the Ross Sea.

At both locations the scientists on board investigated the bottom living animals and made collections of hydrological and sediment samples. A collection of bulk samples for C¹⁴ determination was made over the continental slopes of the Ross Sea. Dredging was carried out off Scott Island. Temperature measurements were made through the Antarctic Convergence. The proton magnetometer was operated during the cruises, and marine seismic measurements were carried out whenever weather and other conditions permitted.

MORE HUSKIES

"Lady" recently gave birth to eight pups, six of which are doing well. Two other bitches are 'expecting' in March, so what with five pups and a one-year-old dog brought south on U.S.S. "Alatna", considerable fresh blood is being added to the present team of 32 dogs. Some of these, however, will soon be too old for field work.

The dogs this winter will be fed on half mutton and half seal meat. In the field the ration is concentrated pemmican.

During the past summer 27 of the dogs in three teams travelled 620 miles and were really fit on their return. The New Zealanders claim that dogs are still the cheapest (and probably the safest) method of Antarctic travel, and it is unlikely that they will be entirely ousted for many years to come.

AURORAL HUT

The new auroral hut and equipment on Arrival Heights, at an altitude of 585 feet overlooking McMurdo Sound, has been completed. The task involved laying and jointing approximately one and a half miles of cable between the American base and the new station. This difficult work was supervised by F. Tod of Dunedin.

The hut measures eight feet by sixteen feet and contains, in addition to the radar set, two bunks, a workbench and space for cooking. It is equipped with enough food to last two men for ten days, and a portable radio transceiver in case observers should be stormbound. It will be necessary for two men to visit the hut once a week throughout the winter to change the film which will automatically record auroral echoes. This means a trip of three miles, half of it over one of the bleakest and most windswept plateaus in the Ross Dependency.

A few yards from the hut, on the edge of a steep cliff, are two grids each 55 feet long and 12 feet high. These will pick up auroral echoes, including those which could not normally be observed visually. They will probe ionised cloud over 80 miles high, roughly in the Cape Hallett area and near the magnetic pole. The two-pronged probe, from Hallett and Arrival Heights, will detect the ionised density of cloud and its direction and speed. Auroral currents are largely responsible for magnetic storms, which in their turn have a vital effect on radio communications.

A receiver in the laboratory at Scott Base will monitor the equipment at the lonely Arrival Heights outpost and will be a check on any breakdown. Such a mishap could call for a special trip to rectify the fault.

In December the maximum temperature at Scott Base was 41° F. and the minimum 6.8° F. In January temperatures averaged 10° F. colder than last year. New sea ice was forming at the beginning of February.

AT CAPE ROYDS

Young and Taylor, the New Zealand biologists who have been studying the bird life at Cape Royds, where Shackleton wintered in 1908, have had more visitors than any other field party in the Antarctic. Cape Royds is the site of the nearest penguin rookery to McMurdo, and it is a regular port of call for U.S. helicopters carrying visitors and also personnel from the American stations, some of whom, especially those wintering at the South Pole, might otherwise never see a penguin.

Several skuas were taken from Cape Royds and flown to the Beardmore Glacier, marked and released, to test their homing abilities. Two Adelie penguins were taken on "Endeavour" and released over the Pennell Bank on February 2. Latest reports make no mention of arrivals 'home'.

Taylor and Young have been hard at work on their ambitious programme from their arrival at Cape Royds on October 23 and November 15 respectively till their departure for New Zealand on "Alatna" on February 27. Wedgwood, who wintered over at Scott Base as cook, was Taylor's assistant until Young arrived.

The two men have studied the whole cycle of the birds' life, from their first appearance in the rookeries, through nesting and the rearing of the youngsters till their final departure to the open sea and pack ice.

HILLARY'S TRACTOR

One of the three Ferguson tractors used by Sir Edmund Hillary in his successful dash for the South Pole in January, 1958, has been brought from the Pole to McMurdo Sound by a Hercules ski aircraft.

"It is only a small thing and I would not have believed Sir Edmund Hillary could have 'made' the Pole in it," said Lieutenant R. C. Smith.

The tractor was then brought back to New Zealand in the "Arneb" and has been returned to C. B. Norwood Ltd., Massey-Ferguson distributors for New Zealand.

NEW ZEALAND DOG TEAMS EXPLORE VICTORIA LAND COAST

The December "Antarctic" contained an account of the New Zealand Geological and Survey Expedition's work up until the accident in which Lieutenant T. Couzens was killed and J. H. Lowery and B. M. Gunn severely injured.

This occurred after the long haul across the shelf had concluded and before the survey and geology work could be started. With such a severe blow resulting in the loss of both geologists to the field party, and in effect crippling the remaining Sno-cat, a complete revision of initial plans was necessary. Nevertheless a substantial part of the original programme was incorporated and amplified in the new.

This included the reconnaissance survey of a 40-miles wide coastal strip between the Nimrod and Beardmore glaciers. Miller and Marsh, during the T.A.E., had carried out a survey of the areas adjacent to the plateau lying west of this area and thus, the programme would tie in with their survey.

The party now comprised:

- Murray Robb, Leader;
- D. R. Goldschmidt, Surveyor;
- Capt. P. J. Hunt, Surveyor;
- G. J. Matterson, Surveyor;
- R. I. Walcott, Field Assistant/
Geologist;
- K. C. Wise, Field Assistant.

Generous air support from the American contingent at McMurdo Sound enabled the party to be transferred completely to their new scene of operations, as well as putting in a food depot 60 miles further south.

They had been landed north of a minor glacier that appeared to offer ready access inland, south of Shackleton Inlet. Though relatively crevasse free the snow was soft: indeed throughout the journey there were invariably poor surface conditions. This, however, only resulted in comparatively small daily mileages and involved no real difficulty.

INLAND BASINS

After short reconnaissance trips and the establishment of three sur-

vey stations, the party travelled up the glacier into an inland basin beyond. The existence of the basin had been indicated by Miller and Marsh who had looked into it from the plateau edge two years earlier. It lies between the high Queen Elizabeth Range—dominated by Mt. Markham (15,000 ft.)—and the coastal range of up to 12,000 ft. To the north an arm of the basin extends into the Nimrod glacier and another, the glacier the party travelled up, tentatively named the Goldie, extends on to the Shelf to the east.

At the junction of the Goldie glacier with the basin the party split up. The surveyors and geologist traversed the lower slopes of Mt. Christchurch as far as the Nimrod and returned by way of the basin's northern arm to the depot laid by the remaining team. The whole party then joined forces and moved towards a group of snow-free nunataks rising from the basin floor to the south. Specimens were collected, survey stations established, and then they moved to the southern limit of the basin, about 60 miles from the Nimrod. Here a series of bluffs and icefalls effectively cut off further progress, but a camp was set up at 3,500 ft. and a station carried to 6,000 ft. This gave a fine view of a considerably higher and more extensive basin that lay between the plateau and the Queen Alexandra Range.

The establishment of a few further stations completed the survey in this area and the party returned to the shelf ice. Xmas was celebrated with carefully conserved festive supplies, during a nine-day lie-up in bad weather. During this period, the Antarctic flight had been

landed at Scott Base and was airborne.

COASTAL SURVEY

On January 2 the weather cleared and two teams travelled south to survey the coastline, while the remaining team provided a contact for the Beaver aircraft. Unfortunately, while the weather at the position of the field party cleared, that at Scott base deteriorated and the two pilots were forced to stay a night in their sleeping bags before being able to return to base.

Dog rations were now in short supply and all were anxious to reach the depot laid earlier without unnecessary delay. A camp was set up in the mouth of the Asquith glacier and the depot, which had proved very elusive, was found by the Beaver and the necessary stores were ferried in.



Earlier it had been hoped to find a feasible route up the Asquith Glacier, which offered the only access inland. Now, it was only too evident that this was impossible. Therefore the party decided to complete the coastal survey before being flown in to a suitable position to complete the last part of the traverse.

Robb and Goldschmidt with one dog team were now returned to Scott Base in order to undertake the recovery of the Sno-cat left at

Cape Selborne. The remaining four carried on towards Mt. Hope at the mouth of the Beardmore Glacier. Heavy crevassing of the shelf made it too difficult to reach that point however, but suitable stations were chosen to complete this section, and they sledged back out of the crevasses to a suitable stretch of open shelf-ice in order to commence the airlift.

The story of the airlift and its unfortunate ending is told elsewhere. When the Beaver crashed Hunt and Walcott were at about 7,000 ft. in the high inland basin with enough food for themselves for at least ten days but only enough dog pemmican for five. While the weather at lower altitudes was very poor they enjoyed glorious calm sunny days. Their position enabled Hunt to set up a most useful station and the rock outcrops in the vicinity yielded some interesting geological work.

As soon as news of the accident reached Matternson and Wise, who were left at the low camp, they set out in the deteriorating weather to see if they could locate the Beaver. However, the increasing cloud cover had heralded several days of snow and white-out conditions and they were forced to make camp once again.

Finally on January 19 the weather improved sufficiently to enable a USN Dakota to fly down from McMurdo and airlift the field party, equipment and dogs to Scott Base. It was impossible, however, to effect a rescue for the two pilots of the crashed Beaver who were later picked up by the N.Z. Auster flown by Flt. Lt. Cranfield.

The Dakota landed the teams at the U.S. airfield on the shelf near McMurdo, and the fastest sledging of the whole trip—the dogs smelling familiar air—ended a most unfortunate summer's sledging programme which nevertheless yielded considerable results.

BEAVER PLANE CRASHES NEAR COAST OF VICTORIA LAND

After only a fortnight of operational flying, the Antarctic Flight of the R.N.Z.A.F. lost the larger of its two aircraft in a crash which fortunately entailed no loss of life.

On December 17 the main part of the Flight disembarked from U.S.S. "Atka" and the three pilots flew the Beaver and Auster aircraft from the ship's side to Scott Base; the three ground crew being brought in soon afterwards by ship's helicopter. By the 30th the whole Flight as well as stores and fuel were at the Base. "The available personnel of the Flight assisted willingly in general work," reports the Base Leader, "and were a great help at a time of man shortage."

When the Beaver flew south to the U.S. Beardmore depot on January 2 the homing beacon was out of order and the huts so buried under snow that Sq. Ldr. Jeffs was unable to locate them. After half an hour's searching their fuel was running low, so Jeffs turned back and landed beside the dog-team party near Cape Goldie, 60 miles to the north. The plane brought Robb's party their first mail since November 19.

Bad weather now held up flying for some days, but on January 7 Cranfield took off in the Beaver for the Beardmore Depot, where a Sarah homing beacon had now been installed. On this journey an emergency depot was put in at Cape Wilson, which is about two-thirds of the way from Scott Base to the Beardmore Depot. On a second flight the same day Jeffs piloted the Beaver and air-lifted some members of the Alpine Club party from south of the Beardmore Depot to Scott Base. Robb and Goldschmidt with one dog team were also brought out.

CRASH IN MOUNTAINS

The Antarctic Flight now turned its attention to assisting the dog-team parties still working in the mountainous area of Victoria Land

west of the Beardmore Glacier region.

On January 15 Jeffs and Rule were air-lifting the dog-teams to a new survey position some fifty miles to the west of Mt. Hope. They had safely transported Hunt and Walcott and one of the dog-teams with a sledge, and were returning to pick up the other dog-team when cloud cover over the shelf ice forced them to try and fly down a valley about 15 miles north-west of Mt. Hope in order to get below the cloud base, which was about 1,000 feet. The topography was very deceptive in the white-out conditions then prevailing, and the plane crashed in the valley at an elevation of approximately 1,000 feet.

Both Rule and Jeffs were wearing "bone dome" helmets and are sure their lives were saved because of this, as they were thrown on to their heads when the plane crashed and capsized.

CAMP ON THE SNOW

After the crash, in which both airmen escaped injury save for a few scratches, an immediate attempt to contact base with a hand-cranked "Gibson Girl" set was made, after which survival equipment was unpacked and a tent pitched. Distress messages were then sent at regular intervals.

Both airmen now felt safe, and confident of rescue. Though food was ample for a month they decided to conserve as much as possible. Physical effort was also kept to a minimum.

Each day they kept themselves busy in some way. The aircraft radio was repaired. This gave two-way contact with base and kept them up to date with rescue efforts. An attempt was made to build up

HIS ANNUAL?



K. C. Wise of the New Zealand southern survey party, 1959-60, melts snow in a dog pemmican tin for washing-day. The men are camped on the Ross Ice Shelf off Cape Goldie, in lat. 82° 52' S.

snow around the tent in case of storms but the snow was so soft it would not compact sufficiently. It was then decided to dig a trench, and after some hours' work the tent was re-pitched below ground level.

FOOD AND WATER

Obtaining water was a problem. Cooking spirit needed conserving in case of a prolonged stay, and considerable fuel was used in melting snow. It was found that a meal could be cooked in 20 minutes, but it took 25 minutes to melt sufficient snow for the meal. For a couple of hours during the warmest part of the day, and especially later when the weather brightened, they were able to melt snow by sprinkling it lightly on the broken wings of the Beaver and to catch the

water in utensils. Sufficient water was gained in this way to last two days, and to keep it from freezing it was stored in the crashed plane.

A typical meal was a third of a meat bar and two crumbed water biscuits mixed in water: dessert was one glucose sweet each. One of their food-tin labels read "Store in a cool place".

It was some days before the fog lifted and they were able to get a sextant shot to fix their position. They were in a little valley not marked on the map. The entrance appeared to be inaccessible owing to ice falls, and the only access seemed to be over a pass.

Ground level fog for the first four days gave the stranded men little idea of their surroundings, but fortunately, for the whole period, there was no wind. This kept the temperature up, though at times it was 20 below zero.

Later the aircraft's wireless was repaired and two-way contact established with base.

ROPED TOGETHER

Whenever they moved far from the camp they roped themselves together in case of crevasses or slipping on the ice. One of the first thoughts was to seek a suitable landing ground in the event of air rescue and as soon as possible a reconnaissance was made for this purpose.

A likely place was discovered and marked so that it could be seen clearly from the air. The only material available was parts of the Beaver, and many hours were spent dismantling sufficient pieces for this operation.

HELP COMING?

Then it was learnt that a United States Dakota was on its way to rescue them. The plane picked them up from a distance of about 12 miles and when it was overhead they watched it circling, preparatory to landing.

They were in contact with the Dakota by radio and the condition of the landing strip was asked for by the pilot and given. The plane then circled lower and began its approach. When almost down the pilot decided the strip did not look safe and full throttle was applied

to overshoot and climb out of the valley.

It then circled round again and made a perfect airdrop of food, books and a Commando radio before returning to base.

Both men were now quite resigned to several days' wait before a further attempt could be made to rescue them with a lighter aircraft. With their regular radio schedules, a bettering of camping conditions, experimenting with different wireless aerial layout, and minor salvage work, they were kept so busy that only part of one book was read.

RESCUE EFFORTS

As soon as conditions permitted, Cranfield set out in the Auster for the scene of the crash.

Bad weather, with snow falling, closed in on Scott Base just after the Auster became airborne and the Beardmore Depot reported cloud closing in with the aircraft only 20 minutes away.

The fog was only 50 ft. from the ground with a depth of about 500 ft., but by flying a little south of the depot, Cranfield came out of it and sighted the smoke signal at Beardmore Depot.

On January 21, just six days after the crash, the little two-seater Auster touched down at the men's camp. The two lone airmen felt they were again linked with civilisation, even though it was another day before they were able to fly out to the Beardmore Depot.

HOPE DEFERRED

Cranfield was heading back to the Beardmore Depot with Rule aboard, intending to return for Jeffs the same day, when Beardmore reported winds and a thick blanket of fog rolling in from the south-west.

Cranfield gave the Auster full throttle in a desperate race against the elements, but before he could reach the depot it had become enveloped in a heavy pall of fog. It was 500 ft. thick and right down to ground level, making a landing impossible.

The homing beacon was switched on at the depot and a fire lit, but

after flying round for 20 minutes waiting for a break in the fog Cranfield advised he was returning to the Beaver.

RACE WITH FOG

When almost there he was told by Jeffs to make a quick landing as the fog was now rolling in from the north-east. Three minutes later the aircraft was safely on the ground, only moments before the icy wastes were blanketed with dense, ground-level fog. It was another day before they were able to fly out to the Beardmore Depot.

On January 24 Cranfield and Jeffs departed in the Auster for Scott Base and Rule settled down with the thought that he was soon to be picked up by an American aircraft returning from the Pole. His companions were Boag, who had been manning the radio at Beardmore during the rescue attempts, Smith of the Alpine Club party, who had already been there two weeks awaiting transport, and the three U.S. weather men. But it was a fortnight later that the weather allowed a landing to be made and he was returned to base.

