

ANTARCTIC

A NEWS BULLETIN

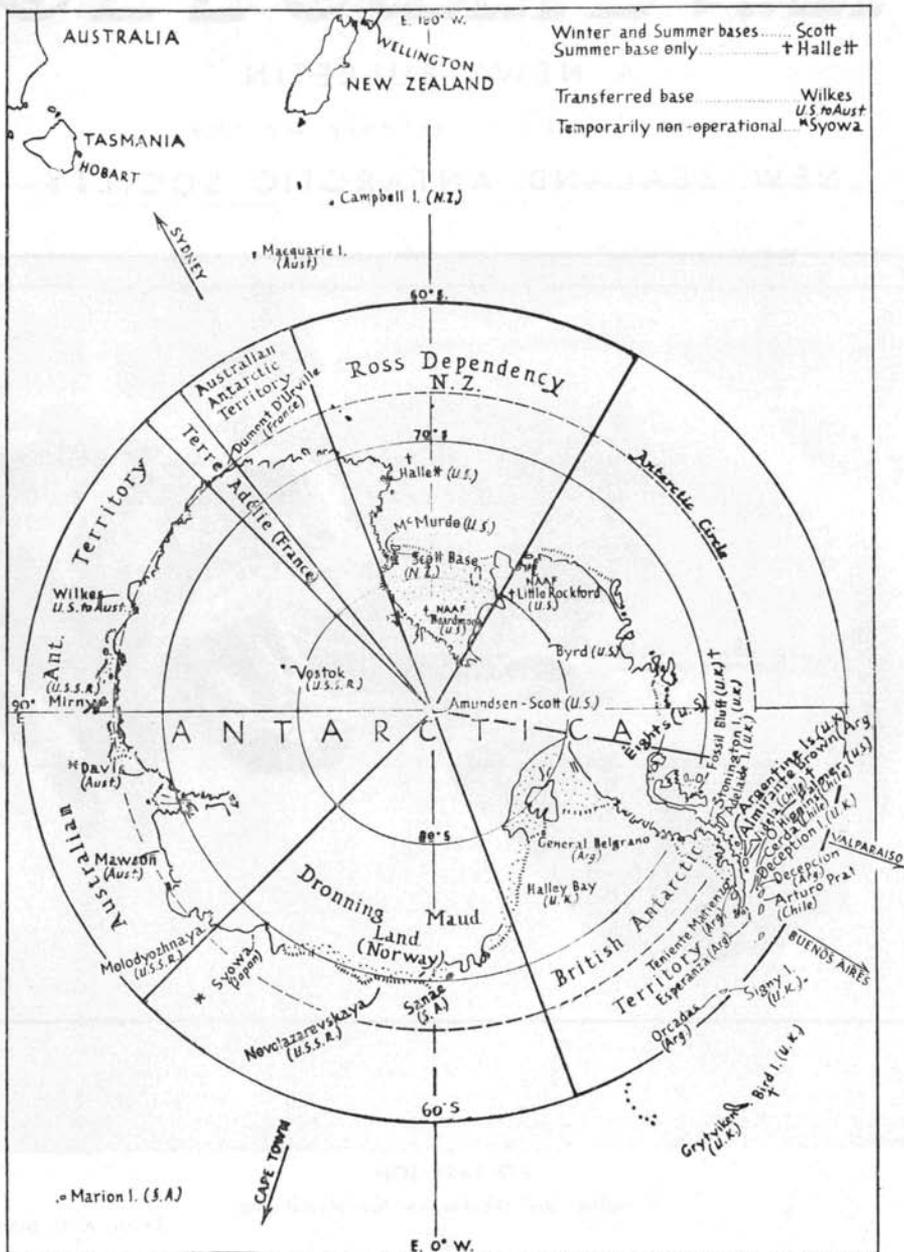
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GO EASY SON!

A mother seal rebukes her too playful pup.

Photo: A. C. Bibby.



