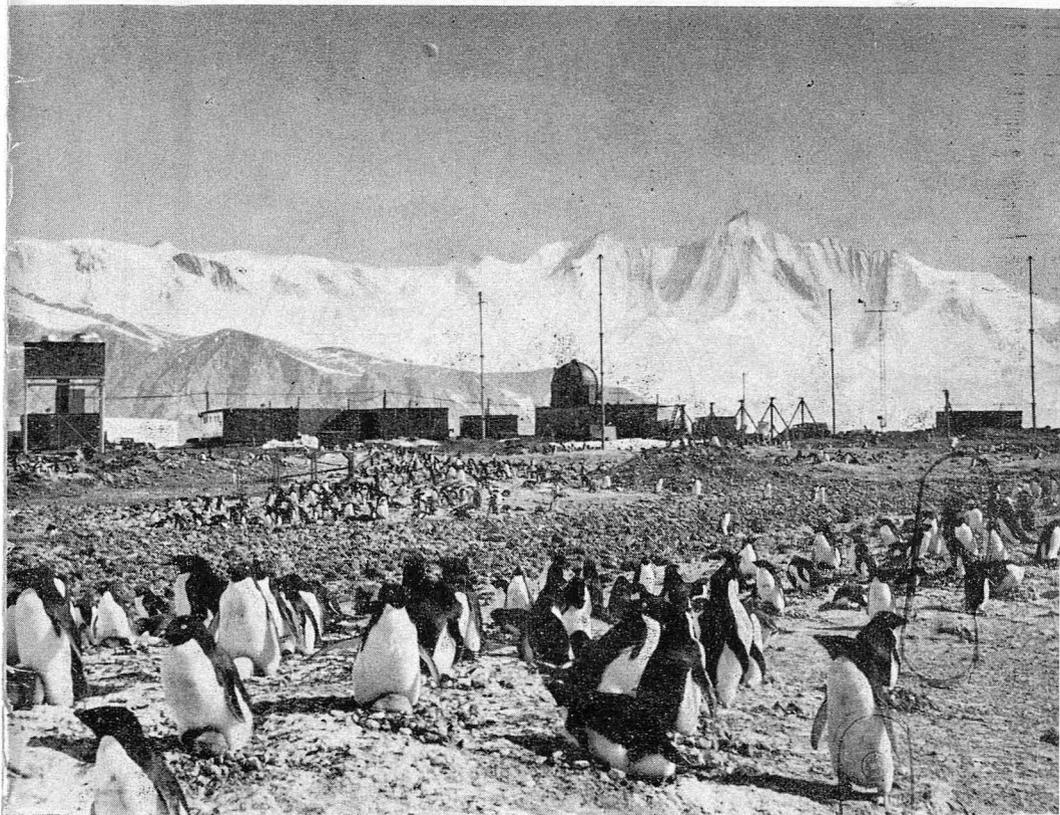


# ANTARCTIC

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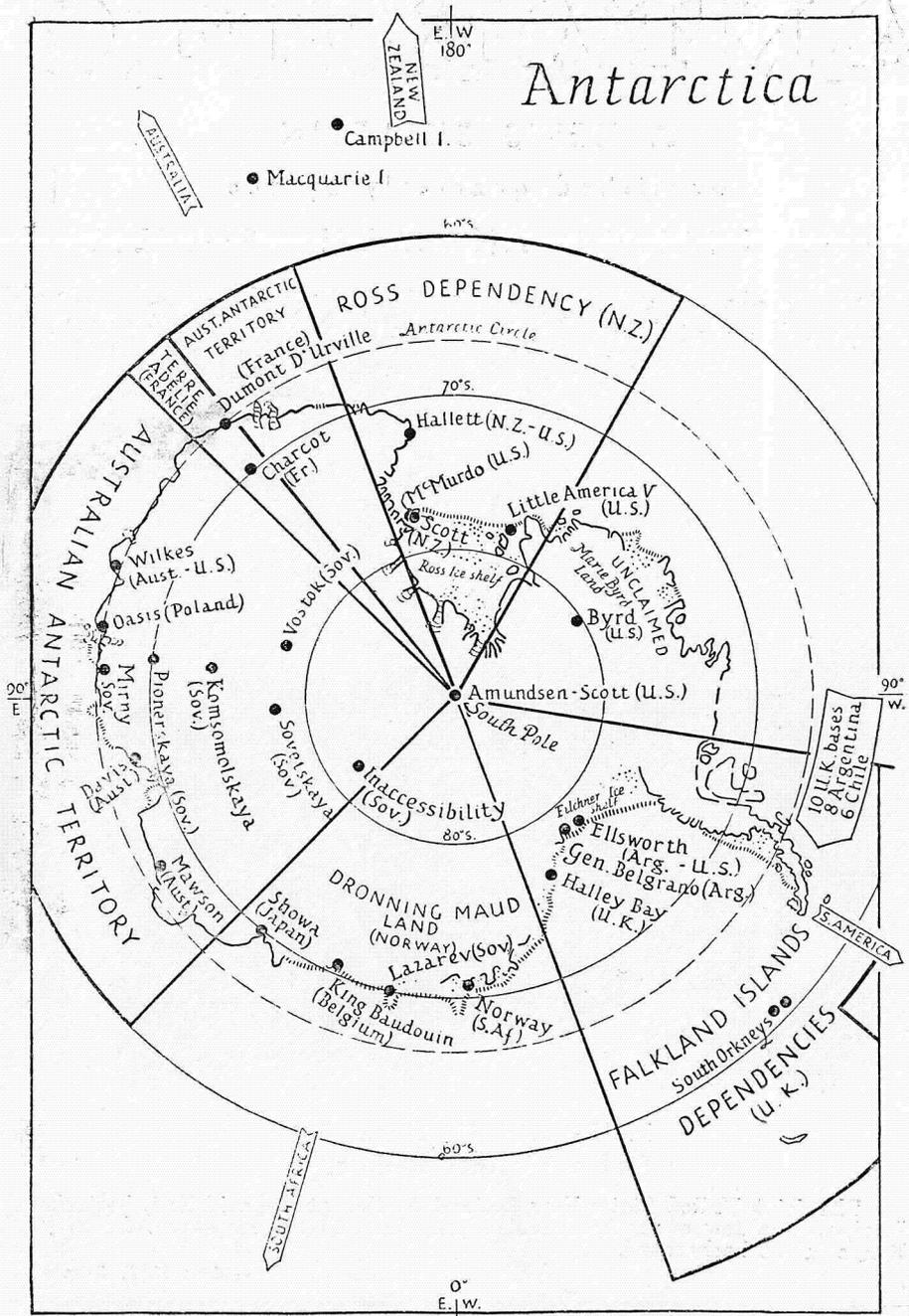


## PENGUINS AT HALLETT And a Weather Balloon

The joint United States-New Zealand Station at Cape Hallett, Victoria Land, with a few of its innumerable penguins and the majestic Admiralty Range in the background.

—Photo K. J. Salmon

# Antarctica



# "ANTARCTIC"

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## HEIGHT OVER ICE ALTIMETER MAY MISLEAD

The significance of the closing paragraph in our interview with Mr. Amory H. Waite ("Antarctic," March 1960, pp. 201-2) in which Mr. Waite spoke of altitude errors made by pilots flying over ice-covered slopes, may have eluded some readers. What has this to do with the use of radio altimeters to measure thickness of ice cover?

The principle of the radio altimeter is that the radio wave is reflected from the ground to the plane: the time before the reflection is received, converted into feet, gives the pilot his altitude. It has been found, however, that when a plane is over glacial ice the radio wave will penetrate the ice and is reflected, not from the ice surface but from the solid ground beneath. So that a reading of 1,500 feet may mean that the plane is flying only 20 feet above ice 1,480 feet thick.

In Greenland the radio altimeter of a U.S. Army plane coming in to land in thick fog was showing a height of 2,000 feet when the pilot suddenly sighted the figure of a ground-crew man signalling him in.

Mr. Waite's contention is that this penetration of ice by the radio wave and its reflection from the underlying rock provides a much quicker method of determining ice depth than the seismic sounding method currently in use. So that a characteristic of radio waves which, not realised, has probably been the cause of many fatal crashes, may in future become the recognised method of assessing ice thickness and thus making possible the mapping of the rock surface beneath.

## BACK ISSUES

We regret that the following back numbers are out of print:

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

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

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

Of the few complete sets to Vol. 2, No. 4 advertised in our last issue, most have since been sold.

The price for the 16 issues plus index to Vol. 1 is £4.

## GUINEA-PIG

An Australian diesel engineer who has spent four winters in the Antarctic, returned to Australia last month from McMurdo, where he lived for a year with the 132 Americans, working on the operation and maintenance of the sno-cats, weasels and tractors used on the United States traverses.

In June he became ill. Despite the fact that he had been living and travelling on the ice for six months beforehand, always with the same group of men and cut off from the outside world, his illness was diagnosed as mononucleosis, a severe form of glandular fever. He was immediately ordered into hospital for a complete rest and vitamin injections. He was in hospital for five weeks. As soon as the new season began, he was flown out to New Zealand.

"The doctors took a lot of interest in my case," he said. "To them I was something of a guinea-pig, and the correspondence still goes on."

But the guinea-pig himself is now fit, though a little sceptical about the old belief that germs cannot live in the Antarctic.

# NEW ZEALAND PLANS MODIFIED FOR 1960-61 SEASON

The New Zealand Government is continuing its programme of exploration and research at the present level of activity; but circumstances have necessitated some changes in the nature of the programme for the coming year.

Scott Base has changed from an expedition base to a permanent station. As such, the scale and standard of accommodation, facilities and base equipment have increased and the necessity for regular replacement of worn out equipment is inevitable.

Owing to the loss of a Sno-cat and the Beaver aircraft, modification of the planned long-term field programme has been necessary.

## TWO FIELD PARTIES

There will be two expeditions working in the field during the 1960-61 summer instead of the four last season.

It had been planned to mount an extensive Geological and Survey expedition last summer in the coastal region between the Barne Inlet and the Shackleton Inlet, with a continuation of the work into the more southern area in 1960-61. The tragic Sno-cat accident off Cape Selborne led to the transference of field activities in 1959-60 to the southern area. It has therefore been decided that next season's theatre of operation will be the original Barne Inlet—Shackleton Inlet region.

It is hoped that New Zealand aircraft will be available later in the season for reconnaissance and the withdrawal of field parties. In the meantime four dog-teams will operate, with limited United States air support for the laying of food depots.

## UNIVERSITY EXPEDITION

The Victoria University of Wellington, after the successful expeditions of the past two years in the Dry Valley system from the Mackay Glacier to the Taylor Valley, proposes to send a five-man expedition to a somewhat similar region north of the Koettlitz Glacier. American helicopter support

would be required to put this party in the field and to withdraw it.

Extension of previous biological and sea-seismic studies are envisaged. A biologist will be stationed for the summer at Cape Royds, and also one at Hallett Station, to conduct check observations on penguin and skua rookeries (see special articles in this issue) in order to confirm the past season's work. Biological and sea-seismic studies from H.M.N.Z.S. "Endeavour" will also extend the work undertaken during the past season.

## AT SCOTT BASE

A report on April 6 from Lt.-Cdr. J. Lennox-King, leader at Scott Base, said that the Base had already seen the last of the sun until next spring, as it was then so low in the sky that it did not appear above the crest of the hills behind the Base. Blue shadows were being cast far over the ice shelf and at sunset the 760 foot pyramid of Observation Hill threw a needlepoint ten miles out across the ice.

Scott Base is on the edge of what Scott in 1902 called "Windless Bight" and has much less wind than the western side of the Hut Point Peninsula. The maximum wind speed this year has been 38 knots, while at the auroral Radar Station on Arrival Heights the winds have frequently reached 50 knots.

## ALL BUSY

The wintering-over men are all busily occupied: the scientists with their instruments and records and the rest on general construction and maintenance work. The two surveyors, Hunt and Matterson, of last summer's field party, are looking after the dogs and overhauling sledges and field equipment. They have built themselves a survey workroom.

Guide-lines have been rigged to near-by points requiring periodical visits, and the routes to outlying points have been flagged for several miles at 50 yard intervals.

### THE DOGS

Meat for the Base's 40 dogs is mostly export-reject New Zealand mutton, supplemented with seals, frozen and then sawn into six pound blocks by a tractor-driven circular saw. Each dog gets a block every second day. The dogs have nearly finished growing their winter coats and sleep happily in the blowing snow and the cold. A dog injured in a fight was brought under cover for treatment but fretted for two days until it was returned to the open.

Nine pups were born to two mothers in March. As in some other part of the world, daughters are not popular and the predominance of female pups has been a great disappointment. They do pull in the sledge teams—but female huskies are not as husky as male huskies.

### ON ARRIVAL HEIGHTS

The auroral radar station erected by the New Zealand party on Arrival Heights, McMurdo Sound, as described in our March issue, became fully operative on the night of Friday, March 4, when echoes were recorded from a height of 110 kilometres—68 miles—above the earth and a range of 1,200 kilometres.

The erection of the station on the crest of the narrow peninsula that juts out from Mt. Erebus involved the transport of fifteen tons of material and equipment over three miles of rough and steep terrain and long days of hard work in below-zero temperatures and howling winds. So constant and so strong are the winds that sweep over this plateau that even in winter it remains practically snow-free. Poised at the edge of a 500 foot bluff the hut and the radar aeriels have had to be anchored by a steel wire rope to thick steel rods sunk into the rock.

The aerial array includes a close-meshed screen some fifty feet long by ten high. The aeriels are accurately aligned to send two vertically-narrow beams 800 miles and more into space,

the signals passing on each side of the South Magnetic Pole. There they intersect with similar signals from the New Zealand station at Awarua, Invercargill.

The transmitter which sends the signals is American built but the receiver was built at the Dominion Physical Laboratory at Lower Hutt, and contains a number of modifications to the original American design. The station is under the charge of Don Webster of Petone. It is known that from within the zone reflections will be obtained from some phenomena which are not seen from outside the zone. The extent to which these will be visible remains to be seen, but the scientists are hopeful that the station will provide information otherwise unobtainable. The echoes which the radar obtains (apart from those of the Prince Albert mountains, 70 miles across McMurdo Sound) are considered to be possibly from electrons energised from outer space and having a high-powered electric current of their own, far higher than any produced by man.

The result obtained by the Arrival Heights radar may help to solve the mystery of the earth's magnetism.

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### U.S. KIWI

"Tony" Gow, a New Zealander attached to the United States, Snow, Ice and Permafrost Research Establishment (S.I.P.R.E.) left McMurdo on the "Arneb" on February 16. Mr. Gow worked on the ice-core project at Byrd Station in 1957-58. He returned to the Antarctic in October 1958, as a glaciologist at Little America. He assisted in drilling 840 feet through the ice shelf to the sea bottom. At between 600 and 750 feet three distinct layers of ash were found, possibly from an eruption of Erebus. The last eruption is estimated to have taken place 1,000 years ago.

Last summer Mr. Gow again went south and the Byrd Station hole was re-examined. He has returned to the United States where he will spend six or eight months carrying out further studies of the ice cores obtained.

# THE SEAS BETWEEN

## NEW ZEALAND OCEANOGRAPHERS' WORK

We are now able to give further details of the work accomplished by scientists travelling on H.M.N.Z.S. "Endeavour" during the Ross Sea cruises outlined in our March issue.

"Endeavour" sailed from Wellington on December 27, 1959. The scientific complement for the cruise was: Lieut. R. D. Adams, Naval Research Laboratory (leader), R. A. Garrick and R. G. Jenkins, Geophysics Division, D.S.I.R., J. S. Bullivant, Oceanographic Institute, D.S.I.R. and E. C. French and G. A. Harlen, Antarctic Division, D.S.I.R.

The aim was to carry out seismic and oceanographic work between New Zealand and McMurdo Sound and in the Ross Sea, and to tow behind the ship a proton magnetometer to measure the total strength of the earth's magnetic field.

After some work off the New Zealand coast a course was set for Campbell Island on December 30. On January 1 the magnetometer fish was lost, apparently cut off by a bathythermograph wire, but the spare fish was working the following day. On this date two-hourly soundings were commenced with the explosive echosounder, and hourly bathythermograph measurements were begun to cover the area of current convergence.