The aircraft was badly damaged, upside down with both wings shorn off. The engine was 30 degrees out of alignment and the fuselage twisted. The terrain, anyway, would make any salvage attempt extremely difficult.

The accident called a premature halt to the activities of field parties, most of whom had to be returned to base.

JIM LOWERY

Mr. J. H. Lowery, who was seriously injured when his Sno-cat crashed into a crevasse, will probably be in a Christchurch hospital for at least a year. He had his right leg amputated below the knee, also a portion of his left foot, suffered a severe spine injury and a fractured jaw. He is reported cheerful and 'his old self'. On behalf of all our readers we greet him and wish him well.

Alpinists Explore New Land in Beardmore Glacier Area

by R. W. CAWLEY
(Leader of the Expedition)

The Expedition consisted of R. W. Cawley (Leader), C. H. Biscoe (Deputy Leader and Biologist), M. R. Bolt (Surveyor), N. C. Cooper (Asst. Surveyor), R. L. Oliver (Geologist), P. L. M. Bain, B. J. McGlinchy and B. L. Smith. Our task was to carry out mapping and geological work in the mountains east of the Beardmore Glacier. The area was quite unexplored, although a number of the peaks are visible from the Beardmore Glacier and had been named and mapped approximately by Shackleton's and Scott's parties.

We were flown to McMurdo Sound by various U.S. aircraft between 11th and 17th November. On 23rd and 24th we were flown to U.S. Weather Station NGD1 (Beardmore Depot) by two R4D's of VX-6 Squadron. The station is on the Ross Ice Shelf some 30 miles from the coast, S.E. of the mouth of the Beardmore Glacier. It consists of two Jamesway Huts manned by three men during the summer months, and the R.N.Z.A.F. also established an advance base there this season.

We left our emergency stores here, in case aircraft failure compelled a long walk back to Scott Base, and set off across the Ice Shelf southwards towards the coast with 60 days' food and fuel. We travelled in pairs, each pair equipped with an 11 ft. Nansen type manhauling sledge, a polar tent, cooking gear, etc. With survey equipment and other scientific impedimenta our loads were 650-700 lbs. at this stage, and progress was slow—6 to 7 miles per day. Fortunately the surface was good, although some sastrugi were troublesome and in our inexperience we sometimes found the sledges brought to a halt. The prevailing wind here

was easterly, and therefore the sastrugi lay across our line of march.

BASE ESTABLISHED

On November 30 we established our Base Depot on the coast to the west of a large glacier which we named the Hood Glacier.* We then set off towards Mt. Kyffin, a prominent rock peak rising above the Beardmore Glacier and some 12 miles to the west of Base Depot. We crossed a low pass in a ridge which jutted out from the coast and camped on a small glacier immediately east of Kyffin. From here we carried out a fairly intensive programme and in the next few days we climbed in various groups Mt. Kyffin, Mt. Scott, Mt. Harcourt and an unnamed peak at the head of the valley. We took rounds of bearings from Kyffin and Scott, and made geological observations. Abundant lichens were collected and also fungi, and, most interesting of all, small insects. The latitude was 83° 50' S. and, so far as we are aware, the previous furthest south for insects was McMurdo Sound. From the summit of the peaks we had impressive views of the Beardmore Glacier and the magnificent peaks to the West, and also interesting views of the Hood Glacier. We could see that the glacier was some 5 miles wide and very little broken in the lower portion, but that about 15 miles from the mouth it diverged into a number of branches and rose more steeply.

* Shackleton's map shows a Hood Glacier in this vicinity but flowing east to west to join the Beardmore. There is no true tributary answering this description in this region, so we suggest the name be applied to the glacier we ascended, which flows south to north and joins the Ross Ice Shelf some 15 miles eastward of the mouth of the Beardmore.

We decided to split into two parties, one to explore the lower glacier, the other to penetrate as far as possible to the south by ascending a suitable branch.

SOUTHERN PARTY

We returned to the Base Depot, carrying out more survey, geological and biological work en route, and on the 14th Biscoe, Cooper, Smith and McGlinchy left to explore the upper, or southern, part of the Hood Glacier. They sledged up the glacier, establishing survey stations on "Beehive"† and on Mt. Patrick (7,100 ft.). Lichens were found on rocks near the summit and this is believed to be the highest altitude and latitude occurrence so far recorded. They were able to see a large glacier to the East ("Canyon Glacier") with fine peaks beyond. They sledged further up the Hood Glacier, finally camping at 6,000 ft. close under "Christmas Dome", about 25 miles from the mouth. In the final stages of the climb the four men pulled one sledge and cut down weight by using one polar tent and one Meade tent. The cooking was all done by the pair in the polar tent and they exchanged with the pair in the Meade tent at intervals. Unfortunately, the weather deteriorated at this stage, with white-out and frequent snow falls, and they were unable to carry out survey work from the vantage points that were now so tantalizingly close. They waited eight days, but eventually the poor travelling conditions reported by radio from the lower glacier by the Northern party made retreat advisable. They climbed Wedge Peak on January 2 and established a survey station on the summit, then sledged down the glacier to rejoin the Northern Party on the Ice Shelf on January 6.

NORTHERN PARTY

Meanwhile Oliver and Bain climbed Mt. Kathleen, and a little more geological tidying up was done before we (i.e., Cawley, Bain, Bolt and Oliver) set off up the glacier on December 16. We camped below a prominent spur ("Prospect Spur")

and in the next few days measured a base line on the glacier, fixed its position by sun shots and mapped most of the surrounding country by means of bearings from the ends of the base line. At the same time geological work was carried out on the ridges to the South of the camp, and later we climbed "Mt. Bali H'ai", a granite peak which guards the Eastern entrance to the glacier.

We then shifted camp across to the Western side of the glacier and climbed Mt. Cyril, carrying out geological and survey work as usual. Later we shifted camp further up the glacier to the foot of a low pass ("Ancestor Pass") which proved to give easy access to the Beardmore Glacier, suitable for either dogs or vehicles.

Our next move was to head across the glacier to the Eastern side again to examine some rocky spurs, but the weather deteriorated. Very slow progress could be made across the glacier in the new snow and rough ice formed on the Tufnol sledge runners. We cleared the runners each morning with the empty sledge upside down, and again at midday by digging a pit and clearing the runners as we dragged the sledge across. On the 30th we lay up while more snow fell, and next day we decided to move down the glacier. By this time some 18 in. of snow had fallen, and the sledges were running with the decks level with the snow surface. In the next two days, sometimes travelling by compass in white-out, we travelled only 4½ miles with great effort. From here on, conditions improved slowly, and a breeze which sprang up for a few hours on the 3rd, effected a striking improvement in the surface. We reached the Ross Ice Shelf again on the 5th and established a survey station from which the coast line was fixed.

The Southern Party joined us on the 6th, and on the 7th the R.N.Z.A.F. Antarctic Flight Beaver landed by the camp and flew Biscoe, Bolt, Cooper and Oliver to Scott Base. The remaining four sledged to Beardmore Depot where all but Smith were picked up on January 11. Smith did not reach Scott Base

† Names in inverted commas provisional.

New University Expedition Explores Dry Valley Area

by R. W. BALHAM*

The 1958-59 Expedition into the ice-free area of Victoria Land by a party from the Victoria University of Wellington, led by Dr. Colin Bull, was so successful that a similar expedition into the same block of country was mounted during 1959-60.

The programme was designed to complete the broad fields of the previous expedition and to supplement their findings. I was responsible for the expedition's biological and meteorological work; Mr. R. H. Wheeler, lecturer in Geography, was deputy leader, responsible for the topographical survey. The three other members of the party were Messrs. A. Allen and G. Gibson, graduate students in Geology; and Mr. I. Willis, student, who was to collect specimens for palaeomagnetic studies.

The area we were to work in has already been described by Dr. Bull in the June, 1959, issue of "Antarctic". It is a deglaciated area of South Victoria Land, lying between the latitudes 77° S. and 77° 45' S.; and between longitudes 160° E. and 163° E. It is bounded to the north by the Miller and Debenham Glaciers; to the west by the inland ice (here at an altitude of about 8,000 ft.); to the south by the Taylor and Ferrar Glaciers; and separated from McMurdo Sound to the east by the Wilson Piedmont Glacier.

THE PARTY FLIES IN

Our expedition established its bases in the Victoria Valley, just north of the Wright Valley, from which last year's party operated. Our job was to concentrate on the

for three weeks because of the Beaver crash—a typical example of the uncertainty of Antarctic travel.

In brief, we sledged 150-180 miles, mapped some 1,000 sq. miles and collected some 150 lbs. of geological, lichen and soil specimens in seven weeks.

northern half of this block, an area covering roughly 2½ thousand square miles. Like last year's expedition, our party was small in numbers and financed on a modest scale. Because of the logistic problems involved, the expedition was made possible solely through the generosity of the United States Navy.

The three students, plus our 3,500 lbs. of gear, left Harewood by Globemaster Transport on November 12, 1959; and the other two followed by Super Constellation on November 16. During the next week we organised and repacked our stores at Scott Base. Of paramount importance to us all was a reconnaissance and photographic flight into the Dry Valley area arranged through the co-operation of Mr. G. Toney, O.C., U.S.A.R.P., and Captain Munson of the VX 6 Squadron. Two Otter aircraft plus an official U.S. Navy photographer were provided; and not only did the flight enable us to see the country from the air and give us notice of some of the problems involved in back-packing through it, but also it helped us to pick likely sites for our two high-level depots. As soon as the aerial photographs were processed we set off, the large naval helicopter in use at McMurdo taking us in on three flights.

BASES ESTABLISHED

The main base was established at Lake Vashka, at the western end

* Dr. Balham was the leader of the 1959-60 expedition. He is a lecturer in Zoology at the University, and was a member of the New Zealand component of the Trans-Antarctic Expedition, wintering at Scott Base in 1957.

of Barwick Valley and about six miles from the Plateau. One depot with sufficient food and fuel for about 60 man-days was set up at the eastern end of Lake Vida in the Lower Victoria Valley. It was close to the original camp occupied during the ten-day survey trip made in the summer of 1958 by members of the T.A.E. and Victoria University of Wellington summer support. In addition, two high-level depots, each with about 50 man-day rations, were established, the first of them on the Apocalypse Peaks at about 3,000 ft.; and the second, also at about 3,000 ft., in a cirque between the Upper Victoria and the Debenham Glaciers. We had hoped to establish our first high-level depot at a greater altitude, but the weather that day prevented our climbing any higher; and as it was we were very grateful to Lieut. Hooper for getting his helicopter as high as he did.

The first two days were occupied in establishing the main camp, which consisted of two permanent Scott tents and one of our portable two-man tents; in setting up the meteorological screen; and in general reconnaissance. Then we all set off on foot down-valley to the depot at Lake Vida, 15 miles away.

Our programme had been designed so that four main blocks within the Victoria Valley system could be tackled from the various depots. From the Lake Vida depot the four other members of the party worked for approximately two weeks in the mountains to the north and south, doing geology, topographical survey, and sampling of orientated rock specimens for palaeomagnetic studies. In addition a second meteorological screen with self-recording instruments was established at the Lake Vida depot. During the previous summer the expedition in the Wright Valley immediately to the south had found in general dry katabatic winds in the western end, and moist anabatic winds in the eastern end of the valley. It is of interest to note here that while the meteorological data has not yet been fully analysed, the wind throughout the length of

the Victoria Valley appears to be predominantly from the east.

CARCASSES IN THE VALLEY

I left the party at Lake Vida and returned to main camp at Lake Vashka to carry out biological studies. These are confined to the collecting of lichens, mosses and algae, the analysis of the fresh waters in the lakes, the collecting of plankton and a study of the desiccated carcasses of seals and birds on the valley floor. As has been found before in this dry valley system, carcasses of both crab-eater and occasionally Weddell seals are present, up to 40 miles from the coast, though why these journeys which end in death are undertaken is not known. But a new and surprising discovery this year was some 40-odd carcasses of skua gulls around the shores of Lake Vashka. That skuas frequent the valley is known; but again the reason for so many dying in this one locality, 40 miles from the sea, in an area which can afford fresh water but no food, is not known.

I spent most of my time around Lake Vashka, doing biological and meteorological work, acting as the headquarters unit for the two two-man field parties and being 'post-mistress' at the Victoria Valley Post Office. A good deal of time was taken up receiving and transmitting telegrams for our five-man party, seeking unsuccessfully for a fault in the modulator unit of the large radio set and keeping a bi-weekly schedule with Scott Base and a twice-daily schedule with the field parties.

AMERICAN VISITOR

The monotony of camp existence for one man was relieved by the arrival of a most welcome American guest, Mr. Bob Rutherford. A graduate geology student from the University of Minnesota, he spent about two weeks with us studying our equipment and techniques. He is to be a member of a small party from the University of Minnesota which plans to send an expedition into the Sentinel Mountains next summer.

In all some 66 days were spent in the field, and I think it would be

fair to say that the general exploration of this area is now complete. From now on the area will be of more interest to specialists. The expedition covered approximately 1,200 miles on foot. The geologists covered something like 600 miles on their traverses and will be able to produce a reasonable map of the area. They have mapped the pre-Cambrian metamorphic basement, the younger Beacon sandstones and the intruded dolerites and granites; and they discovered that the thickness of the Beacon series is much greater than was found hitherto, being of the order of 3,500 feet. Seven survey stations were established to tie in with the survey work done by Lieut.-Commander Richard Brooke and his northern party of T.A.E., and by Dr. Bull and last year's University expedition. Over 150 orientated rock specimens were collected from the sandstones, dolerites, dykes and sills, with special emphasis on samples at the contacts.

The weather in the valley was colder than that experienced by the T.A.E. party in the summer of 1958, and by Dr. Bull in the Wright Valley last year. The ice around the edge of Lake Vida opened up for a few days in December and thawed on a few small, shallow lakes; but this was the only free water experienced through the whole summer. No water flowed into either Lakes Vida or Vashka, though in the summer of 1958 Lake Vida was fed by rivers from the Upper and Lower Victoria Glaciers and streams from cirques north and south. The average temperature at

THE WHITE DESERT

Although the Antarctic has often been called a white desert, few people think of it as a really dry area. But Dr. Robert P. Sharp told a San Diego audience that if the Antarctic were not so cold, it would be "as dry as the Mojave Desert." The amount of moisture deposited on the Antarctic as snow is comparable with the amount deposited on the Mojave Desert as rain. The average snowfall in the Antarctic is only about five inches per year.

Lake Vashka was 29° F., the extremes being 54° F. and 8° F.

The party completed its programme and was uplifted by helicopter on February 1, 1960, returning to New Zealand by United States military sea transport about a fortnight later.

PRE-VIEW

Lieutenant L. D. Bridge, who has been designated Scott Base leader for 1961, was at the base from January 17 till January 28 to get an insight into its running.

He sailed in the U.S.S. "Eastwind". When the ship was off Scott Island on January 15, Lieutenant Bridge with three American officers was landed on the island by the ship's Bell helicopter. They spent about one and a half hours ashore.

Scott Island was discovered by Lieut. Evans of the relief ship "Morning" in 1902 and a party landed after some difficulty.

Scott Island is almost directly in line on the route from New Zealand to the Ross Sea and is just within the Antarctic Circle. It is a small volcanic island about a quarter of a mile long and a few hundred yards wide, mostly snow covered with almost sheer cliffs all round.

Lieutenant Bridge obtained geological soil and botanical specimens which will be taken back to New Zealand for study, and a United States scientist took gravity readings.

Bird life on the island appeared to be mostly Antarctic petrel gulls.

Lieutenant Bridge was later transferred at sea to U.S.S. "Towle" by helicopter, being lowered to the deck by a hoist while the ship was still at normal speed.

Robert Harkness, the New Zealander who is a member of the new F.I.D.S. team (see "Antarctic" Sep. '59), is 28 years of age. He was born and educated in Ashburton, and trained as a diesel mechanic. He worked in Ashburton from 1946 to 1952, when he moved to Northern Ireland. He joined F.I.D.S. last autumn and sailed south on "Kista Dan". He will be spending two years at the Argentine Islands (Base F).

Scientists Make Soil Survey of Ross Dependency

by J. D. McCRAW

Two members of the staff of Soil Survey, New Zealand Department of Scientific and Industrial Research, Mr. J. D. McCraw, Pedologist of Alexandra, and Dr. G. C. Claridge, Chemist and Mineralogist of Wellington, have spent three summer months working in the McMurdo Sound area.

The objects of the expedition were to search for any evidence of soil-forming processes operating in Antarctica at present; to search for buried soils or other evidence of changing climate; to study past and present rock weathering; to study permafrost, especially in its relationship to topography, and to collect as much geological and botanical information as possible.