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NEW ZEALAND'S SCOTT BASE HAS SUCCESSFUL SEASON

Although the topographical and glaciological reconnaissance of New Zealand's Ross Dependency has now been completed, the detailed study of this historic slice of Antarctica has only begun.

When the sun set for a short time at midnight on February 21, to mark the end of another season, eight New Zealand Antarctic Research Programme field projects had been completed.

The furthest south party was at the head of the Beardmore Glacier, about half-way between Scott Base and the Pole: the furthest north party 400 miles away at Cape Hallett. Biology and geology were the principal sciences studied, as well as geophysics and glaciology. The last field team returned to Scott Base on the 22nd. All projects have been carried out to the scientists' satisfaction.

At Base, work in the science laboratory has ranged from seismology to satellite tracking, from the earth beneath to outer space.

When "Endeavour" left McMurdo on February 24 the eight summer support men were on board.

NEW LOOK

Scott Base is no longer painted yellow. The base has been repainted in two shades of green, the buildings proper a lettuce green, and the covered ways a much darker shade. Most of the work was done by working parties including scouts, Boys' Brigade boys and visitors, as well as regular base members after their day's work was finished.

COLD JANUARY

Not only was January colder at Scott Base than December, but it was colder than January, 1965. The average temperature during December was 3.5 deg. below zero and in January it was 6.3 deg. below.

The maximum temperature in January this year was 1.8°C. and the minimum 17.5°C. below zero. For January last year the maximum was 3.5°C. and the minimum 12.5°C. below zero.

During December at Scott Base the men were working outside in shirtsleeves. However, jackets were needed for most outside work in January.

TO WINTER OVER

The 12-man team to winter at Scott Base has been completed by the addition of two men who have been members of the summer party, **R. O. Bartlett** and **R. P. Greeks**. Reference was made to Mr Bartlett in our September 1965 issue, p. 116.

Raynor Greeks (21) of Lower Hutt will be the Base Carpenter Field Assistant. He was educated at Naenae College 1957-9, and was an apprentice carpenter in 1959-63. At 19 years of age he was the youngest man in New Zealand to pass the examination for the Advanced Trade Course in carpentry. He is fond of fishing, hunting, tramping and motor-racing.

On December 13 he fractured an ankle-bone while skiing near Scott Base. The ankle was X-rayed and the bone set at the McMurdo hospital.

A FEW DAYS EARLY

Gordon H. Banfield, assistant maintenance officer at Scott Base this summer, was flown to Christchurch on February 20 for an appendicitis operation. He had been due to come home just two days later, on "Endeavour". He had been admitted to the McMurdo dispensary on the night of the 19th suffering from severe pains.

He was flown in a special flight to the Christchurch Public Hospital, where he immediately underwent an operation. His condition is reported as satisfactory.

Mr Banfield is the son of the Rev. C. W. Banfield of Masterton.

McMURDO ICE SHELF PROJECT

By A. J. HEINE

During the 1965/66 summer, extensive work was carried out on the McMurdo Ice Shelf. The survey work was carried out by Keith Lloyd and Andy Simm, travelling by Polaris motor toboggan, while Roger Bartlett and myself measured accumulation markers and completed a series of snow density measurements begun the previous summer. In the course of this work, we also measured temperatures down to 30 feet which is the point at which the temperature is approximately equal to the mean annual air temperature of that area. We found the mean annual temperature of the Windless Bight area to be about -25°F. to -26°F. , considerably colder than that of Scott Base, about -20°F. This would agree with Wilson's observations of extremely cold temperatures during "the worst journey in the world."

While taking snow density measurements in the thinner parts of the Ice Shelf, the "brine layer" was struck on numerous occasions. Previously measured up to two miles from the Shelf edge, it has now been sampled about nine miles from the nearest open water. This phenomenon is unusual, as far as ice shelves are concerned, and the reason for the sea water soaking into the shelf is not yet clearly understood.