Scott Island was reached on January 5. Here the oceanographers carried out a trawl and obtained a good collection of rock and bottom fauna. An attempted landing was unsuccessful.

On January 8 "Endeavour" arrived off Beaufort Island and the U.S. icebreaker "Atka" led her up the ice channel to a point some seven miles from Hut Point. There the vessel stayed till January 18 and the scientific party assisted with unloading operations.

### ROSS SEA CRUISES

The first Ross Sea cruise began on January 18, after the sonobuoys had been laid for the first seismic station, between Franklin and Beaufort Islands. The weather deteriorated

and the buoys had to be recovered quickly before any useful results could be obtained. The seas were such that the magnetometer could not be towed. The ship had to run before the storm for 24 hours—with the scientists struggling to keep their gear secure on deck. At 1830 hours on January 21, 60 miles north of Franklin Island, the ship resumed a southerly course. The magnetometer was found to be leaking and despite all efforts no further magnetic results could be obtained.

During the period off Beaufort Island between seismic trawls the party carried out a sounding programme near the Island and some trawls and a camera station were also carried out. A party of scientists and ship's company landed and visited the penguin colony.

The ship was alongside the ice in McMurdo Sound from January 27 to 31. A fish-trap was lowered and several fish caught. Three grabs produced a rich haul of animals, plants and rock.

### SECOND CRUISE

"Endeavour" left McMurdo again on January 31, and after a call at the biologists' camp at Cape Royds, a seismic station was carried out between Beaufort Island and Franklin Island; but on February 2 bad weather forced the vessel to head prematurely for Pennell Bank. During the period February 3-9 eleven oceanographic stations were occupied at various positions on the Pennell Bank and to the north of it.

These stations comprised grabs, trawls, hydrology casts and bathythermograph dips.

On the 10th the ship again headed towards McMurdo Sound. Seismic stations were considerably affected by misfirings but nine stations in all

## Blizzard Strikes Hallett Station

In a message dated May 11, Bob Thompson, Scientific Leader at Hallett Station, reported:

**"The climate has so far proved far better than we expected." An ironical twist has given to this rosy picture a fortnight later.**

A message sent from Scott Base on May 26 reported that a fortnight of gales at Hallett Station culminated on May 24 in two days of winds of super-hurricane force. The meteorological instruments were blown away when the wind recorder registered 120 miles per hour; but the wind still increased in strength and at its peak was estimated to have reached 140 m.p.h.

### DEVASTATING WINDS

Thomson describes the conditions as "like being on a ship at sea," so great was the shuddering and creaking of buildings and the noise of the storm. The 30 foot auroral tower plunged so violently that collapse seemed certain, but it remained standing, though all the auroral instruments were flung from their securings on walls and ceiling. They were just a heap of rubbish on the floor.

For more than two days the 17 men at the station were pinned to the buildings in which they happened to be when the storm reached its crescendo. All the telephone wires were down and the only communication possible between men in different buildings was by the transmitters used for

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were attempted and some useful ground waves were recorded.

### IN McMURDO SOUND

Despite difficult ice conditions oceanographic work was carried out in McMurdo Sound itself during the 36 hours commencing on the afternoon of February 16. The homeward voyage then began and there were stops at Cape Adare and Campbell Island, also bomb soundings and bathythermograph dips during the crossing of the Convergence. The ship's echosounder produced a depth profile between Campbell Island and Bluff, where she berthed on February 27.

radio communication. At attempt was made to enable two men to move by securing them with a rope, but they were at once blown off their feet and had to be hurriedly dragged in. Some time later the ice in Hallett Bay suddenly and most unexpectedly moved out. The possibility of this being the effect of seismic waves is being investigated by New Zealand scientists.

On May 26 the wind dropped and snow began to fall. The Hallett men could at last take stock of the damage done. All except one of the communications and scientific radio aerials were down, many of the power lines had parted and scientific instruments were wrecked. All the meteorological instruments were scattered far over the ice "no-one knows where." A gaping hole in the wall of the galley points to a lucky escape by the cook when a boulder was hurled through the double wall.

Mr. Thomson considers it will take several days to sort out the damage, but he hopes eventually to restore most of the station's scientific programme.

### READY FOR WINTER

Hallett saw the last of the sun on May 13 but Americans and New Zealanders alike are fully prepared for the long winter night. The new recreation room provides facilities for table-tennis, shuffleboard and pool: full length feature films are shown every evening, and the Radio New Zealand programme "Calling Antarctica" is eagerly awaited each Sunday evening. Meals are excellent in quality, quantity and variety.

A church service on Easter Sunday morning was well attended.

April 24 marked halfway for the American Navy men; six months at Hallett and six more to go. The cook celebrated with a giant cake and cooked turkey with all the trimmings for supper.

Temperatures have been low, but dry air with remarkably clear days were predominant—until the blizzard arrived. With the departure of the penguins a snow catcher was put in service, 150 yards up wind from the station. The first collection of snow samples indicated no local pollution.

Communications equipment for contact with New Zealand and Scott Base have been overhauled and new aerial feeders installed to the communications hut.

### SCIENTIFIC WORK

*Biology:* Members of the Duke University undertook an Adelie penguin study. The growth of the extra-renal salt extractory mechanism through the moulting stage up to the time of the departure of the colony for the winter, has been one line of research.

*Aurora:* All-sky camera observations began on February 24. The camera operates during all darkness hours. An excellent film record has been obtained of displays in mid-March.

*Geomagnetism:* The new Askania variograph and the new cable to the magnetic hut have been installed and the equipment began operation on February 23. March was a quiet month with peak activity on March 16.

### FIRST DAYS

A letter from Bob Thomson written on March 12, gives a racy account of the New Zealanders' first weeks at Hallett.

'We arrived at Hallett during the evening of February 3 in heavy snow, so did not go ashore until the following morning. The quick unloading of the 'Arneb' established an all-time record allowing her to depart at midday on the 6th. Our first few days were spent in unpacking new equipment, stores, etc., and settling in to our quarters. We arrived here as the penguin population were leaving for we were greeted by some 100,000 birds, but during the next fortnight these had dwindled to only a few hundred. Now there remain just a few isolated ones. However, skuas are still plentiful and on any journey away from the camp we are subjected to dive bombing attacks from these scavengers.

"On February 9 an attack by a young husky on myself ruined a set of clothing and necessitated numerous stitches in my rear. On all occasions for some days after I was always given the most comfortable of chairs and numerous inquiries were always made as to the condition of my seat.

### BLAST!

"Saturday February 13th proved a very bad day for us. Blasting operations were undertaken for the erection of a pole some 50 yards from the science building. The resultant shock wave from the 40 lb. charge was far greater than we anticipated and damage to the equipment and building disrupted all programmes. Many tedious hours were spent in repairing the scientific instruments.

"The weather has been mainly overcast and calm but on February 16 we experienced our first real gale and blizzard with winds gusting to over 80 m.p.h. Average temperature for February was 24°F., lowest, 17°F. and highest 34°F. So far this month our lowest has been 8°F. Also we are now beginning to get an hour or so of quite welcome darkness.

### MOVIE-DROP

"The 'Eastwind' paid us a visit on February 28. This proved another bad day for all. A helicopter dropped 56 full-length movies into the sea and, of course, they were a total loss, much to our sorrow, particularly the Americans as most of our stock of movies have already been shown. Later in the morning the helicopter made a fortunate and rapid crash landing just after take off due to a broken tail propeller shaft. The only damage sustained was to the tail which grounded amongst a heap of oxygen cylinders. The plant then had to be dismantled into sections and loaded aboard a landing craft, a job that eventually took some five hours—the 'Eastwind' departed at 5 p.m.

### WHERE IS CYNTHIA?

"We received from Scott Base per 'Eastwind' what was described by Jim Lennox-King as 'a wall-eyed pup named Cynthia possibly husky'. She proved a very timid dog and eventually found her way to the galley where she spent some days but never

made really good friends with anybody. On the evening of March 6 she went missing and that evening was sighted climbing the ranges to the south-west of the camp. Next afternoon Charlie Trainer, Ray Brown and myself climbed these ranges but a thorough search of the area failed to find any trace of the pup and nothing has been seen of her since.

"During the early hours of February 27 the new galley was completed and our first meals there were cooked later in the day. A large and very modern electric range and commercial type of oven will certainly improve the facilities for Smitty our cook. The old galley is rapidly being converted to a recreation room and

movie house. This should prove a great deal better than our Jamesway hut that has been used for this purpose in the past, particularly during the winter.

"We (the three Kiwis) have now settled in very well and are quite prepared for the long winter months ahead. The help and co-operation received from the Americans is first class and we are all rapidly becoming a very happy family. The new Kiwis have an esteemed name to live up to here, due to Lew Jones and his party, who are held somewhat in awe here. Tales of their activities are related again many times by our American friends."

## New Zealander Studies Bird Life At Cape Hallett

By B. E. REID

[Mr. Reid, a biologist, was one of three New Zealand scientists who wintered at the joint United States-New Zealand Hallett Station last year.]

Perhaps of all the Antarctic Stations, Hallett is one of the best situated for Biological studies. The ecological botanist can become fully absorbed in the lichen and moss associations that occur, entomologists have succeeded in making exhaustive habitat and species studies on Mites and Collembola (Spring-tails), the sea has an abundant Amphipod Crustacean fauna and has also netted a variety of fish and seaweeds, and Weddell, Crab-eater, Leopard and Elephant Seals have all been recorded, but other than the Weddell the others are intermittent visitors. However, even though the Weddell do breed here, the colony is small and scattered. Where Hallett must surely claim pride of place is for bird studies.

The Adelie Penguins and Skua gulls nest on the spit where the station is situated, while Wilson's Storm Petrels and Snow Petrels breed on the steep slopes four to five miles across the Bay.

Unlike the physical disciplines (Siesmological, Geomagnetic, Ionospheric studies, etc.) which are exhaustively pursued throughout the

year, the biologist enjoys a period of quiescence during the winter before encountering the pandemonium of summer. During the winter darkness it is possible to carry out an uninterrupted fishing programme as the area is devoid of other life, but once the birds consider the sun has thawed the place enough they return in flocks, and the seals leave their sheltered refuge below the sea-ice to bask and pup in the sun's rays.

Rather than try to give a brief account of the full Biological field I will endeavour to pass on a few bird observations.

### THE EMPEROR

The Antarctic's most interesting bird is undoubtedly the Emperor Penguin. Aloof to the extent of appearing snobbish, large and immensely strong, its nearest known rookery to Hallett is at Coulman Island, approximately 60 miles away. The Emperor breeds in the winter months but our efforts to reach the rookery in August were unsuccessful. However, during November and December approximately 200 birds visited the station, all immaculate when they arrived,

but many, after banding, weighing and having temperatures taken, looked ruffled and undoubtedly feeling indignant as they departed. The entire station assisted in the round-up and the only casualties were the musters, many of whom were subjected to severe flipper-wallops.

Citing earlier literature, many people regard the Emperor as being a 90-lb. bird, a figure considerably above the true value. Of the 80 birds we weighed, the heaviest was 71-lb. and the lightest 45-lb., but 70 per cent. of them were between 55-60 lb. Just prior to the moult a bird's weight does sometimes rise as high as 90-lbs. One weight of 95-lb. is recorded. Even if not as big as generally thought, they are remarkably strong and at times it was impossible to pinion the flippers. Birds are generally warmer blooded animals than mammals and even the Emperor manages to maintain a body temperature of from 100.2° to 102.6° Fahr., a considerable achievement in such a climate.

#### NATURAL CLOWN

In bearing and behaviour, the contrast between the Adelie and the Emperor Penguin is extreme. Other than occasionally craning his neck and less occasionally looking down between his feet, both movements which are executed with a slow and ponderous dignity, the Emperor is amazingly motionless. In fact an excellent example that Biological Substance and Inert Matter can be synonymous. The Adelie is a natural clown, a constant source of entertainment, and often to those working on him an aggressive nuisance. His personality clashes with his very formal attire.

The Adelies' personality, whether dominant and belligerent or passive and timid, is in large measure determined by at what stage they are in the serious business of mating and chick laying. Generally the male is more dominant than the female, shows greater nest tenacity and is less likely to desert the chicks if disturbed. However, in one case the female was decidedly the better guardian and more belligerent bird, but her spouse would hastily desert the nest and chicks at the slightest suggestion of intruders.

External examination will not re-

veal the sex of an Adelie and so only pairs that had been seen mating were studied for behaviour. This was facilitated by placing numbered aluminium bands on the flippers, left flipper for males and right flipper for females.

In 1959 the first Adelie arrived back at the Hallett Rookery on October 13. The date is not available for 1958 but in 1957 the first return was also on October 13. The bird headed straight for one area and then his tracks, though confined, zig-zagged and circled in a confused mosaic. They tend to reoccupy the same nest site in succeeding seasons but as the entire spit was under snow at the time, re-location of a small two foot diameter scattering of pebbles, under 20 inches of snow, appeared to be a problem. Soon the birds started returning in great numbers from their winter habitat which is thought to be the marginal broken pack-ice which forms a zone between the solid pack ice to the south and open water to the north. At its peak, from November 8-12 the population was estimated at just over 100,000 birds but by the day one expected tenfold that number.

#### BABY SITTING

The first Adelie eggs were laid on November 3 and the first chicks seen on December 7. During the 34-36 day incubation period the nest duty is shared but the male assumes major responsibility while the female returns to the sea to feed. Some females return after a week or so and their partners then go and feed, but others, once they have escaped their commitments, seem to forget their duty and one male did a continuous fast of 42 days before his partner returned. Another female returned to the nest six days after the chicks had been hatched out, and these chicks had died of starvation, as the male could not leave them and return to the sea for food. When the chicks hatch they contain 12-13 grams of yolk which is enough to keep them alive for five days. This reserve is a considerable factor in chick survival, particularly in instances where hatching occurs at an earlier date than the parent, who is at sea collecting food, returns.

The breeding and chick rearing behaviour in the Adelie follows a fairly rigid and inflexible pattern. The de-

velopment of such a rigid routine undoubtedly assists the breeding birds to cope successfully with many adverse environmental factors; but again, when watching them, one often felt that if their behaviour was more adaptive, many more chicks would survive.

It is not possible to average out chick and egg mortality, as during

some summers the weather is kind and at other times howling blizzards occur, and these take heavy toll. A variety of factors contribute to mortality: fighting between adults crushing eggs and chicks, skua predation, eggs freezing in melt pools during the thaw, eggs rolling down the slope from nests situated on hilly aspects, etc.

Col.	Situation	No. of pairs.	Possible No. of chicks.	Act No. chicks.	% Survived
1	Low, flooded in the thaw .....	63	126	23	10
2	Level, damp-wet .....	54	108	43	43
3	15° slope .....	53	106	61	58
4	Mound, dry and sloping sides.....	79	158	101	64
5	High, dry and level .....	56	112	82	73

These figures show the necessity of careful selection of sites if a true and accurate population study is to be achieved.

By March 17 there were only 17 Adelies left at the rookery and by the 20th these had also departed for their winter quarters. The last of the chicks departed approximately one month before the last adults. Most of the adults go to sea before moulting in March, but some remain at the rookery, and four apparently confused and very bedraggled birds were found over 1000 feet up the icy slope of Cape Hallett, going through their moult and probably wondering how they ever got there or would get back.

### THE SKUA

The McCormick's Skua also shared the spit. There were approximately 180 nesting pairs, mainly situated on the lower slopes of Hallett Volcano and on the beach at the base of these slopes. These gulls first returned on October 16 but the first eggs were not laid until November 18, and the first chicks observed on December 17. Thirty days is the average incubation period. No nest, as such, is made but a slight depression is made in the scree. These are not made until such time as the bird is ready to lay and consequently it is not possible to mark nests off before hand. Normally two eggs are laid and though they are fairly constant in size and weight (weight ranges from 84 to 115 grams) the colours vary considerably from slate-grey to drab olive with dark flecks, to turquoise. The chicks make

their first flight in 49 to 52 days after hatching, when they reach a ceiling of six to eight feet and cover a distance of 40 to 60 feet. These first flights are always followed by a most inelegant landing and it is surprising that the fledglings do not damage themselves on the rock and scree.