The party left Christchurch by Super Constellation on October 21, 1959, but the aircraft was forced to return through poor weather and McMurdo was not reached until next day.

After ten days' preparation at Scott Base the party set out with two tractor-drawn sledges and drivers for Cape Royds, and after an uneventful but cold trip established itself in Shackleton's Hut. The hut is in very good repair and was occupied during the summer months by two biologists who were studying penguins in the nearby rookery.

Two days were spent examining the volcanic soils of Cape Royds and then the party moved south to Cape Evans. Scott's Hut was full of snow and uninhabitable, but while the scientists were working two tractor drivers made a start with snow clearing. It is going to be a big job to clear the whole building.

RECONNAISSANCE

After returning to Scott Base two days were spent flying over the dry valleys of South Victoria Land. The route lay up the McKay Glacier, out on to the Polar Plateau and across the extensive dry country

in the Victoria Valley and head of the Wright Valley. Next day the party flew up the Taylor Valley and then south up the Koettlitz Glacier. A valuable set of aerial photographs was taken by a U.S. Navy photographer who accompanied the party.

At this stage it was decided that a visit to a more northerly part of the Continent was desirable to obtain a broader picture of the soil pattern. A flight to Cape Hallett was requested from the U.S. Navy and after four false starts the party was able to spend four hours on the ground at Hallett. Soils were examined at the extensive penguin rookery and in the great scree falling from Cape Hallett. Arrangements were made with some of the Hallett party to collect further samples.

Preparations were now put in hand for a prolonged trip to the Taylor Dry Valley and on November 19 the party left Scott Base with two tractors and two sledges and two drivers. Camp was pitched the first night on one of the Dailey Islands and next day the party proceeded up the Koettlitz Glacier and returned to Cape Chocolate, where a full day was spent examining the terraces and fans at the mouth of the Hobbs Glacier. A broken brake drum on one of the tractors threatened to delay the party until spares could be flown in but expert driving and much patience in negotiating the worsening ice surface made this unnecessary.

THE DRY VALLEY

The mouth of the Taylor Valley was reached on November 22 and

after crossing exceedingly rough sea-ice the party was disappointed to find that it was not possible to take the tractors inland as planned.

The route inland which had been plotted from the air was found to be snow free and thus impassible for tractors. Base camp was therefore established about 200 yards above the beach in a valley draining the extensive moraines further inland.

A novel innovation was the provision of a small cookhouse which had been constructed at Scott Base from a packing case. The shape of this structure (3' x 3' x 6' high) gave rise to many ribald comments but it contributed greatly to the comfort of the party in that it enabled food to be prepared in a "standing up" position and kept the sleeping tent free from food. On the sledge journey across McMurdo Sound it was used as a shelter by the passengers on the sledges who were able to recline in their sleeping bags and read books in comfort.

The tractors departed for Scott Base on November 23, their crews collecting soils and moss from Butter Point on the return journey.

FIELD WORK

Field work commenced immediately. The party found itself on the floor of a valley about 8 miles wide at the mouth and bounded by mountain walls reaching over 6,000 ft. The floor was covered by heaps of moraine several hundred feet high, but further inland topography was much subdued and several large frozen lakes had formed behind morainic or ice dams. The snout of the Taylor Glacier lay 30 miles to the westward near the head of the valley and numerous ice falls and tributary glaciers fell into the valley from ice fields on the mountains. The valley was separated into three distinct basins by transverse rock ridges (riegels) which were pierced by narrow gorges.

Food and camping gear were back-packed into a depot about 8 miles from the valley mouth and from there carried a further 9 miles to a camp about 4 miles from the snout of the Taylor Glacier. From

this camp a point about 6 miles up the glacier was reached. To save further camps several trips extending over 24 hours were undertaken. After a week at this camp the party returned to base camp for a spell and carried out detailed studies of frost phenomena in the vicinity. The party then returned to the mid-valley depot and carried out several days' field work, including an ascent of the low peak, Mt. McLennan. Preparations were now made for manhauling to Marble Point some 20 miles to the north but the sea-ice was melting and exceedingly rough. Arrangements were therefore made for evacuation by U.S. helicopter which arrived on November 19 and flew the party to Marble Point and thence to Scott Base.

WORK ACCOMPLISHED

It will take some time to work up the notes and samples brought back and until this is done only general impressions can be put forward.

The expedition was able to establish that, though soils as an agriculturist understands them are unknown, soil-forming processes do operate in Antarctica. The most striking evidence was a widespread surface crust of lime-cemented sand about two inches thick. This implies that chemical weathering is taking place and lime is being deposited from evaporating soil moisture. The party was much impressed by the amount of physical weathering taking place—rock splitting; disintegration; sculpturing and sand and ice blasting are commonplace. The effects of frost action on soils were noted and the widespread soil polygons, stone rings and so on, were examined. A study of the relationship between the depth to permanently frozen ground (permafrost) and topography entailed digging many hundreds of holes.

All in all the trip was a profitable one and the N.Z. Soil Survey can truthfully say that it has studied soil processes ranging from the tropics to the polar regions.

NEWS FROM HALLETT

The Hallett Station Leader commented in December that "vast amounts" of biological work were being carried out. Reid (New Zealand) reports that the first Adelle penguin egg appeared on November 3. Six Emperors arrived on the 27th: they were banded, weighed and had their temperatures taken. By December 6, over 127 Emperors had arrived. Up till the time of Reid's report, the heaviest Emperor weighed was 66 lbs. and the lightest 44½ lbs. Skua eggs were sighted on the 18th. The Emperors stopped migrating about mid-December.

Exceptionally fine weather in December permitted considerable outside work, particularly in the biological field. Almost all snow in the Station area melted. The highest temperature recorded during the month was 44° F. and the lowest 11° F.

An air-drop of Christmas mail on December 23 was marred by the loss of one bag over the Tucker Glacier. Four men toiled to retrieve the bag in vain, owing to crevasses.

SKUA PALS

Brian Reid, the New Zealand biologist, has created something of a record by establishing friendly relations with the Skuas.

"When I first came down here," he writes, "I regarded the Skua with considerable mistrust as he is an annoying creature with his swooping and dive-bombing and I would be forever ducking my head and threatening destruction of the entire Skuary. However, relations have improved and now two of them feed out of my hand.

"This is a martyr's way of winning them over as every so often they get my fingers along with the morsel. This produces a howl from me followed by indignant squawks from them when I've finally extricated the fingers. I've now given George and Mrs. George half-a-dozen lectures on table manners but they obviously don't pay attention as the next time I feed them they try to include my fingers again.

"The Skuas, like the Penguins,

return to the same mate and nest each year."

Davis, a U.S. Navy weather man who wintered at Hallett, voluntarily stayed on for three months after he was due for relief, in order to assist Reid in his biological work. Davis's enthusiastic support enabled Reid to extend his programme considerably, and his action in staying on after his mates were relieved was greatly appreciated.

RE-SUPPLY BEGINS

The relief of Hallett Station commenced on February 4, when the U.S. cargo ship "Arneb" arrived there from McMurdo escorted by the ice-breaker "Eastwind". "Arneb" is the only vessel of the task force equipped for amphibious operations such as are required to re-supply Hallett Station. This is "Arneb's" fifth consecutive year in the Antarctic. At Hallett her boats are often required to act as tugs, pushing large tide-and-wind driven ice floes away from the landing area.

U.S. - U.S.S.R. EXCHANGE

The U.S.S.R. and the United States have resumed the exchange of scientists between Soviet and American Antarctic expeditions.

A seismologist from the California Institute of Technology, Mr. Gilbert Dewart, is on his way to the chief Soviet base at Mirny. A Russian scientist, Mr. Sveneld Yevteyev, who will work at the United States Antarctic base on Ross Island as a glaciologist, left New Zealand aboard the cargo ship "Arneb" late in January.

The exchange is in the spirit of the 12-nation Antarctic Treaty signed in Washington on December 1, 1959. The exchange of scientists was suspended a year ago after it had been carried out for two years under the auspices of the International Geophysical Year. Soviet approval came through barely in time to complete arrangements for the coming year.

Renewed French Activity In Adelie Land

The 592-ton "Norsel" on her sixth Antarctic voyage reached Hobart on December 22 en route to relieve Dumont d'Urville Base in Adelie Land. At a civic reception the Lord Mayor called the gathering to attention with a silver whistle used during Amundsen's expedition in 1911-12. The ship sailed south on December 26 and reached "L'Ile des Petrels", the base site, on January 2, after passing through three bands of pack-ice of unusual density.

The expedition leader is M. Alfred Faure and the new wintering party numbers 14. This is France's 10th Adelie Land Expedition.

"Norsel" sailed more than 100 miles along the coast line to 136° 58' E.

"Norsel" left Adelie Land on February 5. The weather on the return voyage to Hobart, says Captain Torgersen, was "extremely rough" but the ship suffered no damage.

M. P. Rolland, Administrator of France's Southern Territories, was a passenger on "Norsel".

On October 23 last, the 1959 expedition doctor, D. Digeor, removed the appendix of Swiss-born engineer, Gilbert Caillet, in the converted lounge-room at Dumont d'Urville Base.

France is to continue her programme of Antarctic research at an estimated cost next year of £357,000.

The 158 tons of cargo was discharged under excellent conditions, but the summer scientific programme was made difficult, and shortened, as a result of bad weather and heavy seas which prevented any of the projected landings on other parts of the coast. The proposed programme included the preparation of a geological map of the Adelie Land coast and a geological study of the moraines.

WILKES STATION

Summer came early at Wilkes Station where temperatures up to freezing point were experienced during November and where the winter's fast ice went out as early as November 3. All around and still partly covering the huts of the station the winter accumulation of snow was still persisting, the only effect of the summer thaw being to make the buildings leak like sieves despite every effort to avoid this.

Taking advantage of good settled weather during mid-December, Penney and Denholm, in a twelve-foot dinghy with outboard motor, visited most of the islands of the Windmill group, and landed on several of them, including Frazier Island. They began a biological survey, collected egg albumen from nesting petrels and banded small groups of Adelie penguins and pintado petrels. The total distance covered by the dinghy was over eighty miles.

The leader of the 18-man Wilkes relief party for 1960 will be Harry Black, a veteran of Australian Antarctic work. Three Americans are included in the party, and a fourth American, the biologist, Penney, who has already spent a year at Wilkes, is remaining for a second year.

HOMING PENGUINS

Various navigational experiments with Adelie penguins have been carried out by Penney. Small groups have been released at varying distances from the station. The ultimate test may be assumed to have been made when, in early December, a plane from McMurdo Sound, 1,200 miles away, returned to that area with five marked penguins to be liberated.

NEW AIR LINK

For the first time an air link has been made between the Antarctic mainland and Australia, via McMurdo Sound and New Zealand. A member of the Wilkes wintering team for 1959 had been awaiting evacuation since the previous April at which time he had been taken ill.

On December 3 a U.S. Neptune aircraft from McMurdo Sound landed on a strip prepared on the plateau above the station. It remained on the strip for only 2 hours 18 minutes, during which time the sick man was taken aboard and the plane refueled. All this time a U.S. Constellation aircraft circled overhead. The sick Australian was evacuated from McMurdo to Christchurch, N.Z., and thence to Melbourne.

RECORD RADIOSONDE

With the expected relief party only days away the outgoing meteorologists at Wilkes, Hansen and Hardy, achieved a record radiosonde flight with a sounding to 115,911 feet—almost 20 miles high.

It was announced in Canberra on February 16 that one of two helicopters being used by the Australian expedition has been wrecked during a survey flight of the coast of Australian Antarctic Territory.

The crash occurred on February 13, when the aircraft was caught in violent turbulence and 70 miles an hour winds at Hatch Inlets, at the head of Vincennes Bay, 50 miles south of Wilkes Base.

The pilot, Captain Ivanoff, and surveyor, David Cook who was a passenger, both had bruises and lacerations.

LATE NEWS

After relieving Wilkes Station, the "Magga Dan" worked her way eastward along the coast, and new landings were made by the Australian party.

Mr. Law and Capt. Pedersen took the ship into the bottom of Vincennes Bay where no ship had previously been. Data collected will allow Australian cartographers to delineate the coast accurately.

A small party was landed on a rocky peninsula east of Hatch Island where latitude and longitude

were accurately determined in a 40-knot wind and bitter cold.

The "Magga Dan" then moved into more unknown waters through a maze of giant icebergs to the Davis Islands which have been photographed from the air but not previously visited.

NIGHT LANDING

A night landing on the largest island was made with difficulty, but the following morning the scientific investigations included collection of geological specimens and study of the wild life.

The "Magga Dan" next made a new landfall on the Sabrina coast west of Cape Southerd.

The two tiny rock outcrops 10 miles apart were named Chick Island and Henry Island by U.S. aerial photographers in 1948 but the "Magga Dan" was the first ship to reach the ice shelf beside Chick Island.

GERMAN EXPEDITION CALLED OFF

The proposed expedition to be led by mountaineer Dr. Karl Herligkoffer (see "Antarctic", vol. I, 271, 299, 333) has again been postponed, this time indefinitely. The reason given is lack of financial support. Philatelists who sent covers to the organisers have had them returned to them bearing a cachet, "Deutsche Antarktis Expedition 1958-60, Neu Schwabenland", and a rubber stamp confirming the postponement.

—("Polar Post.")

The New Zealand Antarctic Society's volume "The Antarctic Today" has been translated into Russian, and an Argentinian edition in Spanish is being prepared.

On "Glacier" during the penetration of the Bellingshausen Sea was Dr. Robert Cushman Murphy, 72-year-old American biologist and author.

SOVIET TRACTOR TRAIN REACHES THE SOUTH POLE

The Russian traverse party which left Mirny on September 27, arrived at the South Pole on December 26. This is the first time any party has reached the Pole from the Indian Ocean side of the Antarctic.

On arrival at Komsomolskaya, 500 miles inland, which was not occupied during the winter, the party put into running condition the three Kharkovchanka snow vehicles which had been left there seven months previously. Stores were cached and an air-strip prepared for the flying-in of further equipment.

The traverse proper began on November 6 from Komsomolskaya. The train comprised the three 35-ton Kharkovchankas drawing ten sledges loaded with 400 tons of stores and scientific equipment, and two track-laying vehicles. The Kharkovchankas are 30 feet long, 13 feet wide, and are mounted on broad (three-foot) knife-like tracks. They are flat-topped with a superstructure made of low heat conducting material. They are hermetically sealed and air conditioned.

TRAVEL DE LUXE

Living and sleeping quarters (including reading lamps) are provided for six men. There is linoleum on the floors and curtains on the nine portholes.

The scientists on board can make all their observations without ever leaving the inside. Outside the hull and screwed down from the floor of the vehicles are scientific instruments, readings from which are taken from the heated interior.

Nozzles run warm air between the double glass of armour-plate portholes to keep them clear for observations. To enable those in the vehicles to navigate by the stars or the sun, there is a perspex plate in the roof.

1,000 HORSEPOWER

The vehicles are powered by 12-cylinder diesels of 520 horsepower, without the supercharger, 1,000

horsepower with it.

The Russians claim that, in good weather, they can travel at 28 miles an hour through three feet of snow and the vehicles can withstand temperatures as low as -94° .

While the Russians were at Vostok an IL-12 plane made a ski landing at the station, the first time a plane of this type has landed in the interior of the Antarctic.

The train reached Vostok on November 29, after 23 days' travelling from Komsomolskaya.

The 16 Russians left again on December 8 with two Kharkovchankas, one caterpillar tractor and four sledges. From Vostok to the Pole the plateau slopes gradually downward. On December 12 the train halted at $80^{\circ} 14' S.$, $106^{\circ} 50' E.$, 125 miles south of Vostok, for seismic soundings.

The train was sighted on December 13 by the crew and 50 passengers of a United States Navy Super Constellation, returning from an aerial reconnaissance mission over the plateau. The Russian party was seen several miles to starboard. It was about 162 miles south of Vostok when it was sighted by the Americans.

The pilot of the American plane (Capt. William H. Munson) said: "We simply dipped our wings in a gesture of good luck."

NEARING THE POLE

A request for daily radio contact between the Russians and the Pole station was received at U.S. Antarctic headquarters in Christchurch on December 24. The message, which came from Mirny through McMurdo Sound, gave the tractor party's position at 3 p.m. Moscow time on December 22 as $87^{\circ} S.$, 106°

45' W. This is about 180 miles from the Pole.

The train reached the Pole at noon, Moscow time, on December 26, after a trek of 1,670 miles.

All 16 members of the expedition, led by Mr. Alexander Dralkin, were in excellent health when they reached the Pole. The mechanical equipment of the expedition was in good condition when it arrived.

WELCOME!

As the tractors halted, out stepped 16 tired but happy Russians—scientists, drivers, mechanics. Promptly, the Americans invited them in for a meal of Southern-style pork chops, eggs, and fried potatoes.

After eating, the Russians asked for a Hollywood western, and the Americans obliged with John Wayne standing off the Apaches in "Hondo". The next morning everybody sat down to breakfast plates piled high with buckwheat cakes.

As friendships formed, the Americans heard some harrowing stories of their guests' 1,670-mile trek from the Russian base at Mirny, on the Antarctic shore of the Indian Ocean. Often, the tractors' tracks would crack in the minus-50deg. cold. Sometimes as the huge machines were trundling across mountains 10,000 ft. high, the ground would open and one of them would tip into a crevasse. The other two would crawl back and tug the helpless behemoth free.

ROUGH GOING

It was the passage between the Komsomolskaya and Vostok stations which proved the most difficult, with loose drifting snow handicapping progress.

Despite the yard-wide special tracks on the vehicles, first the vehicles and then the trailers had to be pulled out of the snow, Moscow Radio said.

At the beginning of the journey the landscape was comparatively flat snow, but later the terrain changed to small hills and valleys.

The comparatively soft snow surface alternated with bumpy stretches when loose articles had to be tied to the vehicles because of the rolling and pitching.

The Russians told the Americans they had experienced temperatures of minus 40 to 60 degrees. They had a few mechanical difficulties.

WORK EN ROUTE

On the trail the Russians worked 17 to 19 hours a day, stopping two hours for each of two meals. The scientists slept on the trail in the tractors and the drivers and mechanics slept while the scientists were working.

During their journey the Russians made meteorological, glaciological, gravimetric and terrestrial observations.

Tass said the expedition did not try to break any records. It stopped about every 70 miles to make scientific observations for a meridional cross-section of the ice covering the continent.

It had crossed areas never before trodden by men.

BACK AGAIN

It was thought that the Russians planned to push on 2,000 miles farther to the other side of the continent at Lazarev Station, although a Tass report in early December had spoken of their return to Vostok by the time the relief ships arrived at Mirny. But two days later, after another buckwheat-cake breakfast, the Russians decided to leave, going back the way they had come.

The Russians told the Americans that a Russian supply ship was due at Mirny in a fortnight and they planned to make a fast return trip. They had placed fuel caches along the route and planned to make only minor scientific observations on the way back. As a result they hoped to average 115 miles a day on the return journey.

RETURN JOURNEY

The Russian tractor party left the South Pole at 1.51 a.m. on December 29 on its return trip to Mirny, via Vostok. While at the Pole seismic soundings were taken.

The train reached Vostok on the return on January 8, following the ruts made by the tractors on the outward journey. There was clear, cloudless weather, and no strong wind, the train making 50 to 100 miles a day.

VOSTOK

The minimum temperature of -122.2° F. recorded in August was the coldest recorded anywhere on the earth during 1959.

In late October the temperature at Vostok was -49° to -85° F.

The wintering-over party of 10 for 1960 will be led by V. S. Sidorov, who will be spending his second winter at the South Geomagnetic Pole.

Vostok was considerably extended last year. Much new equipment for auroral and magnetic observations was installed. Five separate magnetic 'pavilions' are connected by 55 yds. long passages. Over 100 cubic metres of snow had to be removed to the surface for their construction.

LAZAREV

The buildings at Lazarev cover 80 sq. metres and are connected by covered ways. A subsidiary base has been constructed five and a half miles south-east of the main station. At first only meteorological observations were taken here, but later, magnetic observations were also made. Remote-control instruments made it possible to note temperature and wind direction and speed from inside the building.

Up until mid-August the sea at Lazarev was generally ice-free, frequent gales breaking up the newly-formed ice and carrying it to the coast.

During traverse operations in August, the shelf was studied two and a half miles to the east of the station. In the north-south direction, a valley was found with several crevasses. To the south-west morainal deposits were found in the crevassed region uncovered: sand, grey sandy loam, shingle, lichens and shells.

Early in October over-snow vehicles made short journeys near the base and a topographical survey of the area was carried out. A wide inlet had been formed in the ice 12 miles north of the station, caused by the calving of icebergs. Smaller bergs had broken off two or three miles north-west of Lazarev.

The leader for 1960 will be L. I. Dubrovin. The wintering-over team of ten will compile a geological map of the Queen Maud Land Mountains under the supervision of D. Solovyev, who has served on three previous expeditions.

LAZAREV-MIRNY FLIGHTS

The first flight between the Mirny and Lazarev Stations (see December "Antarctic", pages 140 and 144) was completed by the return of the LI-2 plane to Mirny on November 1. At Lazarev the aircraft made two reconnaissance flights, one along the Princess Astrid Coast, the other south of Lazarev in the region of the Wohlthat and Sor Rondane Mountains. Two groups of peaks about 10,000 feet high were discovered in 72° S., 16° E. This flight was made primarily to plot the best route from the central plateau to the Princess Astrid Coast.

The plane left on the return flight to Mirny on October 28, and made stops at King Baudouin, Mawson, Davis and Showa Stations.

An eleven-hour, 2,170-mile non-stop flight from Lazarev to Mirny was made on January 11 by A. Pimenov piloting an IL-14. The flight was made to transport E. S. Korotkovich, Chief of the Fifth Antarctic Expedition, to the station. Since its delivery two weeks before from the Soviet Union, the plane had already made two exploratory flights, one in the direction of King Baudouin Station (Belgian) and the other to the Pole of Relative Inaccessibility.

Russians gave the Australians at Mawson and Davis gifts of champagne and cigars at Christmas.

A new Russian gazetteer of East Antarctica contains 750 place names. A bay and an island have been named after Ivan Khmara, the 20-year-old tractor driver who was killed in 1956 during the landing on the Pravda Coast.

A Polish party will again occupy Oasis Station, which has been re-named Dobrowolski.

Fifth Soviet Antarctic Expedition Settles In

Over 120 men will winter this year at the three Russian stations, Mirny, Vostok and Lazarev.

SHIP MOVEMENTS

"Ob" left Leningrad on November 12 and "Kooperatzia" left on November 15.

The "Kooperatzia", carrying members of the fifth expedition, including an American, two Czechs and three East German scientists, arrived at Mirny early in January. The ship was moored near the shore ice 11 miles from the mainland.

The "Ob", after partially unloading at Lazarev and rendering aid to the Japanese ice-breaker "Soya" approached the edge of the fast ice about five miles from Mawson. Here, aviation gas was transferred from the ship by helicopter for the flights planned between Lazarev and Mirny. "Ob" was to travel eastwards from Lazarev to try and penetrate the Bellingshausen Sea.

FUTURE PLANS

Soviet scientists will set up a series of permanent bases in the Antarctic next year to supply future expeditions, Tass reported on February 18.

The sixth Soviet expedition to the Antarctic has already begun training and will replace the fifth expedition next December.

Research will be continued at Mirny and at Lazarev, in Queen Maud Land.

Lazarev was a "long-term" base for geological research and would increase in importance," the radio said.

It was planned to move the Lazarev base in 1962 from the ice shelf in Queen Maud Land to a region sheltered by mountains and suitable for the handling of heavy aircraft with inter-continental range.

A meteorological outpost will be set up on the present site of the Lazarev base.

Temporary scientific research bases will be established in several localities on the coast and inland.

Additional aircraft comprise one Il-14, two Li-2, one An-2, and one helicopter Ni-4. New sledges for the tractor teams with a better coupling system have been sent south.

Protective masks with electric heating have been provided for men working at the high inland bases. Power for the masks comes from high capacity portable accumulators. Gas analysing devices for protection against incomplete gas combustion in the heating installations are used by field parties.

FLIGHT TO POLE?

Rear Admiral David Tyree has agreed to a Russian request for landing facilities at the Pole.

The Russians asked permission to fly in one of the Ilyushin 12 aircraft at a date yet to be decided. They asked if the aircraft could take on 1,000 gallons of fuel at the Pole and Admiral Tyree agreed. The purpose of the flight is to complete seismic measurements made by the ground party which visited the Pole in December.

The aircraft will fly over the same route as the ground party from Vostok to the Pole.

In their signal to Admiral Tyree the Russians said they would make the results of the measurements available to the Americans, if they wanted them.

Admiral Tyree has offered the Russians special weather reports for the flight and added "best of luck". The distance from Vostok Station to the Pole is about 700 miles but it is not known whether the aircraft will take off from Vostok or Mirny Station on the coast. From Mirny to the Pole the distance is about 1,400 miles.

AUSTRALIANS ACTIVE AT ALL A.N.A.R.E. BASES

As the Australian bases on the coast of Eastern Antarctica are dependent for relief on sea transport from Australia, no early switch-over of personnel is possible, as at McMurdo Sound. But activity comes with the spring.

AT DAVIS

In early November life began to return to Davis Station in the shape of a skua gull and a giant petrel, closely followed by the first penguin.

Flight in a different form was in evidence on November 12 when a Russian plane flew over the station on its way to Mawson. Bad weather on the return flight from Mawson to Mirny brought a welcome diversion in the arrival of the Russian crew of their Convair-type plane to spend a night at Davis. Films, Russian cigarettes, vodka and general goodwill made this a very happy meeting, and an almost unwelcome favourable weather report next morning brought the visit to an early close.

A second Russian visit occurred on November 30, when another Russian plane called, bringing this time a Russian film. Mr. A. Dralkin, leader at Mirny Base and Chief of the Polar Institute in Leningrad, being an oceanographer, was very interested in some of the lakes in the Davis area, which are never known to have frozen. Newman and Braunsteffer acted as guides and took Mr. Dralkin, an interpreter and a photographer on a trip up Long Fiord and then on foot to Club Lake and some smaller lakes nearby. The visitors were thrilled by the visit and took back many water samples and rock specimens. The Russian visitors took off on their return to Mirny in blazing sunshine on December 1.

LOCAL TRIPS

Steiger and Braunsteffer left base on November 14 to gather data from Lakes Dingle, Stinear, Deep and Club, travelling on foot. They were to be picked up by a sledge party for their return journey. A

further visit to the lakes was made on November 26 during which journey twenty-five thousand penguins were counted in the various rookeries in the neighbourhood. The first penguin egg was seen on December 5 by Fuller, Newman, O'Gorman and Braunsteffer during a trip to Crooked Fiord. On this trip also the first eighteen elephant seals were observed to have arrived at Mule Island.

A dog sledging journey up Long Fiord commenced on December 9, the party being Torckler, Eadie and Keuken. The dogs performed remarkably well. Numerous skuas, cape pigeons and snow petrels were banded and most unexpectedly, two skuas wearing Russian bands were captured. Not until November 24 was the weather sufficiently settled to allow a second trip up Long Fiord, when Fuller, Newman, O'Gorman and Braunsteffer set out with the tractor and two sledges in tow. Next day, Braunsteffer and Newman started for their crossing of the Vestfold from east to west with the object of measuring the level of the four lakes under observation, and checking on bird life, as they went. On their way they found a waterfall and, in a depression 24 metres below sea-level, some large clumps of mosses.

AT MAWSON

The earliest contact of the year at Mawson was on the night of December 10 when the U.S.S.R. ship "Ob" cut into the fast ice to leave emergency fuel for use by Russian aircraft. Helicopters plied back and forth over the five miles between ship and station during that night and all the next day, bringing welcome mail to those at Mawson.

A warm summer was being experienced from December 1, on which day temperatures for the first time rose above freezing point. Open water was visible six miles to the north of the station and there was every indication that the harbour ice would go out quite early.

However, a hurricane on December 28 which wrecked both aircraft was a bitter blow. Not only did it cause great material damage and loss; it called a halt to a project which, with the help of nearly everyone, had taken a year's planning and hard work to establish successfully. For weeks after the sea-ice became unsafe for aircraft, flying was maintained from the well-equipped plateau airstrip, to the great benefit of the programme of field exploration and mapping. There were in fact two plateau airstrips—one close to Mawson, the other, established by "Operation Icefield" in November, at Mt. Twintop.

THE GREAT BLOW

The vivid story from the *Leader* at Mawson, Mr. J. M. Bechervaise, indicates that this polar hurricane, which reached an estimated 115 m.p.h. with erratic gusts far in excess of that speed, developed without warning. Parties had left Mawson Station during the morning to make routine inspections of the aircraft on the plateau strip. When these parties reached the airfield the wind had already reached 80 m.p.h. and one Beaver aircraft had snapped a tie wire, despite its three-ton breaking strain. The second Beaver seemed secure.

The hero of the day was Sqd/Ldr Sandercock who acted quickly and without thought of personal safety in climbing into the sliding aircraft, starting its engine and holding its nose into the prevailing wind during the increasing storm for no less than two hours before assistance arrived in the form of a weasel tractor. Further cables were attached to this aircraft and for a short time the situation seemed to be well in hand. However, further gusts reaching 120 m.p.h. quickly wrote finis to both planes. A wing

was wrenched off the first Beaver and was thrown 100 yards through the air. The other wing collapsed in the middle. The second Beaver broke loose from its 7½-ton cables and was eventually wrecked completely, despite the most strenuous efforts to secure it.

PLANS FOR RELIEF

The destruction of both Beaver aircraft meant that a replacement aircraft had to be speedily found in Australia, where the relief ship "Thala Dan" was preparing to leave for Mawson. It was intended that the air strength at Mawson would be increased during 1960 by the addition of a Dakota aircraft equipped for jet-assisted take-off. This aircraft was loaded on the "Thala Dan", which left for Mawson on January 10. The Dakota will be the only aircraft at Mawson until a Beaver taken south on the "Magga Dan" arrives from Davis Station at the end of this summer.

SHIPS SAIL

The "Magga Dan" sailed from Melbourne on January 5, with relief parties for Davis and Wilkes. The "Thala Dan" sailed for Mawson on January 10. On board the "Magga Dan" was Mr. Phillip Law, Director of the Antarctic Division, who stated that in the not too distant future he hoped to make his annual visit to the Antarctic bases by air. By that means he could visit all three Antarctic bases in the space of three weeks, whereas now he is only able to visit two of the bases during each twelve months.

The *Leader* of the eight-man party at Davis for the coming year is Mr. Ian Douglas, a 25-year-old Melbourne solicitor. On board the "Magga Dan" were one Beaver aircraft and two helicopters in the charge of Wing Commander Dick Creswell. The two helicopters will be used for ice reconnaissance while the Beaver, after use at Davis Station, will be delivered to Mawson to replace the two similar aircraft destroyed in the hurricane of late December.

NEW ARRIVALS

The "Magga Dan" with the Davis relief party came in sight of the Vestfold hills late on January 30. By the evening of February 3, the relief had been completed and "Magga Dan" sailed at short notice on the morning of the 4th for Wilkes Station. On the southern trip "Magga Dan" was holed just above the water line by ice. The ship's engineer spent four hours on a platform over the stern welding the cracked plates. Winds up to 70 m.p.h. were encountered during the southern trip.

At Mawson among the first things to be unloaded when the "Thala Dan" arrived in early February was the Dakota aircraft. At this station a new 120-kilowatt powerhouse is being erected to replace the one destroyed by fire last year. Sixty men are working 14 hours a day to complete this and other new buildings before the winter sets in.

The new leader at Mawson will be Hendrik Geysen, an ex-leader of a Dutch Resistance group. The wintering complement will be 33.

In the course of further exploratory work along the coast of Enderby Land before returning to Melbourne it was intended that the "Thala Dan" would drop a team of three men in Amundsen Bay to sledge the 200 miles across the ice-gap to King Edward VIII Gulf. Leader would be Syd Kirkby (surveyor) and with him would be geologist Ruker and a radioman. They would have as transport two eight-dog sledge teams.

TV FOR ANTARCTICA

The successful reception of Melbourne TV programmes by Russians at Mirny last year has persuaded the new party for Mawson to take with them a TV set. The special aerial will be 100 feet high. Mawson is 3,500 miles away from Melbourne, considerably further than Mirny.

LEWIS ISLAND

The automatic weather station on Lewis Island has been restored to full operating efficiency since early in February.

Research Institute

An institute, to be known as the Mawson Institute for Antarctic Research, is to be established within the department of geology at the University of Adelaide.

It is to be established from the beginning of next year.

This was decided by the University Council on November 27.

It is intended that the activities of the institute would be:

- To foster polar studies and research.
- Maintain a collection of Antarctic literature.
- Maintain and develop a collection of Antarctic equipment, especially that associated with the explorations of the late Sir Douglas Mawson.
- Maintain and develop collections of geological and biological specimens associated with the Antarctic.
- Maintain a room or rooms for the use of workers engaged in Antarctic research.
- Promote whenever possible public lectures relating to polar research.

Initially a collection of Antarctic literature will be housed in a separate section of the Barr Smith Library and other items will be shown in the geology department of the S.A. Museum.