The adult skuas vary in weight from 2 lbs. 10 oz. to 3 lb. 10 oz. and their body temperatures range from 103.4° Fah. to 107.2° Fah.

Two eggs are laid and a colony of 180 nesting pairs give a potential chick population of 360, except that this bird enjoys its own flesh and blood and only approximately 70 chicks escaped the gustatory attentions of their parents or of neighbouring birds. Some adults eat their eggs, others will see the eggs through hatching and then eat one or both chicks. This seemingly barbaric behaviour can be justified when assessed in terms of food availability and the volume required by growing chicks. In destroying one chick, the other is given a greater chance of surviving, as to try and feed two chicks for two months as well as themselves, calls for abundant food.

Finally, the relationship between Adelie and skua is not completely one sided as is often stressed, as on occasions groups of Adelies in Indian file have been seen marching through the skuary and when coming upon a nesting skua, driving it away. On such occasions the skuas are at a complete loss and quite incapable of coping with such "hooliganism".

## New Wintering Team Takes Over In Terre Adelie

Further details are now available on the work of the 1959-60 summer at the French station in Adelie Land.

"Norsel" arrived at L'île des Petrels on January 2 with the 14 members of the 10th Expedition and remained at the anchorage near Dumont d'Urville Base until January 22, when the unloading of the stores for the 10th French Expedition was completed. At 10 p.m. on that day the vessel set a westerly course for Janet Rock and then made for Rocks X, Gravenoire and Mathieu some 80 miles west of Dumont d'Urville. Roc Mathieu was sighted at a distance of eight miles in 136° 50' E. 66° 15' S., but solid ice from Commandant Charcot Glacier blocked any further advance to the west so "Norsel" returned towards L'île des Petrels and as far east as off the old Port Martin Base. Bad weather throughout the whole of this period however, made it impossible to land on most of the rocks seen.

On January 28 "Norsel" was back at the anchorage at L'île des Petrels. Bad weather continued so it was decided to terminate the summer campaign. The planned programme had been in the main carried out. Moraine petrographic studies were, however, restricted to the Pointe Geologie area, as it was not possible to visit Port Martin, Cap Jules or Cap Bienvenue.

The vessel left Dumont d'Urville on February 5 with the 12 members of the 1959 wintering party under Rene Merle on board as well as the summer party of six. All the passengers disembarked at Hobart on February 12 and "Norsel" reached Le Havre on April 6.

### HELICOPTER AID

The Djinn helicopter was "cocooned" immediately on arrival and prepared for flight. The aircraft made 105 flights and transported 135 tons of cargo.

Thanks to the arrival of "Magga Dan" which had two helicopters and a seaplane on board, affording adequate safeguard, Professor Bellair

(leader of the summer party) piloted by Captain Toupelin, flew over the Astrolabe Glacier and the plateau facing Pointe Geologie.

The unusually extensive deglaciation this year disclosed some 30 islets or reefs not previously shown on the map of l'Archipel Geologie.

New beacons were set up and previously established ones resurveyed. This will enable soundings to be made next summer to the west of the zone covered by the hydrographic mission of 1957.

Between Hobart and Terre Adelie 37 bathythermograph dips were effected on the journey south and 23 during the return voyage.

The change over from Rene Merle's "Ninth Expedition" to Alfred Faure's "Tenth Expedition" took place on February 5.

The new experimental polar vehicle VP90 (a "Petrel") was used to the fullest possible extent in order to give it an adequate trial.

A penguin very seldom seen in Adelie land, the ringed or chin-strap penguin (*Pygoscelis Antarctica*) was seen among a colony of Adelies.

Maximum and minimum temperatures recorded were February +3, -14; March -1.0, -22.3.

General health has been excellent, but in an accident on April 11 Marin (mechanical engineer) suffered a dislocation of the left shoulder, complicated by a comminuted fracture.

On January 7 all at Dumont d'Urville honoured the memory of Andre Prudhomme on the anniversary of his death. Prudhomme, who was chief meteorologist at the station (1957-1959), lost his life in a blizzard.

"Magga Dan" with the Australians relieved from Wilkes and Davis stations arrived off Pointe Geologie at 9 a.m. on January 14. The Australians visited the Base and were warmly received. The ship left again next day at 6 p.m.

# RUSSIANS BREAK FRESH GROUND IN ANTARCTIC EXPLORATION

From Russian sources, through the courtesy of the Soviet Committee for Antarctic Research, we are able to give further details of the extensive late summer field work carried out from the Soviet Antarctic stations.

In the second half of December personnel from the "Ob" began to move to Lazarev, founded a year ago in Queen Maud Land. A large contingent of scientific workers of the Fifth Expedition were landed here in addition to the new staff of the station.

Continuing its voyage along the shores of Eastern Antarctica toward Mirny, the "Ob" rendered assistance to the expedition ship "Soya" in the vicinity of the Japanese station Showa; it led this ship through a belt of heavy ice for a distance of about 200 miles.

By permission of the Japanese, a fuel base was established at Showa for future flights by Soviet airmen. A similar base has been established at the Australian station, Mawson.

## ICE BREAKING

Nearing Mirny, "Ob" encountered the motor ship "Kooperatsia" at the edge of the pack ice. Between them and the point intended for the discharge of cargo was a field of solid ice, about six feet in thickness. For several days the diesel-electric ship forced a path through the ice for itself and the "Kooperatsia", each day making a little more than a kilometre. On January 26 the ship finally reached its objective and began unloading.

On the same day the airman A. Pimenov became the first to make a non-stop flight from Lazarev to Mirny, in an IL-14 transport plane. The 2,170 miles were covered in 11 hours under difficult conditions.

Also successfully completed was a journey by a "Penguin" snowmobile from Mirny to Komsomolskaya. This journey had begun during the previous Antarctic summer and had been suspended at the onset of the polar night. The explorers covered 540 miles, en route carrying out a varied programme of geodetic and gravi-

metric work. Six and a half months were spent in the field.

Four Soviet expeditions were completed by surface travel in tractors, sledges and crawler-mounted snowmobiles; over 13,500 miles were covered in the high-mountain regions.

The Fifth Expedition is being directed by Ye S. Korotkevich, who is in Antarctica for his second season. A change of personnel has been made at the interior stations. The group at Vostok is headed by V. Sidorov, who is spending his second winter at the South Magnetic Pole.

At the request of the Belgians the LI-2 aircraft based at Lazarev carried out an ice reconnaissance for the expedition ship "Erika Dan" in the vicinity of King Baudouin Station; for a long time this ship had been unable to make way through the ice to the base. The Belgians warmly greeted the Russian aviators when they landed at the Belgian station after the reconnaissance.

The aircraft belonging to the Queen Maud Land group made reconnaissance flights to seek out a passage-way through a broad 120 mile crevasse zone. Reconnaissance trips were also made by a tractor-sledge train made up of two tractors and two Penguin snowmobiles; these left Lazarev Station late in January. This route will be followed in the future by a large expedition moving in the direction of the Pole of Inaccessibility.

## CHANGING THE MAP

Soviet hydrographers claim to have discovered numerous discrepancies in the mapped position of shore features of the continent. They have discovered new gulfs, deep depressions, banks, islands and peninsulas. Numerous earlier "discovered" gulfs and glaciers have been removed from the

map. Thus the maps have usually shown a depression and large gulf to the west of Enderby Land. In the place of one gulf three new ones have been discovered and named "Alash-eyev," "Lena" and "Amundsen".

It has been established that the Ninis and Mertz Glaciers, which reach the sea, are now 50 and 27 miles shorter in length, respectively, than formerly charted.

The Scott Mountains do not extend along a parallel, as has been shown on earlier maps, but are aligned north-east—south-west. Mount Eidekholmen was "moved" 25 miles to the south and its elevation proved to be 5,820 feet not 6,700.

### INLAND JOURNEYS

Provision was made in the plans of the Fifth Expedition for a trek to Komsomolskaya Station, 540 miles inside the continent from Mirny. In February there were two men at Komsomolskaya conducting meteorological observations and providing supplies for aircraft on their flights into the depth of the continent.

A tractor-sledge train left for Komsomolskaya on February 26. It consisted of three of the heavy tow-trucks which had proved successful on previous occasions. The tow-trucks took three sledges and beams for a polar hut. The expedition was led by Krasnikov, head of the Transport Division. The sledge train made 25 miles on the first day. On March 3 it was reported that the train party had already covered 125 miles.

In order to keep the party supplied with necessary diesel fuel the aviation section organised drop points en route and had during the previous two days, carried out dropping along the route using LI-2 aircraft (transport planes).

The severity of meteorological conditions increased, the further the party penetrated inland. At Komsomolskaya Station the thermometer was standing at  $-50^{\circ}$  F. (82 degrees of frost).

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"Ob" and "Koopertzia" left Mirny for Russia on February 1.

### PETER I ISLAND

Peter the 1st Island ( $68^{\circ} 50' S.$ ,  $90^{\circ} 30' W.$ ) in the Bellingshausen Sea, west of Graham Land, is an historic spot, as it was the first land ever sighted south of the Antarctic Circle. This was in January, 1821, when it was discovered by the Russian circum-navigator Bellingshausen towards the end of his famous voyage.

Over a hundred years later, on February 1, 1929, the Norwegian ship "Norvegia" reached the island and Captain Nils Larsen with eight men landed on it for the first time. "Norvegia" was engaged in sounding, dredging and surveying about the island for a week and a small depot house was erected. Subsequent landings were made by Norwegians in 1948, by Chileans in 1956, and by Americans in 1948 and on February 28 this year.

The island, which has been under Norwegian sovereignty since 1931, is about 15 miles long and 6 miles wide. "It is completely covered with snow and ice, the bare rock showing only where it is too steep for snow to lie." ("Antarctic Pilot.")

### RUSSIAN LANDING

During the voyage of the "Ob" early this year the Russian vessel visited the island. Conditions proved favourable and on the evening of March 9 a landing was made.

At dawn the "Ob" made circumnavigation of the island while members of the ship's company under Prof. I. Maximov took soundings, photographed the coastline and carried out oceanographical and other research.

Significant errors in the existing charts of the island were discovered. It was found to be only two-thirds of the size shown on the map: ice shelves at the extremities may have been mistaken for parts of the land mass itself. The maps show one peak only but in fact there are three. The highest (Lars Christensen) is situated between the other two and rises to a height of 3,824 feet, while the remaining peaks lying to each side of it are almost 3,270 feet.

Giant glaciers move from the centre of the island coastwards. The

shores, precipitous and difficult of access, are from 300 to 600 feet in height and are overhung with great ice cornices. Approach is possible in only one place, Sandefjord Bay.

#### WEATHER STATIONS

Russian meteorologists report the setting up of three new temporary weather stations.

"Mir" on Drygalski Island (65° 43' S, 92° 42' E.) in the Davis Sea, about 45 miles off the Queen Mary Coast at Mirny.

"Deruzhba," on Zavadvovski Island a "glacial dome" (66° 43' S., 86° 24' E.) about 175 miles west of Mirny.

"Pobeda," on an ice-island (64° 40' S., 98° 56' E.) north of the Shackleton Shelf. The staff of this station were flown in and will stay about a month.

According to Australian press reports, Tass announced on May 11 that Russia had invited Australia to assist in the setting up of the station on Drygalski Island.

#### FLIGHTS

The aviation detachment of the Fifth Expedition under A. Pimenov, arrived in the Antarctic on January 11. Flights were made from both Mirny and Lazarev.

From Lazarev an aerial photographic survey of Queen Maud Land was made in a ski-equipped LI-2. Regular flights were also made in a ski-equipped AN2 to supply parties in the field. Pimenov in a LI-14 made a 1900 mile non-stop flight from Lazarev to Mirny at an altitude of 16,000 feet. Along the route, mountains not indicated on the map were found. The flight lasted 11 hours 30 minutes. The navigational conditions were unfavourable.

#### "I.G.Y. VALLEY"

The Russians announce that they have discovered, bordering the Soviet-skaya mountain plateau in East Antarctica, a valley which appears to be a continuation of the valley occupied further north near Olav Prydz Bay by the Lambert Glacier. The inland valley studied by the Soviet expedition is 800 miles long. It has been named I.G.Y. Valley.

#### WHALERS' MEETING

The 12th meeting of the International Whaling Commission, at which New Zealand is entitled to be represented, commences in London on June 24.

## THE SOUTH POLE

Readers will be interested in this extract from an article in a Russian magazine by Prof. B. Savelyev, describing the arrival of the Russian tractor-train at the U.S. South Pole station last December.

"It took the train 18 days along the route, 1280 km. in length, from the South Geomagnetic Pole to the Geographic South Pole, through places never visited by man. When we were approximately 920 km. from the American Scientific Amundsen-Scott station, which is operating at the pole, an aeroplane of the U.S. Antarctic expedition passed over us. Completing the route, the train stopped on December 26 at 2.43 o'clock (Moscow time) 25 km. from the South Pole, in order to conduct meteorological experiments. After a short stay we moved further. And at 10.26 o'clock we all saw straight ahead of us along the route the Amundsen-Scott station.

"Tractor 'Kharkovchanka 21', which was in the lead, stopped, to wait for the others, and to arrive at the Pole simultaneously.

"The last few kilometres . . . The skyward-pointing radio masts are already in sight and the dome tower erected for scientific observations. At 12.15 o'clock the train reached the Amundsen-Scott station.

"Greetings to the South Pole! We all are infinitely glad to have carried out our difficult task successfully. This is our New Year gift to our dear country.

"Two days passed at the South Pole. We have already carried out the first scientific investigations. American polar explorers met the members of the Soviet sledge-tractor expedition in a very friendly way. They acquainted us with the work of this U.S. Antarctic station which was organized at the end of 1956, with the help of aviation, in contributing to the International Geophysical Year. It was called after leading polar explorers—the Norwegian Roald Amundsen and Englishman Robert Scott, who were the first to reach the South Pole in 1911-1912."

# AUSTRALIANS COMPLETE AUTUMN TREK OF FIFTY-EIGHT DAYS

In our March issue (page 182) we mentioned the proposal to land three A.N.A.R.E. men with dogs and sledges in Amundsen Bay. They were to attempt the long journey of nearly 200 miles east across Enderby Land and to King Edward VIII Gulf.

The three men, Kirkby, Ruker and Bennet, were landed from the "Thala Dan" on February 23 on a rock shelf at the foot of the steeply rising ice-plateau near Proclamation Island in Enderby Land, 300 miles west of Mawson. They reached Mawson early in May after having completed a 59-day journey, in "excellent condition and high spirits."

The men had two dog teams, each of eight dogs, and a ton of supplies. At the outset of their journey they were struck by a severe blizzard which lashed them with wet snow and saturated their sleeping bags. During the first ten days they were able to advance only two and a half miles. The sledges sank so deeply in the soft, fresh snow that all three men had constantly to help the dogs to move. Both men and dogs were sinking up to twelve inches into the snow at every step. The wind at times reached 100 m.p.h.

The party carried out astronomical and trigonometrical surveys and studied the geology of the rock outcrops among the almost unknown Napier Mountains, on the ice plateau of northern Enderby and Kemp Lands. They climbed the steeply rising plateau, 5,500 feet high, in temperatures that fell to almost 60 degrees below freezing point.

In the first seven weeks the party had only five days of "good" weather. They took a month to reach the nearest of the Napier Mountains, 40 miles from the coast. The weather improved considerably during the last stages of the journey.

At the end of the trek the three men and 16 dogs descended the Seaton Glacier to the sea-ice in King Edward VIII Gulf, and were flown out by Beaver aircraft to Mawson.

## FROM THE STATIONS

News received from the Australian Antarctic Stations up to the middle of May showed that all of the parties at the three stations, Mawson, Davis, and Wilkes, were settling in for the winter. The month of April had brought lower temperatures and by the end of the month sea-ice was beginning to form although it was fairly certain at Mawson to blow out before the final freeze-up.

## MAWSON

Geysen reports all well at Mawson. The first taste of blizzard conditions came on February 25 with winds up to 74 knots, these causing some damage to newly erected buildings. Close attention was paid to the progress of the Enderby Land Party whose complete trip is outlined above. A second field party of Newton, Bloomfield, and Jennings made a successful round trip of 84 miles to Twintop to recover a caravan.