NEW STAMPS

Fifty years of Australian exploration in the Antarctic are commemorated in the four new Australian stamps issued on December 16. The denominations have been altered because of postal rate changes:

- 5d. (brown), David, Mawson and Mackay at the Magnetic Pole.
- 8d. (blue), weasel and team.
- 1/- (deep blue-green), sledge and dog team.
- 2/3 (green), Emperor penguins.

When the Perth physicist George Cresswell went to Mawson he took his motor cycle with him. He cabled "Motor bike performing well on hard ice but useless in soft snow."

JAPANESE ANTARCTIC SUPPLY SHIP TRAPPED IN ICE

The Japanese ice-breaker "Soya", for the third year in succession, had to seek outside assistance in the difficult task of re-supplying Showa Base.

The 2,736-ton "Soya" had been remodelled to make her a more efficient ice-vessel.

By arrangement, "Soya", which left Cape Town on December 18, met the Russian vessel "Ob", near the 1959 air-transporting point, on January 1, and the two ships moved south-west into close pack-ice to a point 4 miles N.N.W. of Showa Station. Here "heliports" were constructed on the ice-floes and transportation of supplies began. On the first day, two Sikorsky S-58 helicopters each flew eight times to Showa, and carried 92 tons of material. Between January 2 and 6 no fewer than 59 flights were made. In addition, one journey was made over the ice with three Sno-cats.

THE "OB" MOVES ON

On January 6 both ships moved out to the open sea and the Japanese "said 'Goodbye' with thanks". "Soya" then carried out oceanographical observations. The weather was too bad for the helicopters to fly.

On January 16, with improved weather, "Soya" again pushed into the pack. The heliport was established 85 miles N.N.E. of the station. From January 16 to 18, 17 helicopter flights were made and 30 tons of supplies transported, as well as the 15 men of the new wintering party.

On February 2 a third attempt was made to complete the change-over, at a point 53 miles from Showa. On the 3rd, "Soya" came alongside the fast ice in 68° 17' S., 39° 51' E., about 49 miles north of the station, and the two over-snow vehicles aided the helicopters in the operation, which was completed on February 6. The total quantity transported was 154 tons.

It took "Soya" about a week to escape from the consolidated ice. On February 11 the ship reached the ice-edge and did oceanographic and ice-survey work along the ice-edge between Riiser-Larsen Peninsula and Enderby Land. On February 21 she left for home.

THE 1960 TEAM

The new 15-man wintering team had by this time begun work. Cosmic-ray mesotron observing equipment and a Lewin-sonde have been installed. Of the new team, the leader, T. Torii (41), is a geochemist, and N. Murakoshi, a meteorologist, wintered over with the first expedition. The team includes nine scientists, a doctor, a radio-operator, two engineer-drivers, and two cooks.

The latest news received is that "Soya" on February 10 had been unable to move because of thick ice.

NEW EMPHASIS

This year there will be an emphasis on geographical survey and observation, in which Professor Tetsuya Torii, of Chiba University, the leader of the wintering team of 15 at Showa Base, is a specialist. There are four geographers in the new team as compared with one in the team which has been relieved. Japan will co-operate in the compilation of an accurate map of the Antarctic covering the sector 30° E. to 45° E., from the coast of Princess Ragnhild Land to the coast of Prince Olav Land. For this, instead of aircraft, the Japanese team will use a thermo-meter, a short-wave radio instrument which measures accurately between two points with high frequency waves.

DOGS RETURN

The Japanese party will be aided by a team of Karafuto sled dogs, for use on extensive trips to points

in the interior. They include two already famous animals, Taro and Jiro, the dogs which with others had to be left behind by the departing second expedition in February, 1958, and which were found alive and well when the third expedition arrived at Showa in January, 1959. Other experienced members of the dog team will be Tochi, Mari and Miya, who were on the job last year. Eleven new dogs have arrived, as well as a husky pup, a gift from the Belgian expedition.

Japan will probably continue activity in the Antarctic until the seventh expedition, but final approval to this plan has still to be given by the Science Council of Japan. This is largely dependent upon adequate financial support from the Japanese Government.

SOUTH AFRICAN SHIP IN TROUBLE

The first South African party to occupy the Norwegian-built base on the Queen Maud Land coast had by no means an easy passage.

The "Polarbjorn" left Cape Town on December 3 and reached the pack-ice at 60° S. on the 13th. From then on the going became slow. South of 66° S. the pack-ice was unusually heavy, and the ship stuck fast on several occasions.

Those on board were just beginning their New Year's Eve dinner when the Argentine ice-breaker, "General San Martin", was sighted from the bridge. Neither ship had known the other was in the vicinity.

After exchanging signals, it was agreed that the "Polarbjorn" should follow the Argentine ship, which was sailing in about the same southerly direction. Officers of both ships and members of the South African expedition were entertained to New Year parties aboard each vessel.

As the ships continued towards the coast of Antarctica, about 150 miles away, the "Polarbjorn" could hardly keep up the eight-knot speed of the ice-breaker and several times had to be helped out of the pack-ice, which formed again immediately

in the wake of the Argentine vessel. At one stage the "General San Martin" helped by breaking the ice for a stretch of almost one hundred miles. But soon after its departure, the "Polarbjorn" stuck fast again.

The expedition reached the base on January 8, 37 days after its departure from Cape Town; and after three days of hectic work the offloading was finished. The return voyage began on the 13th and was completed on the 27th. Ice conditions had improved, and apart from a few hours in heavy pack-ice on the 14th no difficulties were encountered.

The 10-man South African wintering party is led by J. J. la Grange. It includes a Medical Officer and four meteorologists. The average age of the party is 27.

The emphasis will be on meteorology, with three-hourly surface observations, daily radiosonde ascents, and studies in radiation and micro-meteorology. The Norwegian programme in geology, glaciology and magnetism will be continued. Dr. Van der Merwe will do physiological research, using the members of the expedition as guinea-pigs.

Chilean News

The Chilean ice-breaker "Piloto Pardo" left Valparaiso in December for Punta Arenas to embark replacements for the Chilean Antarctic bases. The Ambassador of Venezuela in Chile and her Naval and Military Aides are being taken south as guests of the Chilean Government. They are the first foreign diplomats to visit the Chilean stations.

Under the auspices of the Circulo Antartico Chileno, an Antarctic exhibition was held in December in the National Library, Santiago. Pictures of Chilean Antarctic bases and work, models of ships plying Antarctic waters, and specimens of bird and animal life were on display as well as photographs of the visit last year of a Chilean tourist vessel to the Antarctic. It is estimated that between 35,000 and 40,000 visitors saw the exhibition.

NEW BELGIAN EXPEDITION REACHES BASE ROI BAUDOIN

The members of the 1960 Belgian Antarctic Expedition left Antwerp on November 22 on board the "Erika Dan".

Their last port of call was Cape Town (from December 13 to 16). There the members of the summer campaign went on board. They had left Brussels by plane on December 7.

On December 27 "Erika Dan" ran into heavy ice, and on New Year's Day, after making only 43 miles, was brought to a halt. The ship had arrived in Antarctic waters earlier than expected, and had therefore encountered more ice than usual. The vessel now fought against the ice for nearly a month and was stopped several times. Air reconnaissance was made when possible, and helped a great deal in finding a way to Queen Maud Land. Finally, the ship came along the shore near Base Roi Baudouin on January 22.

During the cruise of the ship from Belgium to Antarctica and return, an oceanographic campaign was conducted; temperature and salinity of water were measured four times a day; a thermal section has been made each day at 21 hours up to 100 m. Water samples will be analysed upon return to Belgium. Plankton was also collected each day.

During the stay in Antarctic waters along the coast, special attention was also given to biological sampling and the measurements of currents. Two men were in charge of this programme.

A special campaign of photogrammetry was organised during the summer. The party was headed by Prince Antoine de Ligne. Four of its members (including Prince de Ligne) had already wintered at Base Roi Baudouin in 1958. The results of this survey are not yet known.

THE NEW MEN

The 1960 party comprises 20 men. Two of them have already wintered in Antarctica with the 1959 party. One of these two is the British Kenneth Blaiklock who took part in the Trans-Antarctic Expedition of 1957-58. The leader of the 1960 wintering party is Major Guido Derom.

Investigations will be conducted in exactly the same fields as in 1959: Meteorology (surface and upper air synoptic observations), Radiation, Geomagnetism, Auroral Observations, Ionospheric Physics, Nuclear Radiation, Glaciology, Geology, Gravity measurements, Biology and Physiology; moreover, a study of the psychology of this small group of people will be conducted.

Twenty of the 22 members of the 1959 wintering party will come back to Belgium in mid-March. Their leader was Captain Francois Bastin. The participants in the summer survey will come back either by ship or by plane.

The "Erika Dan" left the Antarctic coast on February 10. She will probably arrive at Cape Town on February 18. She will then sail to Belgium.

Temperatures at Roi Baudouin Base in August, September, and October were:

Maximum: 18.7°F., 10.8°F., 23°F.
Minimum: -42.9°F., -35.7°F.,
-21.1°F.

Aluminium stakes for the measurement of accumulation and ice movement set up in May were broken off at the base by October winds.

Dr. F. Chang, a young scientist from Formosa, was the first to fly the flag of Nationalist China in the Antarctic. He was a member of the Byrd Land traverse.

HEAVY ICE HINDERS RELIEF OF F.I.D.S. BASES

Despite exceptionally severe conditions in the Falkland Islands Dependencies and in the Weddell Sea, all except the most southern bases had been relieved by the end of February.

The "Biscoe", which was scheduled to relieve the northern bases before proceeding to Halley Bay at the head of the Weddell Sea, arrived at the Falklands in mid-November. Ten days later she left on her first southern voyage, and in the course of the next month relieved all bases south to Port Lockroy (i.e., bases H, G, D, B, and A, in the South Orkneys, South Shetlands, at Hope Bay and Port Lockroy), and picked up a geophysicist for Halley Bay, from the ice-edge near Base F. After Christmas she sailed into the Weddell Sea and after penetrating several hundred miles of very heavy pack-ice relieved Halley Bay on January 20. Sea-ice is reported to be very heavy in all areas of the Dependencies, and the "Biscoe" encountered floes up to 14 miles across in the Weddell Sea. She arrived back in the Falklands on February 11, having called at South Georgia on the way.

Meanwhile, the "Shackleton" arrived at the Falklands from Southampton on November 22 and set sail for South Georgia on December 2. She spent two weeks taking measurements of gravity and magnetism along the Scotia Arc, and then, on December 20, visited Base G (Admiralty Bay, King George Island) before proceeding to Base O (Danco Coast) on December 24 and Base A (Port Lockroy) on December 25. She has now been chartered to the South African Government for the relief of the meteorological stations on Marion Island, Gough Island and Tristan da Cunha, and is expected to arrive at Cape Town at the end of February. On board are personnel from Halley Bay—including two South Africans who have served for a year with F.I.D.S.

HEAVY PACK

The "Kista Dan", which was chartered by F.I.D.S. for the relief and re-establishment of the bases off the S.W. coast of Graham Land, sailed from Port Stanley in the Falklands on January 23. She first visited Deception Island (Base B) where the two aircraft were assembled. The Otter was left at Deception and will be flown to the southernmost base (Base E) when it is re-opened; the Beaver, fitted with floats, was taken on board and is being used for reconnaissance. After passing through pack-ice in Lemaire Channel, so heavy that it took 36 hours to penetrate the last quarter mile, the ship reached Base F (Argentine Islands) on February 10. Reconnaissance flights showed the sea-ice to be impassable to the south and west, and it was therefore necessary to turn north again and sail through the Schollaert Channel before being able to reach open water to the west.

The ship then followed the ice-edge for 120 miles before re-entering the ice on February 16. She soon encountered floes up to 12 ft. thick, and after forcing her way through 75 miles was still 40 miles from the coast, and reluctantly turned west once more with the intention of trying another route further south. The latest cable received from Sir Vivian Fuchs, who is on board, reported the ship to be in the latitude of the southernmost base (Base E, Stonington Island, Marguerite Bay), passing through a 30-mile belt of dense floes beyond which conditions appeared to be easier. So it is hoped that Base Y (Horseshoe Island) will be relieved, Base E re-opened and a

new base established on Adelaide Island, as planned.

NEWS FROM THE BASES

All bases (A, B, D, F, G, H, Y, and Z) report the maintenance of routine observations, and during the past few months field work has been carried out from six of them.

Between September and November, six sledge parties from Base D (Hope Bay) were in the field simultaneously, leaving three men to carry out the routine work at base. Two geologists worked south to 64° S., and two more continued the geomagnetic survey of the Tabarin Peninsula just south of base. The other four field parties consisted of groups of surveyors working in the Crown Prince Gustav Channel area.

Several short trips were made from Base F (Argentine Islands) and from Base G, geological work was continued at various localities in Admiralty Bay. Two hundred elephant seal pups were tagged off the west coast of Signy Island in September, by men from Base H. From Base Y (Horseshoe Island) a party visited Adelaide Island in October, and another party visited Base W (Loubet coast) to the north. Two geologists visited Base E (Stonington Island) and Neny Fjord at the end of November.

Physiological work was carried out in a one-week's journey from Base Z (Halley Bay) in November.

All the northern bases reported exceptionally low pressures and high winds in September, and at Base G the barograph ceased to record. Base F also reported the exceptionally low reading of 932 mbs., and gusts of wind up to 123 knots were recorded at Base D.

LATE NEWS

On February 26 Sir Vivian Fuchs reported that "Kista Dan" (1,239 tons) was imprisoned in heavy ice for the fifth day.

Ice under the "Kista Dan" had given her a 10-degree tilt. The message said it would be a relief to return to an even keel. "Living permanently tilted at 10 degrees is inconvenient and exasperating."

On March 2 "Kista Dan" signalled for help from the U.S.S. "Glacier" which was already engaged in an attempt to assist the Argentine vessel "General San Martin", also ice-bound about 40 miles north of "Kista Dan". "Glacier" was then off pack-ice by Amiot Island, north of Adelaide Island.

A long awaited south-east wind had moved hundreds of square miles of ice. This loosened "Kista Dan", allowing her to return to an even keel and sink back into the water from which she had been raised four to five feet. But a wind-change had caused the ice to grip the ship again. Pressure ice built up against her side, threatening to grind her to pieces. Strong winds pushed her along in that dangerous position for 27 miles.

FREED AT LAST

On March 8 it was reported that "Glacier" had freed the trapped vessel, which had been unable to move for 13 days. After breaking out heavy ice by circling the "Kista Dan", "Glacier" had to back up to the smaller ship's bow and push away excessive loose ice. At exactly the right moment "Kista Dan" had to turn up her own screw and follow the "Glacier" before new ice debris tossed back by the ice-breaker filled the channel. Many times the two ships came within inches of colliding.

Earlier, the "Glacier" had made two attempts to tow the "Kista Dan", but the steel wire tow-rope snapped each time. On the 8th the ships had covered only six miles in 36 hours.

After leaving six men on Argentine Island the British expedition planned to fly six men in the Beaver to Stonington Island and bring six men back to Horseshoe Island. Eight men and two aircraft were to be left at Anvers Island.

Seamen and scientists from Russia's expeditionary vessel "Ob" have landed on Peter the First Island for the first time in more than 30 years.

Ice Interferes With Relief of Argentine Bases

The unusually severe ice conditions which have been reported this year are blocking all efforts to relieve two Argentine bases.

Twenty-three Argentine scientists and a North American are marooned at Ellsworth with little hope of leaving for another year.

The director of the Argentine Antarctic Institute, Rear-Admiral Rodolfo Panzarini, said on January 29 that the 4,850-ton Argentine ice-breaker "San Martin" tried to reach the men with a relief crew but gave up after three weeks.

The "General San Martin" reached 76° 27' S., 29° 10' W. before being forced to give up owing to the bad condition of the ice. This point is off the Caird Coast, south of Halley Bay, and some 200 miles from the Ellsworth and General Belgrano stations.

The United States Navy's Antarctic headquarters in Christchurch reported late in February that little hope was held for the relief of Ellsworth Base.

"It looks like they are stuck there for the winter," a spokesman commented. "The Weddell Sea is pretty well closed up."

The main concern now is to see that the men at the base will have enough supplies of food and fuel for the winter. There is no aircraft landing strip near the base, which is out of range of ship helicopters.

The American is Mr. John Heap, a scientific observer. He has been with the rest of the party at the base for 12 months.

The group that was to occupy "Estacion Cientifica Ellsworth" during 1960 had to return to Buenos Aires.