At 5 p.m. on March 18, Collins switched the base over to the new generators which had been installed well ahead of schedule. The former generator had become unreliable, resulting in many power failures and interruptions of radio skeds and scientific programming. By March 26 both wings had been fitted to the Dakota aircraft, but news received up to May 5 contains no word of it yet having taken to the air. The plateau ice airstrip called Rumdoodle, 12 miles from Mawson at the foot of the Casson Ranges is quite a little village in itself. Latest visitors to Rumdoodle were 18 scientists and the crew of a Russian plane which flew in on one of their last flights between Mirny and Lazarev on March 19 to stay overnight at Mawson. International relations in

Antarctica are reported as 100 per cent.

The big event of April was the arrival of the Enderby Land Party. During the stages of their airlift from Kloa Point several people from Mawson took the opportunity of spending a night or two at the final camp of the field party.

With temperatures steadily dropping as winter approaches, the highest winds recorded by the present party were gusts of 80 knots recorded during a blizzard which lasted from the 7th to the 9th of April.

#### DAVIS

The highest wind speed at Australian bases during the period of the present parties has been the 101 knots recorded at Davis early on the morning of April 13. This was almost double the wind speed of the highest wind during March of 56 knots. It is possible that the 101 knots may even have been exceeded as the Dines Anemograph was put out of action by heavy drift during the most severe period of the blow.

Davis has experienced very heavy snowfalls from late March onwards. As early as the end of March the buildings were covered completely. More serious was the finding after the highest blow that the engineers' workshop and the balloon filling hut were both filled to the ceiling with fine powder snow.

Douglas, Leader at Davis, reports that Barratt and Oldroyd successfully navigated Ellis Fiord in the motor boat during the last week of February. During March two trips were made to Club Lake for temperature readings and during April two more round trips of the Salt Water Lakes were made for the same purpose. During the second of these trips Suter found Lake Dingle to have a temperature of 26°F. with a thin covering of ice at its west end; the other three lakes being a little warmer and ice-free. By early May the sea-ice was already over three feet thick with a six-inch snow cover. This new sea-ice has trapped hundreds of bergs, giving great scope for photography.

#### SHIPS HOME

"Magga Dan" arrived back at Melbourne from Wilkes Station via Macquarie Island on March 11. "Thala Dan" from Mawson on March 19.

## WILKES STATION

Black reports from Wilkes that his party are all well and that the scientific programme is being vigorously pursued. A trip to the S2 satellite station 50 miles inland was made during March, and another during April. These trips of about four days each were made by weasel. When one weasel broke a track on the April journey the party was overtaken by darkness and blizzard and forced to camp out.

S2 station consists of a canvas hut, now completely submerged, plus 50 yards of tunnels and a glaciology pit 120 feet deep.

As at Davis, by the end of April, the sea had frozen over, holding fast many large bergs.

A possible site for a mile long airstrip has been located on 39 inch old bay ice between Mitchell and Bailey Islands.

A motor bicycle brought from Melbourne has been used to tow a man on skis 12 miles. This method of transport promises to greatly facilitate local operations. The balance of the rider is maintained by short skis on each foot.

#### BIRD WATCHING

During February and March, Giant and Grey Petrels were often noted with Snow and Wilson Petrels, seen as usual in the vicinity of Clark Island. Antarctic and Pintado Petrels were observed over the water. Weddell seals have been relatively common on floes. Study of the Adelie penguin continued with observations on the moulting one-year-old birds, and the study of the moulting adults. Weighing of adult birds and branding with new pre-shaped flipper bands has been achieved. Population counts in rookeries, and the studies of specific banded individuals have also progressed. By the end of March the moulting birds had departed for the pack ice.

The supply ship "Magga Dan" arrived on February 11 and departed on February 19. The 18-man 1960 party assumed responsibility for the station from the 17th.

# A JOURNEY ACROSS THE POLAR PLATEAU

The Story of the 1959-60 U.S.A.R.P. North Victoria  
Land Traverse

By A. J. HEINE

It was a dull grey day at Scott Base on October 16, 1959. Curious spectators, from the man who said he "worked in Parliament Buildings" (an M.P. I later discovered) to the eager beaver reporter, were gathered around our vehicles. Cameras clicked as we finally moved out through the pressure ridges on to the Ross Ice Shelf.

Until we reached the lower Skelton depot on the 27th travel was fairly routine, except for minor breakdowns, delivery by R4D of two more personnel, delivery by helicopter of the Rolligon\* and several other unscheduled visiting planes. The surface had been rough, and I was then rather concerned over the prospects of the N.Z. Snocat party. We spent a day surveying movement points across the lower Skelton glacier, and then set off up-valley. Brian Fitzgerald had sent us the Skelton map, together with liberal notes on it by Bob Miller and Trevor Hatherton. These helped us no end.

A mishap in a crevasse in the hard blue ice below Clinker Bluff, and bad weather preventing the re-supply of spare parts by helicopter, kept us in camp for four days. The two helicopters finally arrived during a 40-knot blow, and this, plus the drifting snow, proved too much for a scheduled recce. of the Twin Rocks area. We had one more Survey Station up valley from Mt. Tricorni, then we moved into the rough.

## TROUBLE

The weather was poor, with drifting snow, as we drove off into the crevasse area. Although the trail had been flagged by Cary's previous year's traverse we soon struck trouble.

As we were behind schedule in reaching the Plateau depot, our enthusiasm to proceed forward tended to obscure the need for caution in such an area. After driving "Detector" into its third crevasse I must confess that I, personally, was becoming a little nervous. There is nothing quite like the "crump" and that high speed "lift going down" feeling as the back pontoons break through, the front of the Cat sinks down to catch on the edge of the crevasse, while the sled drawbar holds the back of the vehicle from taking a dive into an icy grave. When "Messcat" fell into two holes while trying to extricate us, we decided to stop for the night.

## 'WARE CREVASSE!

The next day, clear and sunny, our crevasse detector decided to work, and we slowly approached Twin Rocks. As we neared the edge of the basin below the rocks themselves, the detector buzzer rang loudly and we stopped immediately. Beneath the pontoons lay a very large crevasse, easily sufficient for the vehicle and the sled. We blasted out the bridge and checked the direction of the crack. About this time, two helicopters arrived to take some of the party on a reconnaissance up the trail. The hidden crevasses were fairly easily discernible from the air, and a good route was flagged, by a man leaning out of the helicopter and driving the bamboo into the snow. That evening, we were past the worst and heading across the Landing to the Upper Staircase. This area was interesting to me, as I had looked down on it from Mt. Harmsworth during the 1956-57 summer, and I knew of the previous New Zealanders' journeys up and down these snowfields.

## "PLATEAU DEPOT"

We arrived at the Skelton Plateau Depot early on the morning of No-

\*A rolligon is a huge rubber-tyre-like fuel container which is towed behind a Sno-cat.

ember 8. Strong winds and drifting snow made conditions unpleasant as sleds were loaded with food, fuel and explosives, previously brought in by R5D ski planes. Hillary's metal-framed cache was still visible, its base being about three feet above the snow surface. Plateau Depot is quite an historic location, as supplies have been left by many parties, Hillary's dog and tractor teams, Fuchs' Snocats, as well as Crarys' Snocat party. Surprisingly enough, drift has been small; we found that the snowfall since Crary's visit during the previous summer had been quite light, in the order of 20 cms. or so. In places we could see the Snocat track marks left by his vehicles. Two R4D's came in next day, bringing bulk fuel for the Rolligon. Admiral Tyree and Dr. Jones, the head of the U.S.A.R.P. organization, came in to speed us on our way. The frost-encrusted smoky-walled Messcat may have seemed a little out of place for a "Chiefs of Staff" conference but, as the Admiral said, "We're all in this together."

We followed Crary's route, due west out from Plateau depot for 65 miles, before beginning our own route to the north-west. The programme was to traverse in this direction until we reached the southern marker of a previous French traverse out from D'Urville and Charcot. This point, at 71°07' S. and 139°11' E. is 127 miles from Charcot and 325 miles from D'Urville and the coast.

#### A DAY AT THE PLATEAU

There were three Snocats, "Detector" "Seismo" and "Messcat", and the party of nine was spread among the three vehicles. "Detector," in which I lived, left first in the morning, usually around 9 a.m., and then travelled for an hour or about three to four miles. Altimeters and vertical magnetometers in both "Detector" and "Seismo", were then read simultaneously, while the gravimeter (in "Seismo") was also read. We would then move forward together, and when "Seismo" (and "Messcat") reached the flagged first stop of "Detector" a call on the radio would be made, and instruments would be read again. "Seismo would pull up the flag left by "Detector" while "Detector" left a new one behind at the second stop. In

this way, corrections could be made to the simultaneous altimetry readings, to produce a reasonably accurate cross-country profile.

Each man took his spell at driving between stations. It is very easy to drive a Snocat, but not quite so easy to drive one well, at least over rough country—this seems to come with long practice. As we were traversing exceedingly rough sastrugi over the majority of the journeys, the passengers easily found fault with the drivers—whether with just cause is, of course, a matter for argument. As the driver is well braced in his seat, it is easy to him to forget about the passengers—until one of them comes hurtling down the vehicle in free flight. We usually stopped around 6 p.m. and "Seismo" and "Messcat" came up an hour later. There was an 8 p.m. radio schedule with McMurdo each night, as well as weekly contact with Scott Base. Usually, the days did not pass quite so simply—at least one vehicle or sled generally had a breakdown every travelling day; sometimes serious, sometimes only the persistent problem of ice blocking the petrol lines.

#### BAD NEWS

November 18 began in the usual way; then, about 11.30 a.m. we heard another operator on our radio. Incidentally, we used the N.Z. field frequency when communicating between Snocats—this was a carry-over from the autumn and spring journeys out from Scott Base, when we had direct radio contact with Peter Phillips there. We had often heard the N.Z. field parties and in so doing, picked up the odd scrap of news. Usually we switched on the radio soon after leaving in the morning, but this day had not done so until we were near the first stop of the morning. To obtain a clearer reception we switched off the motor and then found that Peter Hunt was in serious trouble.

Learning brief details of the accident, we called up Franz in "Seismo" (he was our official radio-operator), who in turn, called McMurdo on their emergency frequency. After several minutes, we heard Peter Yeates call to Peter Hunt and consequently the full drama unfolded. Only then did we realize our luck in the mis-haps



—Photo A. J. Heine

“Detector” crossing typical rough sastrugi during the Victoria Land Traverse.

below Twin Rocks. As we were using a five watt transmitter-receiver with whip aerial, and that day about 250 miles from Scott Base and 280 miles from Cape Selborne, the scene of the accident, it was fortunate that radio conditions were favourable. Some time later, we were not able to communicate between the two Cats, 12 miles apart, and had to relay messages through Scott Base, some 300 miles away.

#### ‘COPTER TO THE RESCUE

Our geologist, Al Taylor, became sick towards the end of November, and on November 25 a helicopter (the surface was too rough for a ski plane landing) flew out to pick him up. This was quite a remarkable feat: 200 miles were made across the Plateau at between 8000 and 9000 feet, and then an uneventful return along the same route.

Our fuel consumption up to this stage had been very high—something like .6 miles to one U.S. gallon. Finer carburettor jets were later air-dropped to us, and our consumption became something like .8 to 1 mile per U.S. gallon. The sleds and

vehicles suffered a great deal from the rough surface and the sleds finally, quite literally, fell apart. In all we had 45 stops to replace broken parts on the Snocats, as well as many other stops to repair the sleds and clear frozen fuel lines. As neither of the vehicles nor sleds were designed for such atrocious conditions, it is amazing they lasted as long as they did, although I think it was a race between the mechanical and human machinery, as to which would first fall apart.

We had two air drops of fuel to retrieve. They had been made by Globemasters out from McMurdo early in November and had been marked by a ten mile line of flags, half a mile apart (the bamboos were weighted and then thrown out of the plane) across our projected path, with the actual drop in the centre of the line. The idea was a good one, except that the numbered flags were not thrown out in consecutive order—a little confusion resulted. However, on December 2 we sighted the flags, and then the drums, which were at 74°34' S. and 144°30' E., 365 miles from Plateau Depot.

Our next depot was reached on December 21, 71°29' S. 139°53' E., 239 miles from the previous one, and 30 miles short of the French terminal point. We had left the first air-drop with sufficient fuel that in the event of not finding the second depot we would be able to travel out to the coast at D'Urville, or return to the Skelton Plateau Depot. As it happened we found it all right, and then went on to the French terminal.

### FRENCH FLAG

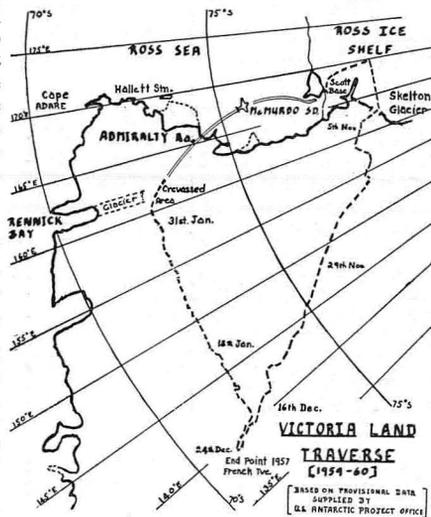
It was a great thrill to find the pipe driven into the snow and surmounted by a tattered French flag. We had by this time travelled 950 miles from Scott Base, and reached the apex of the traverse. It was here, too, that we received an air-drop of mail, spare parts and "goodies" for Christmas. Listening in to the Christmas broadcast to Scott Base we were happy to receive good wishes from fellow New Zealanders.

The second leg of the traverse was made almost due east along the 72nd parallel. To avoid crevasses reported by the Christmas mail plane, we travelled back along our old route for some 70 miles before turning off at 72°02' S., 140°36' E. Travelling in a north-west direction, on our outward leg we more or less ran with the sastrugi, although still very rough — now we were crossing the ridges at right angles. We estimated that our vehicle would break down completely in a very short time, but surprisingly enough the wrecked one, "Detector," which had started to disintegrate 160 miles back along the trail, held together for quite some time. We were finally forced to abandon it at 72°07' S., 148°12' E., 170 miles from the turnout.

By this time I think we were all getting rather tired of the Plateau with its wind and cold. We had been out 90 days and I could well imagine Scott and his men, hauling across to the Pole and finding that they had been beaten to it. While for some of us the Antarctic has an irresistible fascination, the Plateau is, as ever, one of the most desolate, God-forsaken places on the face of the earth.

### ON TO THE EAST

After abandoning "Detector" Al Stuart and I slept in small tents for



the rest of the journey. We slowly travelled to the east, maintaining our major seismic and glaciological stations every 50 miles, but still plagued by mechanical breakdowns and frozen fuel lines. The temperature on the traverse ranged from -50° C. in the spring, to sometimes near +10° C. at midday towards the end of January.

By January 25, the surface had improved a little, and then on the morning of the 30th, at 70°20' S., 158°12' E. we saw the mountain—the first mountain since November 13, 1000 miles and 78 days back along the trail. We realized that the end of the traverse was now much closer, and were able to take a fresh grip at our problems. The surface had improved a great deal, and travelling was almost a pleasure. Our last Plateau station was made on January 30, and then, after 84 days on the Plateau, between 7,500 and 8,500 feet, we began the descent into the Rennick Glacier. Bad weather called a halt for several days before we were able to reach our first nunatak, which we called Welcome Mountain. Some of us went across and secured a good amount of geological specimens.

# Measuring the Antarctic Ice Sheet

Two eminent Soviet scientists, Yu. N. Model and A. V. Nudelman, report the following achievements in measuring the thickness of the Antarctic ice-sheet and exploring the sub-glacial topography of Antarctica.

At Pionerskaya (69° 44' S., 95° 30' E.), 230 miles from Mirny, the thickness of the ice is 6,700 feet. The thickest ice (13,270 feet) was recorded over sharp depressions in the sub-glacial topography, 313 miles from Mirny.

In the middle part of the traverse, in a sector about 300 miles long, the thickness of the ice cover varies between 8,000 and 11,000 feet. At Vostok (72° 08' S., 96° 35' E.) and Komsomolskaya (74° 05' S., 97° 29' E.), situated in this sector, the thickness of the ice is 9,480 feet and 10,980 feet respectively.

We then roared down to the main glacier, travelling 42 miles that last day, and descending some 2000 feet. The poor weather kept with us but fortunately cleared to enable an R4D to pick us up on February 10, 118 days out from Scott Base.

## JOURNEY'S END

Most of the scientific equipment was brought out, but the vehicles were left behind for future trail parties. We flew out to the coast, marked on most maps as Rennick Bay, photographing on either side of the valley. The Rennick Glacier is a very large one, perhaps 150 to 200 miles in length, and 20 to 30 miles wide in many parts. It has several large branches running to the south-east, and these probably have a common neve with the Tucker Glacier. There was some cloud towards the Tucker as we flew south, and I was unable to identify any of the peaks I had seen during the 1957-58 expedition in that area.

We landed on the ski strip out from Scott Base and soon ferried across, by helicopter to McMurdo. Although the Rennick Glacier with its tremendous opportunities for further joint exploration by U.S. and N.Z. parties had re-kindled the interests of some of us, we were all very glad to be back in the "warm" and cheerful atmosphere of McMurdo.

In the central regions, in the second half of the traverse to the Pole of Relative Inaccessibility, the ice thickness decreases as it passes over a complex mountainous country. It varies in wide limits, in a range exceeding 6,500 feet.

At Sovetskaya Station (78° 24' S., 87° 35' E.), the ice thickness is 5,980 feet, while at the Pole of Inaccessibility Station (82° 06' S., 54° 58' E.) it is 9,640 feet. A minimum ice thickness of 2,450 feet was recorded 80 miles to the south-west of Sovietskaya Station.

Soviet researchers have also conducted seismic sounding and gravimetric measurements of the ice thickness at Vostok (78° 27' S., 106° 52' E.) in the region of the South Geomagnetic Pole. The ice thickness there is 5,280 feet—one mile.

## SUB-GLACIAL PROFILE

A profile from Mirny inland shows that for a distance of 124 miles from the shore the ice rests on land that is close to sea level. Further inland the glacier lies on a plateau situated 1,600 to 2,300 feet above sea level. At Pionerskaya Station the terrain beneath the ice rises to an elevation of 2,120 feet above sea level.

Between Komsomolskaya and Sovetskaya the sub-glacial terrain rises to 7,500 feet above sea level and its relief is highly dissected. At Sovetskaya the elevation of the sub-glacial terrain is 5,690 feet above sea level.

Seismic sounding of the ice cover between Komsomolskaya Station and the Pole of Inaccessibility Station between 72° and 92° E. has revealed a mountainous country rising up to 10,000 feet above sea level. In the central part there is a depression beneath the ice which is up to 62 miles wide and whose floor is more than 3,270 feet below the peaks of the higher land surrounding it.

# CAPE ROYDS TOURIST RESORT OF ANTARCTICA

By E. C. YOUNG

Cape Royds is essentially a tourist resort. Its popularity is dependent on two quite unrelated phenomena; the Adelle penguin rookery, famous because it is the most southerly of all rookeries, lies within a stone's throw of the second feature, Shackleton's (1907-1909) hut. All this is now only twenty minutes by helicopter from McMurdo.

Rowland Taylor and myself, deposited here by a sympathetic superintendent to study the skuas and penguins, assumed also the office of caretaker on this site, an occupation not mentioned in our original contract but a difficult one to avoid. This task was simple enough. Helicopter pilots bringing visitors would stress the importance of international co-operation, how to avoid incident and how not to annoy the natives (us). If success is any criterion they obviously took a great pleasure in this business.

For the purpose of this description it is perhaps best to assume you are one of the many visitors, preferably an important one, for then we shall accompany you about the Cape pointing out items of particular interest, that is, items of interest to us anyway.

For most of the summer the helicopter, or chopper, lands behind the hut at the "New Heliport". Its fine yellow marking ring entices these necessary nuisances away from Home Lake and away from the penguins.

## VISITORS

We have been listening to the mounting clackety-clack of your chopper for some time, wondering if mail and fresh bread are aboard, also the paint requested from Scott Base some time ago and which has so far failed to materialise. With a final roar the chopper passes over the hut, swings in a tight circle and thunders on to the heliport. The motor dies, leaving an unusual silence. Soon the muted sound of voices and boot scrapings warn us to bolt the last of our food,

tidy the table, and be ready to exchange cheerful civilities, a difficult job on some days.

All visitors come directly to the hut, show surprise at finding us so obviously established within and enter somewhat diffidently. Our assurance of caretaker status breaks down an uncomfortable reserve and leaves them free to potter and poke around without too much embarrassment.

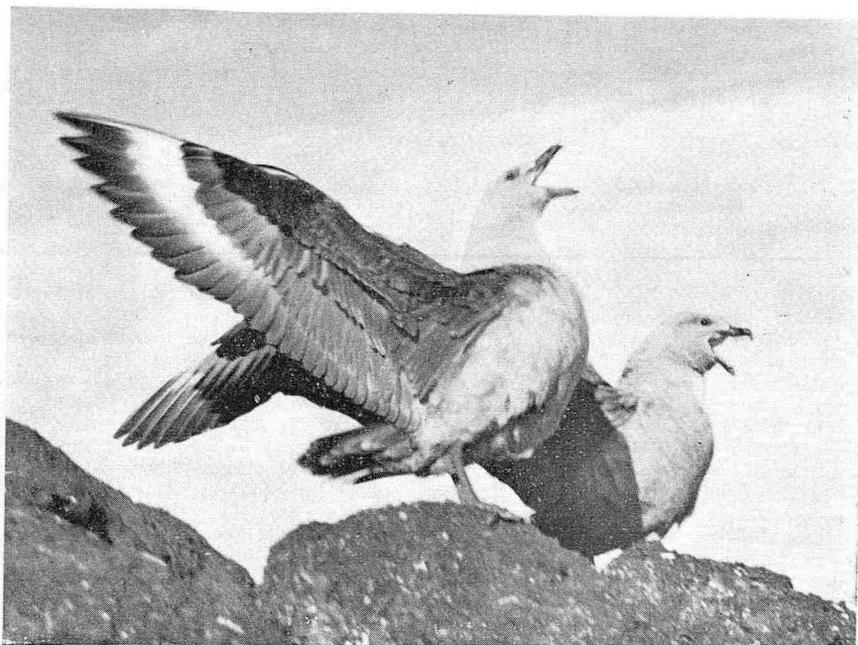
American Antarctic clothing is a fair disguise so that it is not until introductions have been made—generally by shaking hands and saying "I'm so and so"—that we establish which of the group are New Zealanders and sort out a personal hierarchy.

Stumping about inside the hut you will probably notice the cold a little yet returning to it after a time spent being buffeted by a fierce wind its shelter easily compensates for the absence of heating. Shackleton's stove takes up much of the eastern end, an enormous affair and quite capable of devouring the masses of coal suggested in fable—as much in a winter as used by the relieving vessels. It was lit once this summer but volumes of scrap-wood roaring in the fire box for a long period served only to warm the ironwork. Even scrap-wood was too valuable to waste on a second experiment.

Along the walls you can peer myopically at the neatly stacked rows of tins, threading your way between the heaps of boxes and gear, distinguishing ours by its brighter labels and American bias. "Shack" lived remarkably well; the meats in particular being of great variety. Photographs of a King and Queen face you from the south wall. Americans seem to have little trouble in recognising Edward VII and Alexandra.

## HOLY OF HOLIES

Sooner or later you notice that something is missing, leading to the question "Where do you sleep?" This is a subject we avoid if possible for it means a torch trip into "the holy



Challenge Display of a Skua Pair at Cape Royds.

of holies'—our bedroom and Shackleton's. The single remaining partition (apart from that about the dark-room) of all those that once divided this barn into a cosy warren surrounds Shackleton's room. Now canvas-lined and containing two beds, it is ours for the summer. You can't see much in the feeble light of our torch and come out quickly—dissatisfied. At night with both primus and Tilly lamp running it is as comfortable as ever.

Standing at the door of the hut it takes but a moment to become familiar with the general situation of the Cape. Sheltered from the south-easterly wind by a large moraine slope, the hut faces out over Home Lake (sometimes called Pony Lake for it was here that Shackleton's ponies were exercised during the winter), the rookery and beyond this to the sound, frozen over now, and to the Royal Society Range some fifty miles away on the other shore. On the other sides the hut is surrounded by moraine heaps rising steadily to Erebus in the east but continuing into mono-

tony towards the north. Back-door Bay cuts in closely to the south of the hut. A few patches of snow linger on throughout the summer, a good feature, for as they disappear more and more of the rubbish of earlier parties is uncovered. Old sledge parts, a stove, rusty iron pieces, bottles and tins form several heaps in front of the hut. You can't see Erebus from the hut entrance but as we wander off towards the rookery—led by some of the party already bored with too much history (and not sure exactly who Shackleton was anyway) we stop for a moment for you to photograph her—a favourite shot with the hut in the foreground. Erebus is a fine heap, yet because of its gradual slopes and its distance from here, a bit disappointing, and certainly not looking at all as large as a thirteen thousand footer should.

#### 'WARE SKUAS

Question and answer fly rapidly as we skirt the Lake and approach the penguins. You will already have noticed the skuas. Probably the first you met appeared as soon as the

helicopter landed; one of a pair nesting beside the Heliport and soon to lose its life attempting to fly between the rotor blades. As they fly about it's better to ignore them; arm-waving and shouting make no impression and always appears a little foolish to a spectator. They fly over, swooping at you as you pass through their territory but seldom bother at this stage, to attack severely. You have probably been brought up on the descriptions familiar to all, the "callous, greedy, vulturous and disgusting" of Murray, biologist in Shackleton's party. Nothing I say after your first encounter with them will change your views.

#### MEET THE ADELIES

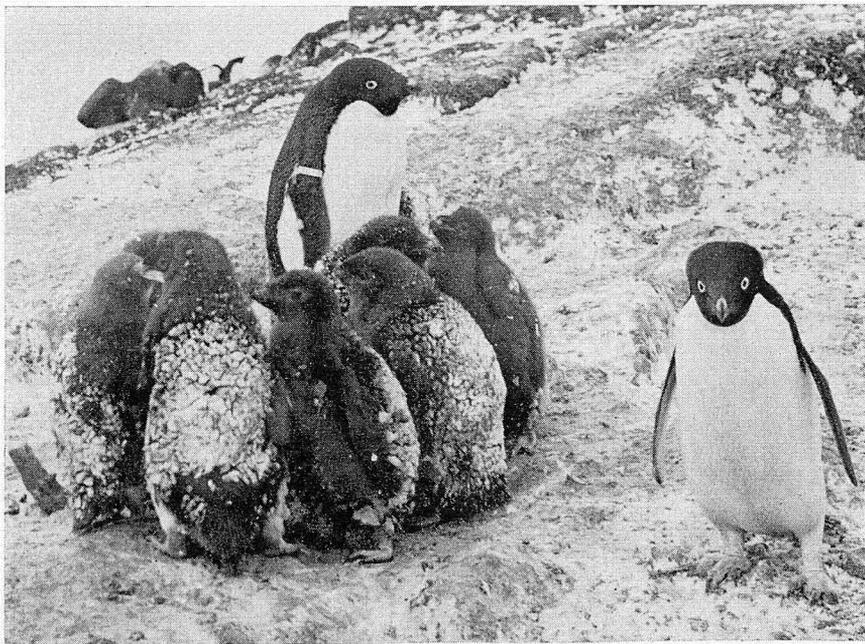
In contrast penguins have always been infinitely attractive and appealing. Popular writers drool ecstatically after a meeting of a few minutes. When you have handled a few dozen, receiving pecks and flipper blows, and watched them for a time snapping and growling at each other, you may like to add to these earlier descriptions. Rowly has been working busily with this group since they first started coming ashore in mid-October.

He takes you in hand, explaining the points you notice and demonstrating as much as he can—or thinks you can understand—without disturbing them over much.

His work is concerned largely with recording in minute detail the changes taking place at each of the many labelled nests dotted about the rookery. These have been selected for various reasons and from them as the season advances and the stages of pairing, nest-building (a misnomer, for the gathering of a "comfortable" pile of stones), egg laying, incubation and chick rearing progress, pages are filled and graphs plotted of nesting, success, fasting conditions, incubation periods and chick weight and mortality. This rookery is minute as rookeries go and the 1300 pairs may be easily counted and a record kept of the fluctuations in number throughout the summer.

#### EXPERIENCED MODELS

Being a reasonably pleasant morning you can take your gloves off and hold your camera quite painlessly, shooting off Kodachrome or alterna-



—Photos E. C. Young

After a Storm—Snow-plastered Adelie Penguin chicks gathered in a small creche,

tively posing for that shot "Me with penguins, Cape Royds, December 15, 1959". Even the most enthusiastic photographer loses interest as he runs out of film so for a moment we watch the efforts of another visitor photographing from hands and knees a bird incubating on a nest built in an old, partly-filled box. You don't have to worry about the camera thrust into the face, upsetting the penguins; they pose now by instinct, so long has been their association with photographers.

Most visitors want photos, not facts, of the penguins, so Rowly doesn't push "life histories" too far. However, the pilots, visiting frequently, have a fund of knowledge which they dispense cheerfully and enthusiastically; the little inaccuracies going unheeded by all—either through ignorance or through tolerance.

#### MEET THE SKUA

At my insistence you reluctantly leave the penguins and follow me to where the skuas are nesting. Skuas appear singularly unattractive to most visitors. Lacking the colour and apparently comical behaviour of penguins they are seldom photographed. In addition, good skua photographs are difficult to obtain. Most must be taken from some distance and here the birds tend to merge into the background.

After the first swoops of the disturbed bird have passed without touching, you seem to have your nervousness fairly well in hand and appear to be listening with some attention to my defence of them. For to me they are a particularly wonderful bird in which I can find no excuse for the persecutions they have often suffered.

For skuas are my reason for being in this place. The skuaries dotted along the coast at Coast Lake, Green Lake and Cape Barne, besides this one at Cape Royds, are toured daily. The birds in each are recognised and their activity during the summer—or of as much of the summer as I am allowed—recorded. A great deal of spade work is needed to fathom the reasons for the fantastic egg-chick mortality (75% compared with about 40% in penguins), to allow the recognition of behaviour patterns in feeding and defence and to determine the

details of pairing and territory. This job is to keep me busy until the party is withdrawn in late February.

#### FOR THE DEFENCE

They contrast greatly with the poor land-water confined penguins and are in every respect the "eagles" of this region. At all points where the two birds come into contact the penguin, with its stupidity and tightly-laced instinctive behaviour, fares badly by comparison. Most eggs taken from the rookery have already been abandoned—in many cases through the upsets and bickering of the nesting birds. A particularly narrow view of penguin usefulness would consider them simply as skua—and man—forage. All of which, of course, won't change your opinion of penguins.

A few of the skuas nest beside the rookery, picking up abandoned eggs, filching the odd chick and generally watching over the penguins with an intense personal interest. Further away from the rookery the other nesting pairs have no part of these delicacies and spend the entire summer foraging in the sea about the Cape or flying strongly to areas as distant as McMurdo and Cape Bird. These birds scoop fish from the surface, swallow them entire, head first, before returning to the Cape. At this time of the year you may be lucky enough to observe the feeding behaviour, for although male and female birds share egg incubation all foraging is done by the male. On return to the nest area some of the food taken is disgorged onto the ground in front of the female. The eggs hatch after 28-30 days, that is, about the New Year. From this time feeding is modified and both birds of the pair now take turns in fishing and chick guarding.

#### TIME TO RETIRE

Before we get very far in this discussion the helicopter motor roars into life and although I assure you this is simply to prevent it from becoming too cold you become nervous as you watch the others leaving the penguins. Much of what I say as we trudge across the loose grit back to the hut falls on deaf ears.

Finally, after a breathless ascent of the hill we reach the chopper; you shake hands in an absent-minded

# Plans for F.I.D.S. Reliefs Hampered By Ice and Weather

The unusual ice conditions which have interfered with so much Antarctic activity this year, caused changes in the proposed relief operations in the United Kingdom's Falkland Islands Dependencies.

As reported in the March issue of "Antarctic", the charter ship "Kista Dan" was beset for 13 days at the entrance to Marguerite Bay while attempting to relieve Base Y (Horse-shoe Island) and to re-open Base E (Stonington Island). With assistance from the American icebreaker U.S.S. "Glacier" she was eventually able to reach open water on March 8 and proceed north to the Argentine Islands where she was joined by the "John Biscoe."