MORE TROUBLE

On February 25 Rear-Admiral Tyece ordered the ice-breaker "Glacier", then just north of the Thurston Peninsula, to leave the Amundsen Sea and proceed in haste to the aid of seven men marooned

at the Argentine General San Martin Base in Marguerite Bay, on the west coast of Graham Land (Palmer Peninsula). This meant a 700-mile dash through ice-pack and rough seas. Two men were reported in need of prompt medical attention, and food at the base was said to be in seriously short supply.

The Argentine ice-breaker "San Martin", which had been attempting to reach the base of the same name, had been trapped in the pack four days before. The ice was exerting severe pressure on the "San Martin's" hull.

Captain McDonald decided to go first to the help of the ship, reported to be trapped about 70 miles from the base, locked in ice at 67° 28' S., 69° 43' W., west of Adelaide Island. It was later reported, however, that "Glacier" was expected to be within helicopter range of San Martin Base on March 1, and would pick up the two sick men by helicopter before going to the assistance of the ice-breaker.

The Argentine Antarctic Institute plans extensive biological work at the Antarctic bases this year. This includes a study of the sea-birds of the Weddell Sea, including the Halley Bay Emperor penguin rookery. Intensive biological studies are also planned on Ardley Peninsula, "25 de Mayo" Island, in the S. Shetland Islands. The group carrying out this project landed on December 23.

(Stop Press)

It was reported on March 3 that two helicopters from the "General San Martin" relieved the Base, during the only period in ten days when there was adequate visibility. The ship then freed itself before "Glacier" arrived on March 6.

U.S. HERCULES AIRCRAFT OPERATE SUCCESSFULLY

A new phase in United States Antarctic operations began in mid-January with the arrival in New Zealand of seven Hercules aircraft of the 61st Troop Carrier Squadron of the U.S. Air Force commanded by Lieutenant Colonel W. Turk.

The squadron had just completed seven months' cargo-carrying in support of the eastern extension of the North American distant early warning radar system and had been operating with good results on the 9,000 ft. Greenland icecap to do it.

Normally equipped to fly 2,200 miles, the Hercules turbo-prop planes have extra fuel tanks fitted for Antarctic service.

The extra tanks give a capability of between 2,800 and 2,900 miles—a reserve of about two hours on the flight between Christchurch and McMurdo Sound.

Though the Hercules cannot carry as much cargo as far as the Globemasters, they can fly faster and higher and land alongside snowfield bases to discharge cargo. The saving to the U.S. Antarctic programme in the cost of parachutes alone is expected to amount to one million dollars a year.

The particular model Hercules in use this season has an operational weight of 124,000 lbs. and cruises at 300 knots between 25,000 and 30,000 feet. The huge tricycle ski assembly on each plane weighs 5,000 lbs.

FLIGHTS DELAYED

Five of the huge aircraft left Harewood Airport, Christchurch, for McMurdo Sound on January 20. The turbo-prop aircraft were already airborne when the latest weather information on the route showed that the flight could not be carried out. Recall of the aircraft was ordered by their commander. The aircraft were delayed for several days but reached McMurdo Sound by January 24.

FIRST FLIGHT TO BYRD

On January 25 the first landing by a heavy transport aircraft on the

inland Plateau was made when Colonel Turk set his aircraft down at Byrd Station. On board was the United States Antarctic commander Rear Admiral Tyree.

SOUTH POLE LANDING

On January 27, a C-130 Hercules carrying about 14,000 lbs. of supplies and equipment landed at the South Pole. The 62-ton aircraft took off some 55 minutes later carrying on its return trip records for the U.S. Bureau of Standards and Weather Bureau in Washington.

The National Science Foundation said data of this kind previously had been sent back by ship in February or March. This sometimes meant a nine-month delay.

On February 5, 12 days after the commencement of the operations, the resupply programme was completed by the C-130 Hercules. The seven planes delivered 400 tons of fuel, building material and supplies to the two American bases. Twenty-eight flights were made to the South Pole and thirty to Byrd Station. Among the cargo was 18,000 gallons of aviation petrol for future air operations and timber for the construction of new buildings.

An unexpected item was a refrigerator for the South Pole station, to be used to keep food from freezing. Both the Pole and Byrd bases are entering eight months of isolation during the Antarctic winter and the material delivered by the Hercules will sustain them until flying begins again in October. Ten Navy men and nine scientists will winter at the Pole and eleven scientists and ten naval men at Byrd.

The United States Navy is acquiring four Hercules to be used through the Antarctic summer season from

October 1960. The Hercules of the 61st Troop Carrying Squadron returned to Sewart airfield in Tennessee and in March they will head north to continue operations in Greenland.

SHIPPING OPERATIONS

In mid January, for the fifth consecutive year, ships of the U.S. Navy's military Sea Transportation service were moored to the Antarctic Ice Shelf off McMurdo Sound in support of Operation Deepfreeze.

The U.S. "Alatna" arrived in New Zealand on December 28 and proceeded to Antarctica on New Year's Day. She was escorted through the Antarctic pack ice by the ice-breaker "Atka", and by mid January was tied up off Hut Point pumping ashore the 1,058,000 gallons of fuel that she carried. On January 18 the "Atka" rendezvoused with the cargo ship "Towle" (aboard which was Rear Admiral Tyree) at the edge of the Ross Sea ice pack to escort it to McMurdo Sound. The "Atka" broke the last two miles into the Sound and prepared the offloading site for the "Towle".

The ever active "Atka" has had an especially busy season this year. She was the first ship to arrive at McMurdo Sound after the long Antarctic winter, and she began by breaking a channel through the heavy bay ice which enabled re-supply ships to offload cargo for the Naval Air Facility. The first supply ship to arrive was the cargo vessel U.S. "Arneb", which arrived on December 19 escorted by the U.S.S. "Glacier", the ice-breaker which also assisted the "Atka" in breaking a channel.

WEATHER BUOY MOORED

The U.S.S. "Peterson", assigned ocean picket station duty at 60° S. 170° E. this season to give communications, weather, and rescue ship back-up for Deep Freeze 60 aircraft operations between Christchurch and the Naval Air Facility, McMurdo Sound, varied this monotonous but vital chore with a few days "off duty" to establish two Antarctic firsts.

An Engineer, Roy M. Anderson from the National Bureau of Stan-

dards, supervised the launching and anchoring of a buoy-type automatic weather station, the first of its kind to be launched and anchored in Antarctic waters.

Upon returning to her ocean station position, the "Peterson" found there was something faulty in the weather buoy's transmissions. Returning 100 miles, the ship was able to relocate, recover and repair the automatic weather station in two hours.

SHORT LIFE

The transmission of coded weather data every six hours was scheduled to continue for approximately three months and thereby give invaluable advance storm warnings both for air and sea craft. However, after only four days, by which time the "Peterson" was receiving only weak and unintelligible signals, all shore stations were advised that the weather buoy would not continue operations this season. However, although it operated for only a fraction of its planned useful lifetime, there is no longer any doubt about the feasibility of positioning automatic weather station buoys in the extreme environment of Antarctic waters. It now remains for technicians to analyze and study the station after its severe test in the world's toughest testing ground, and design the necessary modifications that will result in having several stations operating successfully in the area next season.

UNDERWATER PEAK

The other Antarctic first discovered by the "Peterson" was when locating a site for the weather buoy. Pack ice had prevented the thin-skinned destroyer escort from reaching the originally planned site, and when proceeding through numerous icebergs and growlers, an underwater mountain peak was located 500 fathoms from the surface, in waters usually 2,000 fathoms deep.

ICE-BREAKERS DAMAGED

Two American ice-breakers were out of action as a result of damage caused during their Antarctic service this season.

The "Glacier" damaged both propellers while cutting channels through the ice in McMurdo Sound. She returned to Lyttelton at high speed to pick up new propeller blades which were fitted in dry dock at Wellington.

The "Glacier" broke one blade of the port propeller and bent another blade. All three blades of the starboard propeller were bent.

The "Glacier" finished her mission at McMurdo Sound on the night of January 9 and sailed for Lyttelton, reaching there on January 15. She was to visit Lyttelton in any case to replenish stores and fuel before attempting to penetrate the Bellingshausen Sea in company with the ice-breaker "Burton Island".

Because there is less vibration of the propellers at high speed, the "Glacier" steamed at 15-16 knots, which is close to her maximum speed. Spare propeller blades are brought out each season—in readi-

ness for such an emergency—and stored at Lyttelton.

HARD ICE

This season the ice in McMurdo Sound has been particularly hard. The "Glacier" had to break the cargo ship "Arneb" loose twice. She also had to carve two channels through the ice. One, for the unloading of cargo, was only 12 miles from the American base.

The other channel had to be cut for the fuel tankers to get in close enough to discharge their cargo into the tanks at Hut Point. The "Glacier" was able to get within four hundred yards of Hut Point.

Hard on the heels of the "Glacier" the U.S.S. "Atka" returned to New Zealand and entered dry-dock at Wellington early in February. An inspection was to be made of the propellers and rudder following damage suffered during an extremely busy summer's activity in the Ross Sea.

NEWS FROM U.S. STATIONS

NEW McMURDO CAMP

A complete new township to house 200 men is being built by the United States Navy on the Ross Ice Shelf only a short way from New Zealand's Scott Base in the McMurdo Sound area.

The camp will be self-contained and occupied only during the summer months, to handle the cargo-carrying Hercules transport planes which use a ski-way just built on the Ross Ice Shelf instead of the sea-ice runway about a mile from the base on Ross Island. The new camp is 10 miles from the principal navy air facility at Hut Point and fuel lines have been run from storage tanks in the Hut Point area out to the ski-way.

It is not a simple matter to pick up an existing air facility and move it ten miles, for the problems involved are compounded by the cold, snow and ice. Within 24 hours the move was completed and air operations were once again in full swing. Amongst the many buildings moved was the 20-ton control tower which had to be handled very gingerly

since it is high off the ground and top heavy. Great care was taken not to damage the electronic equipment contained in the tower.

EMERGENCY STRIP

In mid January six men replaced the team already at the emergency landing strip at Little Rockford, located 240 miles from Little America toward Byrd Station. They were to remain at the isolated landing strip until the middle of February, helping to provide weather information and to maintain contact by radio with aircraft flying to Byrd Station. The party they relieved helped to move the weather station from 160 miles from Little America to its present location. The men were evacuated at the completion of summer flying operations and flown back to base.

PLATEAU MISHAP

To the Russian glaciologist, Sveneld Yevteyev, now at McMurdo Sound, flying in Antarctica is sometimes a bumpy experience. During a flight to establish a cache 90 miles west of the sound, the ski-

equipped Skytrain in which he was a passenger collided with a three-foot ripple of sastrugi on the polar plateau behind the Royal Society Range.

The aircraft advised McMurdo Sound of the incident, and requested a starboard ski replacement. The 700-pound ski was taken by helicopter to the snow airstrip near Scott Base and flown out to the crippled plane aboard another ski-equipped Skytrain. Within a few hours the new ski was installed enabling the Skytrain to take off safely for McMurdo Sound.

The cache being established on this flight is for the traverse of the Plateau between McMurdo Sound, the Russian station Vostok and the South Pole, planned for 1961. Included in the cache materials carried by the damaged aircraft were 800 pounds of high explosives for seismic soundings.

NASTY MOMENT

During the last practice parachute jumps of the Antarctic summer by four men of U.S. Navy squadron VX-6 rescue team, the jumpmaster, George Gowen, had an unenviable experience. His parachute failed to function during a free fall from 2,500 feet. "My ripcord hung up in the chute housing," Gowen said. After three attempts to pull it free, he released an auxiliary chest parachute at approximately 1,500 feet and drifted effortlessly to the snow. "This is the third time it has happened," he said. Gowen has made 64 parachute jumps. He is jumpmaster for the squadron rescue team which is flown to the scene of emergencies located in otherwise inaccessible areas. The practice jumps are designed to keep the rescue team at peak efficiency in the event of any sudden emergency that demands their use.

FLYING BUG-CATCHER

A specially equipped Otter aircraft of the U.S. Navy squadron VX-6 at McMurdo Sound is acting as a 'flying bug catcher' whilst assisting the biological programme of three entomologists from the Bernice P. Bishop Museum, Honolulu. The aircraft carries two nylon

nets from a frame on the plane, to catch insects as they are carried by the winds through the Antarctic air. Traps have also been placed on VX-6 helicopters flying in the McMurdo Sound area.

Another phase of the research programme will be carried out on U.S. Navy ships travelling to the continent late this season. Similar nets will be strung from poles to catch insects above the surface of the ice-choked waters. Few insects are found in Antarctica: the two known types are small wingless flies and 'collembella' or springtails which live in decaying vegetation. In Antarctica they feed on algae, mosses and lichens.

DECEMBER CRASH AT BYRD

A United States Navy Dakota was extensively damaged when it stalled at low altitude and the starboard wing caught the snow surface when landing in near white-out conditions at Byrd Station in the Antarctic at 9 a.m. on December 23.

The pilot, Lieutenant Garland M. Renegar, of Statesville, North Carolina, received minor injuries. He was the only person injured.

The landing gear of the aircraft collapsed, the starboard engine mount was broken, the wing sheered off about 15 feet from the tip and the fuselage was buckled.

The plane was flying to Byrd Station with a full crew to replace another Dakota which had been engaged in aerial reconnaissance and the supplying from the air of the traverse party in Marie Byrd Land.

A replacement Dakota was later flown from Invercargill escorted by a U.S. Navy Skymaster.

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United States Ice Breakers Reach Coast of Bellingshausen Sea

Two American ice-breakers, "Glacier" and "Burton Island", have succeeded in penetrating the ice-bound Bellingshausen Sea and have made a landfall near Cape Palmer, close to the Thurston Peninsula, at the western extremity of the sea.

The "Glacier" left Port Lyttelton on February 12 to rendezvous with the "Burton Island" near Peter 1st Island. The "Glacier" had six new propeller blades fitted while in dry-dock at Wellington. The two ice-breakers were expected to encounter extremely difficult ice conditions. The ships' four helicopters assisted in finding a way through.

Aboard "Glacier" were several scientists, including Dr. Robert Cushman Murphy, Ornithologist from the American Museum of Natural History; Harold Hubbard, U.S. Geological Survey; Philip Smith of the National Science Foundation; Robert Starr, Oceanographer; Camm Craddock, Geologist, University of Hawaii; and Robin Leech, Entomologist, Bishop Museum, Honolulu.

SEARCH FOR BANK

During the attempt oceanographers aboard the ships intended to make a careful search for the lost Pactolus Bank.

The submerged bank was first reported in 1885 by Captain W. W. D. Burnham, of the "Pactolus". It has been reported several times since in its charted position, but its existence has also been denied.

Some writers have claimed that the bank—to the south-west and off the west coast of Chile—not only exists as charted but is all that remains of an island at which Sir Francis Drake watered his ship and gathered berries during his circumnavigation of the world in the late 1570's.

Drake's chaplain, Fletcher, described the island as being "wonderful plenty of the small berry with us named currants," and it had a fresh water pond with plenty of wood and verdure.

Some scientists claim that the remains of the island may well be a submerged bank in the tempestuous sea, worn down by wave action and ground at by stranded icebergs which are gradually wearing away even that residue. It could be that Drake's lost island could be re-discovered in 1960.

In three days of heavy seas "Glacier" attained a roll of 47°. Five drums of aviation fuel went overboard and one man fractured a hip-bone. On February 13 the ice-breaker entered the Amundsen Sea pack-ice at 69° 47' S., 129° 50' W., en route to rendezvous with "Burton Island", which was already off Peter 1st Island. The men were now able to sit down to their first normal meal in three days.

THROUGH TO THE COAST

Aerial photographs showed the Amundsen Sea wide open next to the Thurston Peninsula, and a narrow open-water belt north of the adjacent peninsula, offering two good approaches to the coast. The meeting took place on February 15, about 80 miles north-west of Thurston Peninsula, which separates the Amundsen and Bellingshausen Seas. A new furthest south for ships in this area was set.

Both vessels reached the coast in 24 hours after an 80-mile dash through the pack-ice which old Antarctic hands expected might take ten days to penetrate. At noon on February 16 the ships were halted by heavy ice near the Fletcher Islands off Eights Coast. Progress to the east seemed impossible without a long detour to the north and a re-entry into the Bellingshausen Sea further east. Both ships had been moving with great caution, delineating the coast and charting unknown waters where rocky pin-

nacles had been discovered rising sharply to within a few feet of the surface, and where if a ship were trapped it might well be impossible for it to escape this season.

BEAUTY, MYSTERY

The invasion of these seas is a Jules Verne adventure into a lunar world of spectacular beauty, foreboding danger and tantalising mystery, writes a correspondent aboard the "Glacier".

The "Glacier", pound for pound the mightiest ship afloat, is a mechanical marvel of American ingenuity and 20th century luxury intruding for the first time into a sterile world of ice never before seen or visited by men, he says.