## RELIEF BY AIR

During this time flying was severely restricted by bad weather and by the lack of open water or smooth sea ice from which the Beaver or Otter

manner, duck instinctively beneath the turning rotor and are helped through the door and stumble awkwardly into a space on the seat bench. The crew-man clammers aboard, slamming the door after him. We shelter, backs turned to the flying gravel, as the motor thunders, lifting the chopper heavily and unevenly from the ground.

Sitting in the cabin, the safety belt tight across your middle and the "Flash-Gordon" helmet pressing against your forehead, you wonder not about us, returning slowly down the hill to the hut to relight the flaring primus for coffee from snow-melted water, nor about the penguins even yet disturbed from the chopper's passage above them, nor even of the skua, maligned above all other animals. You worry instead of the sickening lurch of the cabin as you hit a sudden gust, of your camera, with its precious film, locked between yourself and the next body, of the cold at the moment, and of the remaining days here of warmth and beverage until the flight back to New Zealand.

could take off. As it was decided that no further attempts would be made to get the ships into Marguerite Bay, priority was given to finding a site suitable as a run-way so that Base Y could be relieved by air. Various sites were reconnoitred and found to be unsuitable, but the aircraft was eventually able to take off from the sea ice five miles south of the Argentine Islands. Six men were flown out on March 19 and three flown in. A fourth man was flown in a week later when the ferrying of stores had been completed. The four-man party which consists of a surveyor, a geologist, a medical officer and a radio operator (two of whom have already spent one year in the Antarctic) will later sledge south to occupy Base E.

The ice conditions in Marguerite Bay also prevented the establishment of a new base (T) on Adelaide Island. Therefore when the "Kista Dan" returned to the Argentine Islands the old Base F hut on Winter Island was temporarily re-opened. Six men and stores have been left there and it is hoped that the "Beaver" and "Otter" aircraft which are being wintered at Deception Island will be flown south early in the spring, and take the six men and 36 dogs to Adelaide Island for four months' summer work.

## OTHER SHIPS

Before joining the "Kista Dan" the "Biscoe" visited Admiralty Bay, Hope Bay, View Point and Deception Island and a landing was made on Trinity Island on March 4. The ship then proceeded to the Argentine Islands, carrying out gravity measurements on the way, and finally made a rendezvous with "Kista Dan" on March 10. The "Shackleton," after completing one southern voyage, returned to South Georgia on January 2 and continued the sea-borne magnetometer survey both at South Georgia

and later at Hope Bay. She also visited the South Orkneys and South Shetlands before returning to the Falklands at the beginning of February.

Men from Halley Bay who had trans-shipped from the "Biscoe" at South Georgia, were then taken to Cape Town and the "Shackleton" was handed over to her charterers, the South African Government, on March 28. She sailed for Marion Island the next day and relieved the meteorological station there six days later. She then visited Tristan da Cunha and Gough Island before finally returning to Cape Town at the end of March. The "Shackleton" arrived back at Southampton on April 27, and the "Kista Dan" on May 16.

H.M.S. "Protector" also visited several bases, besides using her helicopters to assist with the tellurometer survey of the Trinity Peninsula area.

#### BUILDING ACTIVITIES

At Port Lockroy, the ionospheric station, new equipment for the investigation of whistlers has been installed. A new ionospheric hut has been completed at Halley Bay, and an extension added to the balloon hut and magnetic hut. A new tide-gauge hut has been built at the Argentine Islands.

#### FIELD WORK

Journeys have been carried out from four of the bases.

At Hope Bay parties were out continuously between mid-December and the end of March, working on Depot Glacier and Trinity Peninsula. Two men also continued the magnetometer survey of Tabarin Peninsula, south of Hope Bay, and several parties visited the View Point Hut.

Biological specimens were collected at Petermann and Hovgaard Islands by a party from the Argentine Islands (Base F), and at Signy Island by a party from Base H. Bird-ringing has been continued at Signy, 100 sheathbills and twelve hundred young giant petrels being ringed in March.

Parties from Base G, King George Island, have worked in the north of Admiralty Bay and also on the southwest of the island, in spite of gale-force winds which lasted throughout almost the whole of March.

## JAPANESE PLANS

The Japanese expedition ship m.s. "Soya" returned to Tokyo on April 23 (Soya is the name of the strait between Hokkaido and Sakhalin). The members of the 1959 wintering party at Showa Base led by Mr. M. Murayama had returned by air from Cape-town on March 19.

The future of Japanese Antarctic exploration is uncertain: but after considerable discussion it was decided by the Japanese Science Council on April 20 to occupy the Base for two more years. This decision had not, by mid-May been formally confirmed by the Government.

Meanwhile the Antarctic Special Committee is preparing for future work. Emphasis will probably be laid on upper atmospheric physics and on glaciology in addition to routine meteorological observations.

An Antarctic Symposium is to be held at Tokyo from May 30 to June 3. Over a hundred scientific papers will be read and a special issue of the Japanese "Antarctic Record" will be published before the end of the year.

#### URANIUM?

According to newspaper reports a Japanese scientist said in Singapore on April 5 that under the ice of the Antarctic lay large quantities of uranium. He is Prof. T. Tatsumi (43) returning home in the Japanese Antarctic expedition ship "Soya Maru". Prof. Tatsumi said in an interview:

"In the very near future the world will look to the vast white wilderness of the Antarctic for its sources of atomic energy to boost its expanding industry and food products.

"We have discovered that under the stretches of thick ice lies an abundance of uranium. In the near future we may have to get our supply of uranium from there.

"I am sure that there are many other valuable minerals embedded under the miles and miles of thick ice," he said.

The professor said that he was confident that mining operations for the rich mineral resources would sooner or later begin in the Antarctic.

# COMPLETION OF LONG FIELD JOURNEY FROM BELGIAN BASE

The new Belgian team of twenty men, under Major G. Derom, at Base Roi Baudouin, have kept up field work until an unusually late period in the year.

Derom reported on May 12 that April weather at the Base had been similar to that experienced in March: the mean wind velocity was 54 k.p.h. and the maximum 130 km. p.h.; the mean temperature was  $-17^{\circ}$  and the minimum was  $-27^{\circ}$ . The days were at last, however, rapidly shortening: only five hours of daylight at that time.

## LONG JOURNEY ENDED

On May 1 Derom, Blaiklock, Van Autenboer and Berckmans returned by dog sledge to the Base. Except for two very violent blizzards early in April, the weather conditions in the mountain area had been far more favourable than at the Base. Temperatures were lower, but the winds generally weak and the sky clear. The lowest temperature experienced was during the night of April 20-21, about  $-50^{\circ}$ . The party had over 20 days in April suitable for sledging and outside work in the Sor Rondane Mountains, Topography, geology, glaciology and nuclear radiation studies were carried out.

Ken Blaiklock (who was with Fuchs' advance party) and van Autenboer had left Roi Baudouin on October 22, 1959. They had therefore been in the field for over six months. During this time Blaiklock had covered more than 1550 miles by sledge, making topographical observations — a distance equal to that between London and Moscow. He is now experiencing his eighth Antarctic winter.

## WORK AT BASE

At Roi Baudouin Base work meanwhile was vigorously pushed on under deputy-leader Verheye. The Otter plane was readied for its wintering while the little Cessna waited its turn to go on to the stocks.

The station is now entering on a period less favourable for radio com-

munications between Belgium and the Antarctic. Splendid auroras are now being observed. The meteorological section broke its March record on April 7 by its success in inflating and releasing radio-sonde balloons in winds of 112 k.p.h.

The glaciological pits begun by the 1959 expedition are now 26 metres below the snow level.

Some 40 dogs are quartered in the vicinity of the base. They will by now be housed in a large shelter constructed under the snow near the new building. The reserves of food for the months of darkness have been brought to the base itself from the depots. Derom reports that the quality of the meals remains first class. The ice cream brought from Belgium is the highlight of the Sunday deserts. Surprise presents and special menus are provided on the occasion of birthdays and anniversaries.

All the wintering party are in good health and spirits.

## AIR PHOTOGRAPHY

The ambitious summer photogrammetric programme was almost completely successful. Using two aircraft, a de Havilland Otter for photographic flights and a Cessna 180 for general purposes, the air section under Prince A. de Ligne carried out an extensive series of flights (1) along the coast between  $12^{\circ}$  E. and  $34^{\circ}$  E. (approximately 435 miles) and (2) covering the region of the Belgica Mountains ( $72^{\circ} 30' S. 31^{\circ} E.$ ) with, in each case, the establishment of adequate ground control. The base area was also covered in order to facilitate the preparation of a 1:25,000 map. The only part of the arranged programme not carried out was reconnaissance of the area east of the Belgica Mountains and south of the Sor Rondane Mountains. The necessary additional fuel tanks could not be installed in time.

## SANAE SETTLES IN

"SANAE" is an abbreviation for South African National Antarctic Expedition. The site and buildings occupied are those of the former Norway Station.

(For a note on the voyage of the "Polarbjorn," carrying the South African National Antarctic Expedition as far as Bouvet Island, see page 242.)

After leaving Bouvet Island the "Polarbjorn" was stuck in the pack ice for two or three weeks. On New Year's Eve, quite unexpectedly, the Argentine icebreaker "General San Martin" was sighted to the northeast, and sent her helicopter over the South African vessel. Later, the icebreaker herself came alongside and then broke the heavy ice ahead while "Polarbjorn" followed in her wake for some 180 miles before proceeding alone to the former "Norway" station.

### WORK ASHORE

After the departure of the "Polarbjorn" from Antarctica on January 15 it took the ten expedition members five weeks to transport all the provisions and equipment from the dump near the coast to the base which is situated on shelf ice, 25 miles from the coast. The scientific programmes necessarily suffered during this period and the installation of new instruments was delayed. During March matters improved and the full meteorological, magnetic and glaciological programmes gradually came under way. Recording anemometers and thermometers were installed at various levels on the 30 metres high

A fully equipped photographic laboratory was set up on the "Erika Dan". Photographs taken during the day were developed, printed and assembled during the night and the next day's programme settled accordingly.

The Otter clocked 98 hours flying of which 47 were on photographic missions, while the Cessna flew 47 hours on varied tasks and 1300 vertical photographs were taken, 500 oblique and 200 infra red, and a Gevacolor film was also used.

tower erected by the Norwegians. Electrical thermometers for recording snow temperatures down to 2 metres were also installed. A ceilometer was successfully used to measure cloud heights. The magnetic programme carried out by the Norwegian teams is being continued. The first auroral display occurred on March 15 and since then auroral photography with the all-sky camera has become routine.

The area marked by the Norwegians for observing ice movements has been extended to 140 square kilometres.

### AUTUMN WEATHER

Severe storms with gusts up to 94 knots raged on March 19 and 20 and again on March 30 and 31. Visibility was reduced to a few feet but no outside observations were missed and the storms did no material damage. The March mean temperature was  $-16^{\circ}$  C. and the mean wind speed 16 knots.

With dropping temperatures and decreasing light during April, outside activities were reduced to a minimum. Work started on the excavation of a 40 yard tunnel to be lined with oil drums and tarpaulin for sheltering the 13 huskies during the winter. These animals will have several tons of seal meat, gathered by the "Polarbjorn" on the southbound voyage, to exercise their jaws during the long months in captivity.

The erection of a rhombic aerial for the reception of meteorological broadcasts from South America was completed in the beginning of May and the results so far are encouraging. This would perhaps solve a long standing problem in South Africa where direct interception of South American broadcasts has been a failure so far. The regular reception of South American data in South Africa would make it possible to draw more reliable weather maps for the western Atlantic Ocean, thereby improving shipping forecasts as well as

opening up the possibility of extended range forecasting in South Africa.

### WINTER ROUTINE

The men have now settled down to routine indoor activities and schedules of work. They are taking turns of four days to do the cooking and this system seems to work as successfully as in the case of Fuchs' Trans-Antarctic Expedition. The standard of living is reported to be "high and the food very good." What with music, sing-songs, birthday parties and new bath, drying and woodwork rooms, the men seem to be quite happy and have developed into a solid team. Our New Zealand colleagues will appreciate that the SANAÉ team are anxiously looking forward to the coming visit of the All Blacks to South Africa. Reception of the South African Broadcasting Corporation programmes are fair most of the time and the men promise to cross fingers for a South African victory in the battles between the Rugby giants.

The team, and especially the geologist-glaciologist, have been viewing the distant mountain peaks looming on the southern horizon with longing eyes, but it will not be possible to visit "solid Antarctica" before next summer.

### NEW STATION?

The establishment of a new station possibly in the vicinity of the present station, but a good deal nearer to the coast is at present under consideration. With the floors of the huts already 20 feet below the snow surface, the effects of ice pressure are becoming evident. The huts were erected by the Norwegians more than three years ago to be occupied for only two years, but even now the main quarters show only slight signs of the increasing pressure.

"Polarbjorn" paid a fleeting visit on January 16 to Maudheim, the base of the 1949-52 British-Swedish-Norwegian Expedition at 70° S. 10° W. and found that only a few feet of the tops of the radio masts, which were originally about 30 feet high, still protrude above the snow.

## CHILEAN - UNITED STATES CO-OPERATION

A significant ceremony took place in Washington when the Chilean Ambassador signed a convention with the U.S. Government for the loan to Chile of the vessel "Tekesta" for the purpose of scientific work in the Antarctic.

The joint declaration published simultaneously in Santiago and Washington states that "The Governments of Chile and of the U.S.A. have agreed to co-operate in a scientific programme in Antarctica, in order to continue and possibly increase the valuable scientific work carried out during the I.G.Y."

The ship will be provisioned and serviced by both countries. It will be principally employed on oceanographic work and scientists from both countries will participate in the programme, which will be of mutual benefit.

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## S.C.A.R.

The fourth meeting of S.C.A.R. (Special Committee on Antarctic Research of the International Council of Scientific Unions) will be held at Cambridge, England, from August 28 to September 3..

The main function of the meeting will be to review the progress made in accomplishing the S.C.A.R. programme. Among matters likely to come under review are Meteorological Research, Communication, the World Magnetic survey, the conservation of Nature in the Antarctic and the dissemination of information on newly discovered geographical features.

As New Zealand's permanent representative, Dr E. I. Robertson, is unable to attend, the New Zealand delegate will be Mr. R. W. Willett, Director of the Geological Survey, who will be accompanied by Dr. M. A. F. Barnett, Prof. R. H. Clark, Mr. R. Unwin and Mr. J. W. Beagley as advisers.

# AUSTRALIAN MAP MAKERS SAY WILKES WAS RIGHT

The long and often bitterly contested conflict between the detractors and the supporters of the United States explorer, Charles Wilkes, seems at long last to have been decided in favour of Wilkes, and by Australian cartographers.

In December, 1839, Lieutenant Charles Wilkes of the United States Navy set sail from Sydney with the remaining four ships of the United States Exploring Expedition for his second attempt to penetrate Antarctic waters. Steering somewhat east of south, the squadron passed through north-western Ross Dependency waters almost to the Antarctic Circle and then swung east. The ships—now only three—took varying courses, but from one or other of them land was reported here and there along an arc of about 1,500 miles from 160° E. to 100° E., somewhat north of the Circle, and entered upon a chart which Wilkes courteously forwarded to Capt. Ross when the great English explorer was in Hobart ready to strike south, about a year later.

Trouble flared when Ross sailed over an area in 165° E., 66° S., which Wilkes' chart clearly shows as land. What is more, Scott, in March 1904, found open water in other places further west where Wilkes had charted land—Ringgold's Knoll, Eld's Peak, Cape Hudson—and Scott bluntly commented "We have definitely disposed of Wilkes Land."

In early 1912 Captain J. K. Davis in Mawson's "Aurora," "disposed of" landfalls still further west which Wilkes had named Totten's Highland and Termination Land. Mawson, during the second year of his B.A.N.Z. A.R.E. Expedition in 1931, proved that there was no land where Wilkes had charted Budd's Land in 116° E., so there did not seem to be much left of all Wilkes' discoveries.

Although fair-minded writers have always given credit to Wilkes (to use Captain Davis' words, "this great sailor") and to his work ("a remarkable achievement in the annals of Ant-

arctic exploration"), all except such ultra-nationalistic admirers as the American Professor Hobbs have assumed that Wilkes was far too ready to accept as definite landfalls what were at best only mirages thrown up by refraction, and at worst mere figments of the imagination. This last has become the generally accepted opinion as regards the more eastern "landfalls," those to the south of New Zealand and Australia.

## A NEW MAP

But during the last two years Australian explorers have carried out reconnaissances of the area from Cape Freshgeld (151° 10' E.) to Horn Bluff (149° 48' E.) from the sea and by air, while a landing was made and an astro-fix for mapping purposes secured on Magga Peak, near the Oates Land coast. The results of this work have been carefully studied in conjunction with the extensive aerial photography of the American Operation Highjump in 1947, by the Australian Division of National Mapping, Canberra, under Mr. B. P. Lambert. Mr. P. G. Law, Director of the Antarctic Division, and Mr. Lambert reported the result of their study to the Antarctic Symposium held in Buenos Aires, Argentina, last November. By using all the available data, old and new, the Australian cartographers were able to compile a map which they modestly describe as "quite good in the light of the material available."

Close examination of the map in conjunction with Wilkes's chart and the descriptions he gives in his "Narrative," showed a newly-disclosed peninsula in approximately 154° E., 68° 20' S. to the north-west of the Wilson Hills in Oates Land. The peninsula is flanked on its western side by a series of nunataks about 2,000-3,000 feet high which resembled Wilkes's pano-

ramic sketches and his written descriptions of Cape Hudson. The Canberra cartographers now superimposed the relevant portion of Wilkes's chart upon their new map, converted to the same scale and projection, so that "Cape Hudson" coincided with the termination of the new peninsula.

This implies that Wilkes's actual landfalls during this period were about 120 miles, nearly two degrees, south and nearly 20 miles west of their charted positions. This is considered to be quite possible in the light of the effect of refraction upon the apparent position of distant objects in the polar regions.

### WILKES WAS RIGHT

When this adjustment had been made, it was apparent that Wilkes's chart was a remarkably close approximation to the actual coastline as it is now known. To the west of the "new" peninsula is a bay which corresponds in general with Wilkes's "Peacock Bay." And, "When directions were extended from the position of Wilkes's Peacock on January 16, 1840, through the plotted positions of Reynold's Peak and Eld Peak, these rays went very close to the hills now mapped to the west of the glacier (a new feature west of the Wilson Hills) but chart distances from the Peacock were short." The description of the hills seen by Reynolds and Eld is in accord with the photographs of the hills, now available. It was not possible to pick out which two particular peaks were the prominent features to which the names of Reynolds and Eld were given by Wilkes, but two peaks in the western group of hills and one in the Wilson Hills have been arbitrarily selected and shown on the provisional map as Reynolds and Eld Peaks and Ringgold Knoll respectively.

These latter features are shown as nearer to the ships' positions at the time of sighting than they really are, but this, as well as the consistent differences in latitude, could be due to abnormal atmospheric refraction existing at the time of observation. The longitudinal differences between Wilkes's chart and the new provisional map are understandable.

Students of Antarctic history who have always admired Wilkes for his

## WHALER'S CATCH

Catch reports have been published for most of the pelagic expeditions which operated in Antarctic waters during 1959-60 season, but totals are not yet available.

The season opened on December 28, 1959. For the period up to March 19 (83 days) the eight Norwegian expeditions had obtained 494,330 barrels of whale oil. In the previous season, which lasted only 69 days (January 7-March 16) the same eight Norwegian expeditions had obtained 673,503 barrels of oil.

The six Japanese factory ships reported a production of 454,900 barrels of whale oil in the period December 28 to March 5, 69 days—last season's Japanese production was 550,288 barrels.

The three British expeditions in the period up to March 12, 72 days, had obtained 177,960 barrels, as compared with 223,230 barrels last year.

The single Netherlands factory ship from December 15 till March 6, 83 days, had produced 103,886 barrels. Last year's production was 112,704 barrels.

It is reported that the Russian expedition had already by March 9 exceeded its last year's catch.

### WHALE LIMITS

All efforts last year to fix agreed quotas for five Antarctic whaling nations failed. The total limit for last year was 15,000 blue whale units, but by mid-March this year it appeared that this figure would be exceeded by March 20.

Twenty expeditions in all were engaged this season: eight Norwegian, six Japanese, three British, two Russian and one Dutch.

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courage and skill, and regretted the contumely which has been poured upon him, will rejoice that he has now, after 120 years, apparently been cleared of the charge of carelessness in charting landfalls. Unbiased readers of his "Narrative" have never doubted his sincerity.

# Field Activities of the Argentine Antarctic Institute

We are indebted to the Director of the Argentine Antarctic Institute for the following information regarding Argentine summer activities in the Antarctic.

The field activities organised by the Argentine Antarctic Institute included the extension of scientific work and the relief and re-provisioning of Ellsworth Station. It was also planned to recover the equipment which had to be abandoned through force of circumstances at General San Martin Base (GSM) during the previous summer, to measure the glacier movement in that area, to complete scientific collections and to obtain photographs of scientific and technical interest.

The scientific programme comprised work in cosmic rays, ornithology, paleomagnetism, geochemistry, glaciology, geology and meteorology. Two groups were formed under the general direction of Captain Carlos A. Perticarari. One group was to carry out cosmic ray observations on board the icebreaker "General San Martin" and the other to set up camp on the Ardley Peninsula, May 25 Island in the South Shetland group to carry out the rest of the planned programme.

The first group, under Dr. Adulio Cicchini, measured the intensity of cosmic radiation from Rio de la Plata to the Antarctic. Ricardo Novatti of this group also made ornithological observations during the penetration of the Weddell Sea by the icebreaker "GSM", registering 16 different bird species between 63° 50' S. and 75° 11' S. In the middle of January he joined the second group on the Ardley Peninsula.

## ON MAY 25 ISLAND

This second group comprised a geologist, a glaciologist, a meteorologist and a photographer, all of the Argentine Antarctic Institute. This party had to disembark from the "General San Martin" by helicopter at their camp site on May 25 Island because of the difficult ice conditions prevailing at the time.

During their sojourn at the camp till February 29 when they were taken aboard "Bahia Aguirre", the

members of the group completed their programme in spite of the bad weather conditions. They obtained a valuable collection of biological specimens; carried out a geological survey, and collected rock specimens to complete the collection previously made. They also collected fossils, carried out chemical analyses of water, determined the carbonic anhydride content of air, obtained rock specimens for paleomagnetic analysis and noted meteorological data. Among the biological specimens captured there were an adult goat and an Antarctic fur seal pup (*Arctocephalus australis*) a species almost exterminated by indiscriminate and uncontrolled killing during last century.

On February 16 Mr. R. Dalinger, geologist, was taken on board the icebreaker to travel to Base G.S.M., being unable, owing to ice conditions, to carry out his original intention to disembark at Marguerite Bay.

Argentine reports indicate that while data on ice conditions and temperature fluctuations are still incomplete, scientists believe that the season was the most severe, climatically, since 1952-53. On the area of the "General San Martin" operation, wind velocities of 16 and 17 metres per second were reported. The use of helicopters is very difficult under such conditions as they normally operate only when the wind velocity is under 14 m/s.

Observers on the "Glacier" which met the Argentine ice-breaker just after it had freed itself from the pack off Adelaide Island say that the "General San Martin" had been caught on the sheer line between fast ice and moving pack, which had heeled her over 40 degrees and subjected her to enormous stresses. Five hundred tons of cargo had been jettisoned before the pressure eased and she got free.

## ELLSWORTH

This year it has proved impossible to relieve Ellsworth Station, the American-built base now operated by Argentina. The station has no airstrip of sufficient length to permit the landing of large aircraft which might effect the exchange of staff. From the airport of Rio Gallegas it is 1800 miles to Ellsworth, and aircraft capable of flying this distance could only drop supplies and return without landing.

Operations had to be restricted to the evacuation of the base personnel. The "General San Martin" was immobilised and suffered the effect of "friction flow".

### LIFE LOST

A young Argentinian, assistant chief cook Lorenzo Vera, lost his life recently at Ellsworth. When his absence was noticed search parties made every possible effort to locate him, but without success. The weather was bad and the short hours of daylight, high winds and low temperatures made search operations difficult and dangerous. Vera's track could not be picked up.

### FOR THE FUTURE

A comprehensive scientific programme had been prepared at the Argentine Antarctic Institute for the 1961 season at Ellsworth Scientific Station.

The station has sufficient supplies of food and fuel to maintain itself for the forthcoming winter, but is low on expendable scientific equipment.

## ATOMIC POWER

It was reported on May 11 that Congress had authorised the spending of 13 million dollars (about £6,000,000) to start construction of four small nuclear reactors for three U.S. Bases in the Antarctic.

An earlier report said that the United States planned to have four reactors in the Antarctic within five years. The Defence Department planned to build reactors at McMurdo Sound and the South Pole by 1963, another at McMurdo Sound by 1965, and one at Byrd Station by 1964.

## BOOKSHELF

"A CONTRIBUTION TO THE GEOLOGY AND GLACIOLOGY OF THE WESTERN PART OF AUSTRALIAN ANTARCTIC TERRITORY." By P. W. Crohn (A.N.A.R.E. Reports Series A. Vol III Geology).

While primarily a geological report for geologists, this hundred page volume is of great interest to the layman who is keenly interested in the Antarctic, even if his geological knowledge is about non-existent. Mr. Crohn writes most interestingly about the general topography of the Australian Antarctic Territory and the field work carried out by the A.N.A.R.E. expeditions. The book is magnificently illustrated with 66 photographs and there are six detailed maps of portions of the territory.

The volume is not for general sale, but any reader particularly anxious to obtain a copy should write to the Antarctic Division, Department of External Affairs, 187 Collins Street, Melbourne, Victoria.

### NEW ZEALAND PUBLICATIONS

SOME PHOTOGRAPHS OF THE BOTTOM FAUNA IN THE ROSS SEA. By J. S. Bullivant. N.Z. Journal of Science, Vol. 2, No. 4. December, 1959, pp. 485-497. Nine illustrations, three in colour and a chart.

"POST - GLACIAL TERRACES NEAR CAPE CHOCOLATE, McMURDO SOUND, ANTARCTICA." By I. G. Speden. N.Z. Jnl. Geology and Geophysics, Vol. 3, No. 2, May, 1960.

### TRIBUTE TO COOK

A Mawson news-letter says: "Ralph Dyer is still the curse of Mawson—everyone is putting on weight as the result of his excellent cooking."

Transportation operations in the Antarctic had cost 17 lives, 17 aircraft and 13 vehicles worth more than 10 million dollars.

Eighty per cent. of these operations involved bringing in fuel. Using nuclear reactors in Antarctica would save both money and lives.

# United States Task Force Re-maps The Thurston Peninsula

It is now possible to give a more complete survey of the penetration of the Bellingshausen Sea by the U.S. vessels "Glacier" and "Burton Island" than appeared in our last issue.

Of considerable interest is the fact that the meeting of the two ice-breakers took place in latitude  $71^{\circ}$  S., longitude  $104^{\circ}$  W. This is very close to the  $71^{\circ} 10' S.$ ,  $106^{\circ} 54' W.$  which was the point reached by Captain James Cook on January 30, 1774, the farthest south point ever achieved until the 19th Century. It is interesting to recall Cook's words: "I will not say . . . it was impossible anywhere to get in among this ice, but I will assert that the bare attempting of it would be a very dangerous enterprise, and what I believe no man in my situation would have thought of. I, whose ambition leads me not only farther than any other man has been before me, but as far as I think it possible for man to go, was not sorry at meeting with this interruption."

This point was north-west of the Thurston Peninsula, discovered from the air by Admiral Byrd in 1940. Most of the United States' previous knowledge of the area was from Operation High Jump (1946-47) which assigned a seaplane-tender, under Captain George J. Dufek, to carry out an aerial reconnaissance of the Bellingshausen and Amundsen Seas. Several successful photographic flights were made. On one flight, however, a plane crashed in the vicinity of the Thurston Peninsula. The survivors, who were picked up a few days later, were the first men ever to set foot on this inhospitable coast.

## IN TO THE COAST

From the rendezvous a wide shore lead extended southward along the edge of the Thurston Peninsula and eastward towards the Eights Coast. During the cruise eastward the two ships operated separately, "Glacier" going on ahead while "Burton Island" took ocean stations along the coast and put scientific parties ashore at various points by boat and helicopter.

The ice-breakers steamed eastward as far as the Fletcher Islands. A geological party was landed on Dustin Island, one of the Fletcher group (approx.  $72^{\circ}$  S.,  $95^{\circ}$  W.), and another sent into the Thurston Peninsula mountains to the west. High oblique photographs were taken of approximately 75 miles of the Eights Coast to supplement existing vertical photographs.

## TO THE WEST

As the shore lead now ended and helicopter reconnaissance showed no possible leads to north or east, both ships now moved back to the west past "Grasshopper Bay", where a Grasshopper weather recorder was left on the Noville Peninsula, and worked warily past "Porter's Pinnacles"—an entirely unofficial name for three rock upthrusts which had been submerged when the ships passed before. (Cdr. P. W. Porter Jr. is Commanding Officer of "Glacier".) One, in  $71^{\circ} 41' S.$ ,  $99^{\circ} 30' W.$ , stood 30 feet above sea-level.

On February 20 it was found that "Glacier's" shaft bearing had overheated, sheared, and had to be replaced. Lying to off Cape Palmer in bad weather, the repairs were effected by the 23rd, and both ships made preparations to get under way.

The two ships were near Cape Flying Fish (the tip of the Thurston Peninsula) going west when the plea for aid came from the "General San Martin", beset off Adelaide Island near Marguerite Bay on the west coast of Graham Land. On February 29 the two ships parted off Peter I Island. "Glacier" proceeded at once to help the Argentine vessel (see "Antarctic", March) while "Burton Island" carried out scientific reconnaissance off the island, and oceanographic work

between the island and the coast of Chile. The projected return to the Amundsen Sea west of the Thurston Peninsula had, of course, to be abandoned.

"Glacier", after meeting the "General San Martin" off the west coast of Adelaide Island went to help the "Kista Dan", on charter to the Falkland Islands Dependencies Survey, beset some 47 miles to the south-west. "Kista Dan" was led to the safety of the open sea and "Glacier" headed for home via Schollaert Channel, de Gerlache Strait, Bransfield Strait and Deception Island.

#### WORK DONE

Only a portion of the projected scientific programme had been carried out. Ice conditions blocked much of the Eights and George Bryan Coasts. However, 120 miles of the Thurston Peninsula coastline was charted and the ships found many sub-surface features. Scientists examined accessible coastal areas for geological and biological samples and obtained much data from the many oceanographical stations. Ocean bottom samples, lichens, mosses, and rocks, as well as data on bird and animal life, helped disprove or have given verification to many theories and have opened new avenues for studying the origin, structure and history of this little-known section of the Antarctic Continent.

Dr. Robert Murphy having already made the southernmost sighting of the Tufted Macaroni Penguin, remained on board "Glacier", as did several other scientists. The geologists returned on "Burton Island" with their granite and gneiss samples, hoping to complete analyses that would tie the Thurston Peninsula with either the Palmer Peninsula (Graham Land), the Walgreen Coast or inland locations (the Sentinel Mountains).

#### BIOLOGY

Ornithological and general zoological observations and collections were greatly curtailed by the changing of plans consequent upon the rescue operations. The areas of dense inner pack evidenced little visible life. A small collection of birds, significant from the standpoint of zonal distribution, was made. No insects were collected in the nets south of the Falkland Islands.

#### METEOROLOGY

During the period February 16-March 1 all except four transmissions from the automatic weather station set up on Noville Peninsula were received, and these at night only. The to 5 only three transmission were received, and these at night only. The final transmission was received on March 5 at a distance of over 700 miles.

## Preparing for Winter at the Bases

### McMURDO

After air operations ceased on April 15, the Transportation Department of Public Works was engaged in moving all equipment and material from the Barrier air-strip to the main camp. This was done so that valuable machines and buildings would not be buried under the deep snow deposited on the Barrier by the winter storms.

The last six of the summer scientists left on March 13 on the U.S.S. "Atka". Weekly voice conferences with Mirny continued with fruitful exchange of scientific and technical information.