Every scientific aid known is used by the "Glacier" to help her probe the mysteries of the Bellingshausen, for there are no charts of these waters.

From high on the "Glacier's" mast, radar continuously sweeps the horizon and the dancing beat of a fathometer records the depth of water beneath her bow and aids detection of shoals and reefs which threaten her along every unexplored mile she travels.

Each hour brings new mysteries and new questions. Why no bird life? Why no seals, no whales and so few penguins?

Far inland are plumed and unnamed peaks whose snows are blown by 100-mile-an-hour gales.

DANGER

The two-ship task force is under the command of Captain Edwin A. McDonald, Deputy Commander and aide to Rear-Admiral Tyree. Captain McDonald is fully alive to the dangers involved in his present mission.

An ice-breaker can get caught in the ice fairly easily. "That's bound to happen a few times on this trip," Captain McDonald said. "Then it's just a case of singing, eating, and watching films until the wind changes to ease the pressure."

Nor is ice the only problem. "Our present charts could be fifty miles out in their placing of the coastline," said Captain McDonald.

The ships carry a large supply of food and equipment in case they

should be trapped by the ice for a long period.

The "Glacier's" helicopters were now aloft to determine whether it would be possible to reach open water along the Eights Coast, or whether it would be better to spend the available time in scientific work to the west, along the equally unknown Walgreen Coast. Reconnaissance indicated that it may be necessary to re-name the Thurston Peninsula Thurston Island.

EXPLORING THE UNKNOWN

The second day off the Fletcher Islands saw full-scale scientific reconnaissance parties at work ashore and ashore, with the 'copters almost constantly in action. It was one of those summer days rare in this part of Antarctica, with visibility excellent for miles. Captain McDonald and Philip Smith (National Science Foundation representative) were flown parallel to the coast for approximately 75 miles east. High oblique aerial photographs were taken to supplement existing vertical ones. Mountains were seen in the distance: also wide areas of open water to the east, with many deep bays previously unmapped. It now seemed even more certain that Thurston 'Peninsula' is an island or one of a group of islands, with the Peacock Bay ice extending north-east through it to the Bellingshausen Sea.

Conditions immediately to the east, however, appeared so hopeless that Captain McDonald decided to expend the major scientific effort in the Amundsen Sea and then skirt the known bad ice conditions to reach the open water in the Bellingshausen Sea.

ON STRANGE SHORES

A party now went ashore and set up a "Grasshopper" electronic weather station in the area of Cape Palmer, a promontory just east of the Thurston Peninsula.

It is recording weather conditions and automatically morsing them through a relay station to the British Falkland Islands Dependency Survey, and the international analysis centre in Melbourne.

The station is expected to send

signals till its batteries run down—in about four months' time.

Warrant Officer Glen N. Drummond, a Navy aerographer, said that the station was "about the size and shape of a 500 lbs. bomb". It weighed 225 lbs. including the batteries, and could be set up on the ground manually, or automatically by compressed gas after having been dropped from an aircraft by parachute.

The station recorded wind direction and velocity, temperature and barometric pressure and coded the information into three-letter groups which it transmitted through a 20 ft. whip antenna to a base up to 1,000 miles away.

A similar station set up on the Ross Ice Shelf had proved "one of the most reliable reporting stations in Antarctica," Warrant Officer Drummond said. Its reports had been transmitted every six hours for 2½ months.

Several scientists spent the night ashore in sleeping bags in order to examine the rock exposures and to carry out other field work.

The two ice-breakers were proceeding eastward along the Eights Coast towards the Graham Land or Palmer Peninsula area, relatively open water, when orders were received to proceed immediately to the relief of an Argentine base and an ice-breaker off the Graham Land coast.

Plans for 1960-61 Season

United States Antarctic operations will be conducted next season on about the same scale as during the present summer.

The United States Navy task force budget for this season's expedition is about 15 million dollars. Some new developments are planned for 1960-61, including expansion of support for scientific research.

"The total dollars are slightly different but will permit operations at the same level as for this season," said Commander J. W. Haskell, task force logistics officer. "We hope to effect a few economies and it is possible there will be increases in certain areas and some changes and expansion in some programmes."

Aerial support next season at present called for 10 United States Air Force Globemasters on wheels with 14 crews and four United States Navy Hercules ski-planes which would be improved versions of the cargo type of Hercules now in Christchurch for experimental operation.

The present model of the Hercules had rigid skis and could land only on prepared skiways. The Dakotas and Neptunes would still bear the brunt of overland traverse support and airborne seismic research which required landings in open unprepared places.

The task force surface fleet would comprise two cargo ships, one tanker, four ice-breakers and a picket ship.

SNOW PROBLEMS

Snow burial of two American stations in the Antarctic is a problem for the United States Navy.

Replacement of the South Pole station—which cost about 18 million dollars to build when it was occupied in 1957—and the Byrd station where buildings are becoming submerged in snow drifts and unusable would be necessary in the foreseeable future, Rear-Admiral D. M. Tyree said in a recent newspaper interview.

Raising replacement buildings on stilts, constructing them on skis to enable them to move around keeping on top of the snow drifts, and underground (or "undersnow") mining were alternatives at present under consideration.

POLE HUT CAVES IN

One hut at the South Pole has already caved in and another deteriorated into uselessness.

Admiral Tyree with technical officers, including a civil engineer, made a survey of the South Pole station in November. He was pleasantly surprised at the condition of the station where he had expected to find more problems than existed.

Two new buildings would be added to the nine-building station at the Pole and an emergency building

away from the base would be also taken in this season to replace the deteriorated emergency accommodation.

TROUBLE AT BYRD

"Some buildings" would be added to the Byrd station which already has more than a dozen buildings.

"But these are temporary measures only because sooner or later—and with Byrd it will be sooner—we have got to come to a new conception if we are not going to lose the battle of snow burial," he said. "It is not good enough to have to replace a portion of your bases and shore up each year."

One of the biggest problems was the cache areas that drifted over with ever-accumulating snow.

POSSIBLE REMEDIES

The United States Army was experimenting in Greenland with colossal stilt-like slabs to support buildings above snow level and private contractors in Greenland were trying snow mining with the object of building an under-snow "town" starting from known factors. Having buildings on sleds in sections and moving them each season was another idea seriously considered.

The ski scheme had "just about been discarded" for a permanent base required for continuity of scientific observation, but for work on one site in a particular season and research and study on another site a thousand miles away the next season, the skis were practical.

If the bases were built into mines dug into the Antarctic plateaux then there was still the problem of what to do about radio antennae and aurora towers that had to be on the surface.

NEW SNO-CATS

Two self-propelled camp buildings recently arrived at McMurdo Sound. They are the largest vehicles sent by the United States to the South Pole since the ill-fated Snow Cruiser was carried south in 1939.

The new American vehicles are an enlargement of the Tucker Sno-cat, which has become a standard means of Antarctic transport. Scientists travelling in earlier Sno-cats had to sleep on the floor or on benches and the other amenities within them were makeshift.

The interior of the enlarged version is 24 feet long, 8 feet wide and 9 feet 11 inches high. One carries five bunks and a scientific laboratory. Its twin holds a kitchen, dinette and snow melter. Most important of all, the vehicles will be self-sufficient for distances up to 1,700 miles or more.

This means they should be able to operate an entire summer season without air support. Their first great journey is to cover 1,200 miles during the southern summer of 1960-61, which coincides with the Northern winter.

FUTURE TASKS

Dr. Albert P. Crary, chief scientist of the United States Antarctic Research Programme, under the National Science Foundation, said that the final route of this traverse had not yet been decided. The tentative plan, he said, was to go up the Skelton Glacier and head for the area between Vostok and the Pole.

The self-propelling camp would then roll past the Pole toward the Horlick Mountains. A primary task of this cavalcade, as with other tractor groups on the Antarctic Ice Sheet, will be to measure its thickness. The 250-mile stretch from the Pole to the Horlick Mountains is completely unexplored.

Because this leg is the most interesting it may prove economical to airlift the out-sized Sno-cats to the Pole in C-130 aid transports.

LIGHT TREAD

The new vehicles have such broad tracks that their pressure on the surface is only one and a half pounds per square inch. Each is equipped with a winch and a hoist, mounted on an A-frame in front, so that one vehicle can haul the other out of a crevasse. They are so large that only the largest chasms in the ice sheet could engulf them.

One has been designed so that its passengers can lower a gravimeter to the snow without getting out. The instrument is sensitive to extremely slight variations in gravity and will be used, every few miles, to estimate the depth of the ice.

VICTORIA LAND TRAVERSE PARTY RETURN TO BASE

The United States Traverse led by Franz Van der Hoeven returned safely by U.S. aircraft after a successful 1,530-mile Sno-cat journey of four months in largely unknown territory.

Shortly after the start Taylor, the geologist, was evacuated by helicopter, suffering from suspected pneumonia, and returned to the United States. Baldwin, a U.S. Navy mechanic, then joined the expedition as mechanic and cook, and W. Jackman went as far as the Skelton Glacier to make a cinematographic record.

The three Sno-cats, "Detector", "Seismo" and "Messcat", travelled south over the Ice Shelf and then west to the T.A.E. depot at the foot of the Skelton Glacier, a distance of approximately 150 miles; then up the glacier to the Plateau Depot, where fuel previously air-dropped by Globemaster was picked up. Numbered flags on bamboo poles had been dropped at half-mile intervals for ten miles across the planned route, and the 44-gallon drums were then dropped in the centre of the line of flags. Although the drums were partially buried in snow, they were easily found. One Sno-cat hauled a "rolligon" trailer holding 1,000 U.S. gallons and the fuel was pumped direct from the drums into the "rolligon".

Drops were made at 300-mile intervals. The final dump was only 30 miles short of the apex of the traverse.

From the head of the Skelton Glacier the party travelled southwest to tie in with the southern apex of an earlier French traverse, about 30 miles from the now unoccupied Charcot Station. The U.S. party navigated to within half a mile of this point, which had been marked with flags on steel pipes. These markers were quickly sighted. Here the party spent Christmas Day. An American P2V aircraft flew them in mail, Christmas delicacies, and spare parts for the Sno-cats.

NO THROUGH TRAFFIC

Back at their last outward depot, the party learnt from the plane that there was a large area of gigantic rifts, approximately 140 ft. wide and 40 ft. deep, in the plateau surface right on the proposed route to the Tucker Glacier area and at right angles to it, extending out of sight to the south. The mountainous area west of Cape Hallett, they were told, was much more extensive than charted, with peaks rising to over 9,000 ft., heavily crevassed at their bases. Beyond this range lay an area of 30 miles of crevasses before the next mountains, with an impenetrable mountainous area then on to the coast.

The traverse party was now at 71° 29' S., 139° 53' E. They moved south for 40 miles before again turning to the east, towards the Victoria Land Coast. Now, instead of travelling with the grain of the sastrugi, they were going across the grain and sastrugi two or three feet high imposed a heavy strain on the vehicles. After 400 miles on the second leg of the traverse, "Detector" had to be abandoned: the chassis had finally broken in so many places that it was impossible to repair it in the field.

But 50 miles from the abandoned cat the party ran out of the rough going and for the first time enjoyed reasonably smooth travelling. The bone-rattling sastrugi had made life almost unbearable. Many members of the party were almost "seasick".

The due east leg continued for 600 miles, when the party reached the first mountain range sighted from the supply plane. These mountains were 100 miles further west than had been anticipated. From the mountains they began to lose altitude, and finally parked the

remaining two Sno-cats on the neve or upper snowfield of a large glacier.

On February 2 a Skytrain flew in and selected a pick-up site in a valley 180 miles from Hallett Station. During the flight a "giant" glacier was discovered "in the vicinity of Rennick Bay", a deep indentation in the Oates Coast. The traverse reached the chosen site four days later. After an abortive attempt foiled by bad weather and poor visibility, a successful pick-up was carried out on February 12. The vehicles and supplies were cached at the pick-up site. On the return flight the plane diverted to photo-map the newly-found glacier.

The cats will probably be used again by American explorers next year.

WORK ACCOMPLISHED

Every three to five miles for the whole trip vertical magnetic records were made, and every 50 miles seismic shots were carried out. At the same time full work-stations were set up and full glaciological studies made. This entailed digging an eight foot by eight foot pit ten feet deep. Preliminary calculations indicate that the total thickness of the snow and ice on the plateau is ten thousand feet. As the party were travelling at a height of approximately 8,000 feet above sea level it appears that the ice protrudes into the sea for from one to two thousand feet. Elevation and gravity measurements were also taken throughout and some geological work done.

The total distance covered was in the vicinity of 1,530 miles, and most of it was rough. The R4D plane which evacuated the party had a limited runway in which to take off. At the elevation of 5,000 feet and with a load of one and a half tons, the aircraft needed fifteen JATO bottles to assist it and even then only just managed it in the space available.

After landing safely at base it was discovered that a large hole had been torn in the tail, probably by a jettisoned JATO bottle.

In the field daily radio schedules were kept with McMurdo, but only

in morse, so the once-weekly voice schedules with Scott Base were greatly appreciated and looked forward to for all the latest news.

Magnificent support by U.S. Navy planes throughout made the trip a success and it is planned, if acceptable, to name one of the new peaks discovered "VX6" in honour of the VX6 squadron's support.

(We hope to publish in our next issue a first-hand account of this notable journey by Arnold Heine, the New Zealand member of the traverse team. Ed.)

BYRD LAND TRAVERSE

On a reconnaissance flight prior to the traverse from Byrd Station to the northern coast of Marie Byrd Land, the leader, Mr. John Pirritt, a Scottish glaciologist who wintered at Byrd last year, found the ice-front to be ten or fifteen miles south of the position mapped from aircraft of Operation Highjump which first charted this coast-line in 1946-47. The ice-shelf, he discovered, is only about a third of the size shown on current maps.

The traverse party, driving four Sno-cats, left Byrd on November 5. The first ten days out were very cold, windy and overcast, but except for a total of about two weeks of blizzard, the party worked in good weather with temperatures about zero.

"We encountered many white-outs," said Mr. Pirritt, "but this did not stop us. We knew there were no crevasses in the area we were covering."

UNCHARTED MOUNTAINS

In early December the party investigated the tentatively named Toney Mountains in about 75° 08'S., 115° 48'W., and Crary Mountains in about 76° 48'S., 117° 41'W. In both ranges there are peaks rising above 11,500 feet. The mountains are of volcanic origin. Gravity readings between the two ranges suggested a deep sub-glacial valley below sea-level. A "vigorous" waterfall 100 feet high was sighted in the Toney Mountains. The fall ceased when there was a shadow over them. Water trickling under

loose rocks on the talus slopes also stopped when covered by a shadow.

From here the party continued north to place a station on the newly-discovered ice-shelf, the bay area west of Martin Peninsula, which projects into the Amundsen Sea. The southern margin of this shelf according to the surface topography was crossed by the traverse at 74° 13' S., 116° 18' W. The junction was marked by depressions and disturbed ice, with crevasses up to 50 feet wide mostly well bridged.

TO THE ICE EDGE

Mr. Pirritt now led two vehicles and six men to the barrier edge, which they reached on December 2 at 73° 58' S., 116° 11' W. "It was easily the happiest day of the traverse," he writes. "There was a beautiful sky and open water as far as the eye could see. Seals were floating on small floes and icebergs drifted north. It was a welcome break from the monotony of the plateau."

The party joyfully opened a large box of steaks they had been hoarding for such an event "as a change from beef patties": but the box was found to contain 60 lb. of pizza cheese.

They now turned west to investigate the region round Mt. Petras. At the end of December they were at 76° 01' S., 124° 40' W., near the northern end of an uncharted mountain range. They had now travelled over 600 miles. In early January the party encountered its worst weather. On the 11th a blizzard struck, halting them for nine days. On the 20th they went on again, but another blizzard hit them. In early February they reached the Army-Navy Drive (between Byrd and Little America), and on February 8 covered 60 miles to reach Byrd Station.

ICE SHELF TRAVERSE

The last traverse of the 1959-60 season was one not included in the planned programme. According to Mr. George Toney, U.S.A.R.P. representative at McMurdo, it was decided to take the opportunity to try out the new Sno-cats on what was originally to have been an airborne traverse.

BOOKSHELF

"AMERICA IN THE ANTARCTIC

TO 1840", by Philip I. Mitterling; Urbana, U.S.A., University of Illinois Press, 201 pages ill., price \$5.

This notable contribution to the detailed study of the history of Antarctic exploration is a relief after a spate of books which attempt to tell the whole story from Dirck Gherritsz to the I.G.Y. in a single volume: fast becoming an impossible as well as a redundant task. Prof. Mitterling at least has room to move in this intensive study of one nation's Antarctic activities within a specified period.