### SCHOLASTIC

McMurdo Sound University academic year has commenced. With the re-opening of the world's most

southern university, the University of Antarctica, McMurdo, service and scientific personnel have available to them courses in basic Russian and German, physics, advanced algebra, geometry, American history and business arithmetic.

In determining the courses to be given, personnel were given the opportunity of noting three preferences, and in the light of available "professors" the subjects were decided.

Among the enrolments are two New Zealand scientists from Scott Base, who trudge the two miles between the Bases twice weekly to attend the basic Russian course.

### "BOL HALL"

The Chapel at N.A.F. McMurdo has been enlarged by the addition of another hut section 24 x 20. This annex

houses a 4,000-book library, and acts as a distribution point for many items of recreational and hobby-craft material. It has been named Bol Hall after the chaplain Padre Bol.

In May the new Hall was used for the first of three formal musical concerts, made possible by the new high-fidelity tape and record playing installation. Some 20 members of the wintering-over party enjoyed the three-hour concert, as well as a group of scientists from the New Zealand Scott Base. Plans are to stage a concert each Sunday afternoon throughout the winter. Each concert will feature a different type of music, including classics, semi-classics, jazz, folk music and rock and roll.

### BYRD

On February 9 the Byrd Station Traverse returned to Byrd Station after completing a summer trip of nearly 1,200 nautical miles.

Personnel who had wintered over at the Station during the past year were transported to McMurdo on February 12. This included six scientists from the traverse party.

During the month 150 tons of cargo were flown in by Hercules aircraft. This has been largely cached outside and covered with parachutes.

Construction and maintenance included the completing of a new barracks by Navy Seabees and the overhauling of the Sno-cats. On these have been included a crevasse detector and the power supply for a gravity meter. It has been necessary to shore up various parts of the Station because of sagging under the drifts.

### POLE STATION

Re-supply, totalling 250 tons of equipment, was effected in 28 flights during January and February. Tunnels have been formed to aid access to out-buildings.

Large-scale out-door activities were terminated with the setting of the sun on March 20. Station power remains a serious problem for many of the programmes.

Since January 1958, annual snow accumulation has been measured at approximately 21.1 c.m.

March average temperature was  $-71.6^{\circ}$  F., the coldest March on record.

### AIR-BORNE TRAVERSE

During the period November 1959-January 1960, extensive air-borne traverse scientific work was carried out by a team of scientists led by Dr. Edward C. Thiel of the University of Wisconsin.

This covered an aero-magnetic study from McMurdo to Wilkes, a gravity-magnetic flight to Hallett, gravity and seismology studies at the South Pole, and an interior landing on the Ross Ice Shelf to study tides, as well as conducting an extensive programme in Marie Byrd Land to define surface and sub-surface features.

### NO TROUGH

This part of the traverse followed the 88th meridian and passed between the Sentinel and Horlick Mountains. Eight stations were made from 50 to 100 miles apart, half near nunataks and the rest in the ice-cap area. It was found that along the route no major trough existed between the Ross and Weddell Seas, but that a smaller connection might be possible.

Aerial photographs were made of the traverse, thus helping to tie together the photo-mosaic, and help in its interpretation.

## ANTARCTICAN SOCIETY

The newly-formed Antarctic Society originated from the desire of several people to have an organisation where persons interested in the Antarctic could meet "for a friendly and informal exchange of information and views."

Launched on October 8, 1959, it was able to arrange for a film showing to delegates to the Washington Conference on the future of Antarctica. The venue of the evening was the auditorium of the National Academy of Sciences, and the large number of Conference delegates present readily expressed their gratification for the initiative taken by the Society.

The address of the secretary, Antarctic Society, Mr. Wayne Fisher, is Room 214, 515 22nd Street, N.W., Washington 25, D.C., U.S.A.

## THESE NEW ZEALANDERS

Members of the 1958 New Zealand team at Scott Base speak appreciatively of Paul Astopenko a Russian who wintered at Little America and who spent a week at Scott Base in October. Here is part of Mr. Astopenko's impression of the Base and of his hosts, as he describes them in a Russian journal.

"We liked the location of Scott Base, its organization of scientific work and the atmosphere of comradeship and friendship which reigned among the members of this small group. The winter party carries out a large volume of scientific observations according to the I.G.Y. programme with which eight of the 11 inhabitants of Scott Base are occupied."

Fellow members may recognise the "very energetic and friendly man" and the "man of rare modesty—very reserved in the expression of his feelings, a great lover of skiing and riding behind dog-teams."

Mr. Astopenko tells that the Italian scientist who wintered with the New Zealanders welcomed the arrival of the Russian and his French companion, because as he said "Now I have met some people who speak English in such a way that I can understand every word."

"The comparatively large number of engineers and technical specialists amongst the winter personnel is very noticeable," writes Mr. Astopenko. "This is no accident. The execution of the vast programme of work by a group of 11 men in Antarctic conditions would be impossible without the technical maintenance of all equipment."

"At Scott Base there are six huts connected by metal tunnels, an electric power plant, six generators (operating continuously, at midnight only three meet the needs of electric power), a radio station and a garage. In the latter, besides two wheeled tractors, a "Ferguson" of English manufacture and two American cross-country vehicles, there is also the

celebrated "Snocat," on which Fuchs with the help of the auxiliary group of the well-known mountaineer and conqueror of Everest, the New Zealand explorer Hillary, accomplished a trans-Antarctic crossing across the South Pole from the Weddell Sea to the Ross Sea. The members of the New Zealand Polar Expedition are very proud of this machine; nevertheless it does not worry them to make use of it as a general means of conveyance. Hillary left at the station the three dog teams which are more active than they should be. Their main use is for sporting sledge rides and not for other purposes.

"In two huts at Scott Base there are the main establishments, that is, well equipped laboratories; in the third the electric power plant, a snow melting plant, a bathroom and a photographic laboratory, in the fourth is a kitchen and dining-room, and it is also a rest room, and finally in the fifth and sixth huts are the living quarters of the expedition members. The rooms are very effectively partitioned off; they are small but comfortable and, above all, each man has his own separate living quarters. Heating and ventilation is effected centrally with the aid of furnaces which work automatically on liquid fuel.

"All the subsidiary household tasks of the New Zealanders, except the preparation of food, are carried out in turn by the men on duty. The men on duty on Sundays, when the cook is off duty, prepare the dinner also. The members of the New Zealand expedition all eat together and each one clears away and washes his own dishes.

"There is also a library in the dining room, a small film projector, a wireless and musical instruments. Two portraits adorn the walls: the Queen of Great Britain and Captain Robert Scott, after whom the station is called. The working places of the research workers, their living quarters and all their equipment produced the greatest impression on us, having wintered at the American station of Little America, as all this is undoubtedly promoting constructive work."

# ON SUB-ANTARCTIC ISLANDS

## ILES KERGUELEN

The French station on the Kerguelen Islands has now been in existence for ten years. Port-aux-Francais was established by a team of 14 men under M. Sicaud, Administrateur en Chef de la France d'Outre-Mer, on December 19, 1949.

M.S. "Norsel", en route for Terre-Adelie, called at Port-aux-Francais from November 20 to December 3. Four new men replaced five who were returning to France. The new Adelie Land team was given a warm greeting by the Kerguelen personnel. Excursions were organised to la Baie Norvegienne and to le Val-Studer.

The E.D.F. party, which began its work early in December, established itself on the bank of the South River and ascended it in the direction of the Studer Lakes. The topography above and below the lakes was studied and hydrological work carried out. The expedition concluded its work on February 25.

An electric cable 1,470 feet in length has been installed from the pumping station to the top of Elizabeth Hill. It is designed for rawin work.

All reliefs have now been effected and scientific observations have resumed their ordinary course. At New Amsterdam Island, which is under the control of Terres Australes et Antarctiques Francaises, the remodelling of Camp Heurtin has gone ahead. Two permanent buildings have replaced the two Fillod huts to house the personnel.

At Kerguelen, veterinary surgeon Bajard has made a census of the flock of sheep on l'Ile Torgue, which now numbers over 400. Shearing was also carried out.

Radio-telephone communication with France was difficult for several weeks during April and early May because of adverse conditions.

"Thala Dan", conveying Australian personnel back to Melbourne from Mawson was at Kerguelen from March 6 to March 8. The Australians were given a warm reception.

Preparations for the 1960-61 relief are already under way but there seems little likelihood of the proposed systematic mineral prospecting programme being commenced in 1961, as had been hoped.

## MACQUARIE ISLAND (Australia)

Most of the outdoor construction programme was completed by the end of March. Nearly everybody had journeyed to "Holiday Camps" at Hurd Point or Green Gorge for relaxation and very fresh air. The weather generally had been mild; in fact, drought continued and, reports Taylor, "we must choose between central heating and hot showers."

"Of biological interest is the capture of the first Grey Petrels since 1911. Of domestic interest, the first progeny of the new rooster have hatched. Brilliant auroral displays have been observed on several occasions."

On April 26 Taylor reported that Brennan and Warham, the biologist, had spent a week at Hurd Point observing and photographing wandering albatrosses. Wright had erected new radio masts, making the Isthmus area a jungle of stays and aerials. Reception had improved, however, and amateur radio enthusiasts were making long-distance contacts.

The drought had broken and on several days temperatures were higher than in Melbourne. On one occasion winds reached 90 m.p.h.

## BOUVET ISLAND (Norway)

The South African National Antarctic Expedition ship "Polarbjorn," which left Cape Town en route for the former Norwegian station on the Antarctic Continent on December 3, arrived off Bouvet Island during the afternoon of December 10.

The weather was bad and it was obvious that it would be impossible to make a landing there, so after approaching the north-west corner of the island (Cape Circumcision) to within

a mile and a half to two miles, course was altered to the south-west and Antarctica. The island was studied and numerous photographs were taken.

On the return voyage from Antarctica the ship was in the proximity of Bouvet Island once again on January 22. A strong gale was blowing and although the island was visible on the radar screen (distance twelve miles) it was impossible to see it with the naked eye. The weather prospects were bad, so the voyage was continued to Cape Town.

("Polar Post")

## MARION ISLAND

(South Africa)

The South African stations on three sub-Antarctic Islands were relieved by the M.V. "Shackleton" during March. The "Shackleton" arrived in Cape Town from South Georgia late in February with the returning members of the 1959 Halley Bay team, including the two South African meteorologists.

The "Shackleton" first relieved Marion Island, returned to Cape Town and then sailed to Tristan da Cunha and Gough Islands, completing the round trip in exactly one month from March 1 to April 1. Arriving at Marion Island on the 6th, offloading was delayed for two days by rough seas, but the task was completed on the 9th and the ship was back in Cape Town by the 14th. During the outward and return voyages bathy-thermograph readings were taken and water samples collected every 6 hours by an oceanographer. A geophysicist from the Geological Survey made gravimetric and magnetic observations on the island.

The station on Marion Island now forms quite an impressive picture with 13 newly painted buildings clustered above Transvaal Cove. A Public Works Department team had been busy "modernising" the station during the four months preceding the relief. With greatly improved landing, housing and other facilities it has been possible to reduce the staff from 10 to 7 without impairing the scientific programme. In addition to the routine surface and upper air meteorological observations, an auroral watch is maintained and radio whistlers are re-

corded. The latter programme is a new one being carried out by the expedition. The new arrangements and improvements made it possible to dispense with the services of a diesel mechanic, cook and handyman.

The "Shackleton" departed for Tristan and Gough on the 15th after only one day. Here again the weather was kind and offloading was finished within two days. After picking up the returning staff at Tristan, the ship was back in Cape Town on April 1.

## CAMPBELL ISLAND

(New Zealand)

With the approaching winter, outside activities are becoming more restricted. The staff are busying themselves with the host of interior jobs always needing attention, so that with the advent of the warmer months the interiors of the Station buildings will be spic and span and work on the major outside projects can be resumed.

Apart from the recent repatriation of Allan Dodds, Ionosphere Observer, no troubles have arisen and the leader reports that everyone is in fine fettle.

### TSUNAMI STRIKES

Seems that the powers that be decided not to leave Campbell Island out of this Chilean affair! Perseverance Harbour opens in the general direction of the on-coming tidal waves and on Tuesday, May 24, at 4 a.m., to the consternation of all inhabitants, a ten-foot wave did its worst. The waterfront buildings at Beeman Point, including the power house, were temporarily flooded and partially damaged. For a short while the Station was without power, but after determined efforts this was partly restored. Until all unserviceable plant is thoroughly cleaned and re-commissioned, two generators will provide power sufficient for the barest essentials and a restricted scientific programme. The main wave, and subsequent smaller ones, caused losses of lubrication oil, wrecked the boat shed at Tucker Cove and seriously damaged the jetty.

In spite of damage and losses, the situation is well under control. Civil Aviation Administration Head Office is making arrangements to send in items urgently needed as soon as possible, and expects that an air drop will take place in the very near future.

Meanwhile, the annual ordering of all supplies for 1961 and the recruitment of the new expedition is under way. Apart from the position of Radio Technician and Cook (these are to be re-advertised) the response to recent advertisements has been very good and we anticipate another good team next year.

### ON SOUTH GEORGIA

(We are indebted to Mr. W. L. N. Tickell and the Falkland Islands Dependencies Survey for information enabling us to give this brief report of the South Georgia Biological Expedition 1958-9.)

The South Georgia Biological Expedition 1958-59 comprised two men, W. L. N. Tickell and P. A. Cordall. Its primary object was to spend as much of the summer as possible on the western end of the island, where it was known that the albatrosses bred in the greatest numbers. It was stipulated by F.I.D.S., which assisted the expedition financially, that it should as far as possible assist Mr. W. N. Bonner, the Government Biologist and Sealing Inspector, who planned to study the Fur Seals he had discovered on Bird Island.

An undertaking was also given to collect specimens for the British Museum of Natural History and the Wildfowl Trust.

#### AT ELSEHUL

Tickell and Cordall reached South Georgia on September 24, 1958, and on October 11 were langed by sealing vessel at Elsehul on the north-eastern side of the island. Here the party camped in a pyramid tent in a glade on a fairly sheltered handy beach with scattered tussock.

Extremes of living conditions were a temperature of 23° F. and trouble with sand flies. Some survey work and climbing was done, but the chief task was the observation and banding of Grey-headed Mollymawks, Light-mantled Sooty Albatrosses and Shoemakers, as well as some thirty nesting Wandering Albatrosses. The party was picked up on November 16 and returned to Grytviken.

#### ON BIRD ISLAND

On November 24 Bonner, Tickell and Cordall landed at Jordan Cove, close

off the western end of South Georgia. Here they camped, using hut and tent, for 15 weeks. The camp was in the midst of a large skua "club" of one hundred to two hundred birds. These were their constant followers, and consumed the remains of all their meals, in addition to thieving meat and specimens and scattering the rubbish heap. Giant petrels, Mollymawks and Wandering Albatrosses were breeding close at hand, and between December 15 and 19 1,300 fur seal pups were tagged with metal flipper clips.

The sealing vessel "Petrel" on December 20 was manoeuvred right into the main bay of Jordan Cove, the only time this is known to have been done since Harrison Matthews visited the island in 1924. Bonner now left and Tickell and Cordall moved into the hut. They tagged another 400 fur seal pups in January and skuas were banded from January onwards. During the first fortnight of February, Tickell banded all the 900 Giant Petrel nestlings on the island. No fewer than 4,530 Mollymawk nestlings were then also banded, making a total of 6,899 birds marked, claimed to be the largest number ever marked by a single expedition in one Antarctic season.

Any spare time was devoted to survey work, meteorological observation, bird collecting, including two live South Georgia Teal and colour and black and white photography. Sound recordings were made of most species of seals and birds, but a projected cinema record was nullified by an unexpected difficulty in obtaining a cine camera.

"Petrel" returned to relieve the pair on March 6 and they returned to England on the R.R.S. "Shackleton" on June 26.

#### FAR WANDERERS

On November 9 a White-rumped Sandpiper was seen in Undine Harbour. "This bird almost certainly came from the Falklands or South America and represents the first identified wader south of the Antarctic Convergence." On December 29 an adult Wandering Albatross was discovered carrying an Australian C.S.I.R.O. ring. It had been ringed near Sydney.

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