Inevitably such a book deals at length with the background to the expeditions, as well as with the expeditions themselves, but a reasonable balance, and the reader's interest, are preserved throughout.

A "foreign" reviewer is deeply impressed by the author's honesty and fairness, as well as by his careful examination of the facts. It is indeed refreshing to meet an American historian who is prepared to assert unequivocally that Bransfield "sighted the Antarctic mainland apparently nine months before . . . Palmer", and that Wilkes "left himself open to censure by charting all elevations seen only indistinctly": this without abating one iota his admiration for the men concerned or for the importance of their discoveries. Such fairness merits re-

On February 26 the two newly-arrived vehicles left McMurdo Sound to investigate an area of the Ross Ice Shelf 200 miles out known as Discovery Deep. It is a spot on the floor of the Ross Sea under the ice shelf, discovered during Operation Deep Freeze III, 1957-58, on the traverse led by Mr. A. P. Crary. The present four-man traverse will attempt to delineate the shape and depth of the deep. The leader, Mr. Edwin S. Robinson, planned to take seismic soundings and gravity readings en route. The trek is expected to last about a month.

ciprocal fairness, and readers of Professor Mitterling's book will for that reason be all the more pleased to learn of the recent Australian assertions that Wilkes was far more correct than he has generally been given credit for.

Excellent documented and with a full index, this is not the last word on its subject, but it is a significant contribution to it.

"THE WHITE ROAD", by L. P. Kirwan; London, Hollis and Carter, 374 pages ill., N.Z. price 36/.

This "survey of Polar Exploration" covers such a wide field that drastic cutting somewhere was inevitable. Mr. Kirwan's method is to give the most summary treatment to all but a few expeditions, and to cut almost to tabloid form everything after Shackleton's expedition of 1914-17. But at the same time he describes in detail some sections of the subjects on which he has special knowledge. For example, the "Belgica" expedition has less than a page and Drygalski only a few lines; yet two full pages are devoted to the life of Sir Clements Markham. This lessens the book's interest for the general reader: but it makes it of particular value in parts to the serious student of Antarctic history.

Much of Mr. Kirwan's material is—to the reviewer's knowledge—new, and interesting: for instance, we have Hooker's description of Erebus, not Ross's. The book gives special attention to the background of the favoured expeditions, the genesis of them and the preparations. One appreciates the fact that the Director of the R.G.S. is fair, even generous, to men like Borchgrevink and Shackleton, and does not hesitate to criticise the massive Sir Clements himself.

It is a pity, however, that Mr. Kirwan has made a number of rather serious errors. He asserts, for example, that Ross saw King Edward VII Land in February 1842, that Skelton and Armitage in 1902-3 ascended the Skelton Glacier, by implication that Scott used dogs on his western journey in 1903, and

that he penetrated southwards over the plateau on the same great journey.

"BECAUSE IT IS THERE", by George Lowe; London, Cassell, 216 pages ill., N.Z. price 21/.

The New Zealand school teacher who was with Hunt and Hillary on Everest, and crossed the Antarctic with Fuchs, here tells his own story of these two great exploits of our time. Of the 216 pages, all but the first 48 deal with the Trans-Antarctic Expedition.

Lowe's narrative style is a little uneven, but in the main is as fresh and colourful as his camera pictures: which is saying a lot. Even when dealing with such a much-described topic as the ways of the Emperor penguin, he avoids saying what has often been said before, or at least says it in a different way—probably a colloquial one.

The book is frank without being anywhere in doubtful taste. In a particularly interesting chapter Lowe sums up his impressions of those "three remarkable men": John, Ed and Bunny. Few men, if any, are better qualified to do so. Hunt the idealist, "inspiring his party with his own dreams"; Hillary, "ebullient, restless"; Fuchs, asserting "the disciplined direction of a fine headmaster". Lowe is a successful portrait artist with both camera and pen.

"DER 7 KONTINENT", by Hans Steinitz; Berne, Kommerly & Frey Geographischer Verlag, 296 pages, ill.

A beautifully illustrated, well-mapped, all-in-one volume in German about the Antarctic, by a journalist who himself visited the Antarctic in 1957, and has made a careful study of its geography, history and problems. Dr. Steinitz summarises his material well and so manages to cover a vast field without losing colour and interest.

His assessment of Hillary will interest New Zealanders: "Hillary had no prior Antarctic experience and no scientific training at all (nor even scientific interest): for Hillary,

Antarctic Ice Depths Measured By Radio Altimeter

(An interview with **AMORY H. WAITE**)

A rapid technique for measuring the depth of polar ice has been developed by U.S. Army Signal Corps scientists.

The new method employs a modified aircraft radio altimeter. It promises in some instances to replace the laborious, time-consuming seismic soundings that have been used for such measurements, according to the Signal Corps announcement.

The radio soundings can be made as fast as the operator of the equipment moves across the ice surface. The device is designed to be placed on the front of a weasel, a small tracked carrier of cargo and personnel. The method was developed by Amory H. Waite of the Army Signal Research and Development Laboratory at Fort Monmouth, N.J.

the conquest of Antarctica was a sporting challenge, which he won. Victory was even more complete than planned: originally he had only to travel a little to meet Fuchs in order to deliver food and fuel for Fuchs' last stage; but impelled by his zeal, he went on to the South Pole to meet Fuchs. He reached it even before Fuchs, who had to cross a much more difficult terrain."

NEW ZEALAND PUBLICATIONS
"GEOLOGICAL INVESTIGATIONS
IN SOUTH VICTORIA LAND,
ANTARCTICA": Part 2—Geo-
logy of Upper Taylor Glacier
Region. B. C. McKelvey and
P. N. Webb. In "N.Z. Journal
of Geology and Geophysics":
Vol. 2, No. 4, November, 1959.

"A SECTION OF 14c ACTIVITIES
OF SEA-WATER BETWEEN
9 S. AND 66 S. IN THE SOUTH-
WEST PACIFIC OCEAN: R.
W. Burling and D. M. Garner.
In "N.Z. Journal of Geology and
Geophysics": Vol. 2, No. 4,
November, 1959.

In an interview with "Antarctic" Mr. Waite stated that helicopters, skimming a few feet above the surface, will be used as survey vehicles.

A veteran of seven expeditions to the Antarctic and five to the Arctic, he says the method will make it possible to determine conclusively the structure of the Antarctic continent and Greenland under their masses of ice. Some specialists believe that part of the Antarctic "continent" consists of a string of islands buried under the ice cap.

The potential speed of the method makes it possible to visualize geographical features under the Antarctic ice, Mr. Waite said. The radio soundings have been tested at hard ice depths up to 1,250 feet in the Antarctic and Greenland, he said, but improvements in equipment will make deeper probes possible.

It is estimated that ice, some of it two miles deep, covers more than 5,250,000 square miles in the Antarctic. In Greenland, about 750,000 square miles are under ice that reaches a maximum of 7,000 feet.

The basis of the 440 m.c. device is a modified ten-watt radio altimeter. Plate-shaped antennas are mounted on the ends of a 24 ft. long horizontal boom. Radio waves are transmitted downward from one antenna, and the signals, reflected from solid ground under the ice, are picked up by the other.

Radio waves in space travel at a velocity of 186,000 miles a second. Mr. Waite's research team has established that the velocity through the ice is about 50 per cent. less, and a correction factor of .535 must be applied to "in-air" indications.

The device measures depth by timing the extremely small interval between the transmission of a signal and its return to the receiving antenna. Data emerge as tracings

on an oscilloscope, just as radar signals do. The conventional method of mapping polar ice depths has previously involved an analysis of sound wave reflections from the sub-ice terrain caused by explosions set off on the surface. Though accurate, this method is time-consuming and expensive, and requires a research team that includes a trained seismologist.

In a test of the new method last year in Greenland, Mr. Waite and a colleague surveyed the ice depth along a three-mile course in two hours. This area had previously been surveyed by conventional methods in a project that lasted several weeks. A comparison with the seismic results showed the new method to be accurate within 20 feet, and in one place between two earlier seismic soundings a new depth of 100 feet was discovered.

Mr. Waite first suggested that radio might be used as a yardstick of ice thickness almost a decade ago. He took the first vertical soundings of the Antarctic continental ice cap near Wilkes Station in January, 1958. These, down to

500 feet, were later confirmed by seismic methods.

Mr. Waite returned to the Antarctic on the "Glacier" in February to attempt 4,300 mcs. soundings on the hitherto unexplored Bellingshausen Sea coast.

Mr. Waite summed up his findings by stating:

"Our results proved two-fold: (1) We were successful in rapidly mapping sub-ice terrain to depths of 1,250 feet with standard, currently available equipment and this can now be accomplished by anyone, with or without training; (2) we know that over-snow pilots relying on radio altimeters (at 400 mc. frequencies) will see indications of greater (and therefore apparently safer) heights when approaching a fog-bound, ice-covered slope, than will be present when they are actually at greater altitudes. In other words, the closer the airborne radio altimeter is to the surface of thick Antarctic ice the higher the pilot thinks he is because more radio energy penetrates the surface when the antenna systems are in close proximity to the ice.

Islands of the Southern Ocean

MACQUARIE ISLAND (Aust.)

"Thala Dan" reached Macquarie on Christmas eve.

Two ducks were launched in a 30-knot westerly and a bad sea a mile from the beach at Hurd Point.

Lt. Smith, who is O.C. an Army party in the ship, had the misfortune to have his duck break down in heavy seas as it was returning with cargo from the island.

He lay across the forward part of the engine compartment to stop the heavy seas from breaking in while a mechanic cleared the blocked fuel lines.

Great quantities of water were shipped, but the blocked fuel lines were eventually cleared and the duck got under way again.

Later, a net full of cargo being

loaded on to the "Thala Dan" knocked Lt. Smith off a plunging Army duck into the sea. He grabbed the cargo net, however, and was hauled safely to the "Thala Dan's" deck.

The relief ship carried, in addition to the 15 new men and the usual working party, two Queen's Scouts, Robert Clancy (18) and Chad Perry (17). The boys assisted in scientific and routine duties, and Clancy assisted the medical officers.

WOMEN!

On board also (for the duration of the voyage) were four women scientists.

The women, biologists, were:

Miss Isobel Bennett, of Sydney University.

Miss Hope Macpherson, of the National Museum of Victoria.

Dr. Mary Gillham, an English

botanist now with the C.S.I.R.O. in Perth.

Miss Susan Ingham, who has been concerned with the direction of biological surveys by the Antarctic division.

NEW MEN SETTLE IN

The new Leader at Macquarie, Michael Taylor, reports the change over: "Following a smooth voyage from Melbourne and a record fast 'unintrepid' changeover, the keys of the Kingdom of Macquarie were ceremoniously handed over on December 27.

"The base is now becoming shipshape again. An unexpected hazard is drought conditions, as the water shortage has curtailed showers and caused blocked drains. Doctor Palmer successfully treated a pullet and a penguin and has now embarked upon an orgy of tetanus and polio injections. The new kitchen building has been almost completed. Levick, following some initial difficulties with the radar equipment, has started constructing an antenna for our television. We hope to prove the sceptics wrong by receiving Melbourne programmes.

"We have banded several thousand penguins at Nuggets and are continuing to Bauer Bay. An ornithological event was the visit of a spine-tailed swift, the first ever recorded at Macquarie. A visit from a sea lion also interested photographers. Our farm is flourishing; the calf is weaned, the pigs have fattened visibly and already there are thoughts of pork chops. Our Horticulturist has produced fine crops of lettuce and radish, despite glasshouse temperatures of 110° F. which scorched some plants.

"On the year's first trip to Hurd Point, walky-talky radios were delivered safely to Green Gorge and Hurd Point, for the use of radio novices on field trips.

"American aircraft activity has brought demands for additional observations from the weather-men. Their resultant appetites are barely held at bay by the magnificent culinary efforts of the cook. The new kitchen will probably inspire him to delights that will be ruinous to our figures."

CAMPBELL ISLAND

(N.Z.)

The Officer in Charge recently reported that 1960 was ushered in at Campbell Island with unsurpassed brilliance. The Meteorological Service provided weather conditions befitting the occasion and suitable contributions from the station's larder and refreshments set the eight inhabitants on the right road for the New Year.

In four months the team has welded into a happy and industrious one. The usual heavy general and scientific programme for the year has been tackled with confidence and with high hopes that a trouble-free year might be anticipated.

Even the best of plans go awry—Campbell Island being no exception. Just before Christmas Allen Doran (the station mechanic) fell ill and on medical advice was repatriated to New Zealand. For almost two months the station was without a mechanic. During this time George Poppleton (Leader) and Ian Johnstone (Radio Technician) kept things going. A fine effort by these two.

"Case" C. G. Roobeck, just recently returned from a year at Raoul Island, volunteered to fill the breach and after some frantic rushing up and down New Zealand to catch fast-moving U.S. ships he eventually arrived at Campbell Island on U.S.S. "Petersen". Many thanks to our American friends for their assistance.

Meanwhile the leader and head office medical authorities were anxiously watching Allen Dodds (Ionosphere Observer) who seemed to be suffering from a throat complaint. Finally, to everyone's regret, Allen was repatriated on H.M.N.Z.S. "Endeavour". Much credit is due to the "survivors" over the period, particularly Senior Ionosphere Observer D. M. Souter who has, through working many long hours (with some assistance), installed the new American Model C4 Semi-Automatic Panoramic Ionosonde.

This equipment is semi-automatic in operation, requiring attention only for changing film and routine

maintenance. Records are developed in the station darkroom, ionograms are interpreted, full data is written up for later distribution to World Data Centres and urgently required prediction parameters are coded and transmitted daily to the Geophysical Observatory, Christchurch, for quick analyses and distribution to World Prediction Centres.

OLD BOYS

We are very pleased to know that the following ex-Campbell Island men have been selected and are now serving in the Antarctic:

R. B. Thompson, ex-Ionosphere Observer;

D. W. Farmer, ex-Ionosphere Observer;

J. A. Warren, ex-Cook, both at Campbell and Raoul Islands.

We are confident that they will more than justify their selection.

With the approach of the winter months which greatly restrict outside work, all available members are toiling hard to smarten up buildings, prepare sites for the new buildings programme for 1961, and generally prepare for the harsh weather to come. In spite of staff shortage problems morale has been high and we are confident that this year's team will see the winter through without difficulty.

LATE NEWS

Urgently needed stores, mail and fresh meat were landed on Campbell Island on March 8 by the first helicopter ever to land there.

A Sikorski helicopter from U.S.S. "Atka" touched down at 10 a.m. after flying a distance of four miles from the ship, which was lying off the entrance to Perseverance Harbour.

A man at the meteorological station was taken to the ship for minor dental treatment and then returned to the island.

The U.S.S. "Atka", an ice-breaker, was on its way to the Antarctic following repairs at Wellington.

The Commonwealth Trans-Antarctic Expedition made an unexpected profit of about £30,000. One-third is earmarked for New Zealand Antarctic projects.

ILES KERGUELEN

(France)

On July 11 last a fire razed the principal meteorological building. The wooden hut, 13 feet by 13 feet, was completely destroyed with all its contents. Fortunately no-one was injured and the fire was prevented from spreading to other buildings.

For the first time men on Kerguelen are now able to converse by radio-telephone with their next of kin in France.

The trout liberated in November 1958 survived the winter satisfactorily. The herd of reindeer also is flourishing. Four, a male, a female and two young, have been seen on "la Grande Terre". They showed no fear and approached the men who were watching them.

"Norsel" arrived at Kerguelen on November 29 and left on December 3 for Adelle Land. A quite unexpected visitor, on January 31, was the sailing vessel "Mischief" with a crew of six, including an English captain. They were warmly welcomed, and left again on February 2 for Cape Town.

BOUVETOYA

(Norway)

The South African Minister of Transport announced last year that South Africa would undertake, in co-operation with Norway, a research expedition of the "utmost importance" to Bouvet Island. However, unfavourable weather and sea made the proposed reconnaissance during the voyage to Queen Maud Land impossible. It was hoped that the "Shackleton", chartered by the South African Government for the relief of Marion and Gough Islands, might be able to make a further attempt to reach Bouvetoya.

Two Antarctic ships, the American ice-breaker "Glacier" and the Russian whale-chaser "Besposhtadni", entered Wellington harbour with damaged propellers on the morning of January 19.

The New Zealand Antarctic Society

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

You are invited to become a member.

BRANCH SECRETARIES

Wellington: J. H. Hall, Box 2110, Wellington.

Canterbury: G. King, 80 Slater St., Christchurch, N.E.1.

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

"THE ANTARCTIC TODAY"

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

Ionosphere Research (J. W. Beagley).

Meteorology (A. R. Martin).

Marine Biology (R. K. Dell).

Aurora Australis (I. L. Thomsen).

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

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

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5-6, 8-10, 12-20.

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