Following the discovery of sub-surface melting in the clear ice area north of Black Island, further investigations were made this summer. The U.S. Navy has built a new ice runway on the northern limit of this area, about eight miles south of Observation Hill. The problem of melt pools forming below the surface will need to be overcome before the runway is operational all the summer.

As reported last year, a number of penguins and seals were sighted on the McMurdo Ice Shelf. During our first visit to White Island on

December 3, we found two female seals and two pups. One of the adult seals was tagged, and I have since learned that this seal was tagged at White Island on December 16, 1964. Perhaps the seals live there all the year; during the winter remaining under the ice, but below air-giving tide cracks.

Two emperor penguins were sighted about 10 miles south of Scott Base; in fact they remained in that area for several weeks. On February 22 a seal was sighted by Roger Bartlett and Ray Greeks about 16 miles east of Scott Base, while a week earlier, we had found another seal 15 miles south of Scott Base, and eight miles N.E. of Black Island.

ICE CORES

For the glaciological and geophysical project initiated by Dr M. Hochstein, the drilling team J. H. D. Hill, B. T. Muddiman and geophysicist G. Riske, with R. Rae as a replacement when Hill was injured and evacuated, struck blizzard conditions when they reached Scott Base on November 7, and had only one fine day in their first fortnight. The three men first bivouacked on the ice four miles from Scott Base in day temperatures ranging from 20° to 43°F. Subsequent drilling sites were about 5 and $12\frac{1}{2}$ miles from the base.

The team drilled holes to about 100 ft. in pure glacier ice, taking regular temperatures and other measurements. The core samples were brought back to New Zealand for detailed analysis at the D.S.I.R. laboratories.

Two technicians from the Engineer-in-Chief's office of the Wellington East Post Office, W. V. Glavin and W. Gray, installed single side-band radio equipment at Scott Base this summer to replace the much less powerful set which has been in use at the base since 1957, and which will be maintained as a stand-by and for contact during summer seasons with New Zealand field parties.

ICE BREAKOUT

On February 3 the sea ice started to break out in front of Scott Base. Last summer, the sea ice south of Ross Island and some of the McMurdo iceshelf broke out further than in any other summer since Scott Base was built. This summer the break-out developed into the biggest known since Captain Scott's time when men on Captain Scott's first expedition rowed a small boat along the Ross Island coastline where Scott Base now stands on Pram Point.

This portion of the coast was named Pram Point because a Norwegian-type dinghy called a "pram" was used for crossing the sea to the Ross Ice-shelf.

The record break-out this summer turned the sea in front of Scott Base into a mass of jostling ice, which bumped and crashed as the wind and tides carried it back and forward.

The edges of roads that led down to the sea crashed into the water and marker flags and 40-gallon drums that lined the edges of routes across the shelf could now be seen bobbing on chunks of ice in the open water.

At the weekend (February 5-6) members of the New Zealand party at Scott Base were forced to forsake their usual Sunday relaxation of skiing, because the run out for the most popular ski hill was a casualty of the breakout.

MIGHTY SPILL

One spectacular casualty in front of Scott Base was the huge 10,000 U.S. gallon rubber tank (about 25 ft. by 10ft., and holding 2ft. depth of diesel oil), which was somehow shaken from its low stand about 80 feet from the coast-line on January 23 and rolled down the ice slope, ripping as it rolled over the low cliff into the now open sea. Probably 5,000 gallons of valuable fuel were lost.

A replacement bladder has now been obtained, firmly (it is hoped) based and supported, and filled with diesel oil, which is piped from the huge tank into smaller steel tanks nearer the base.

SPECTACULAR

Scott Base men back from the Antarctic are talking about the magnificent scene in mid-February when the midnight sun was "winking behind high landmarks along the horizon—Mt. Discovery, Black Island and White Island". On the night of February 21-22 the crimson sky was reflected in a sea of beaten copper while the full Antarctic effect was provided by a thousand-foot long slab of McMurdo Ice Shelf which drifted slowly past the Base and onward to destruction in the warmer northern seas.

WHAT DO I SEE?

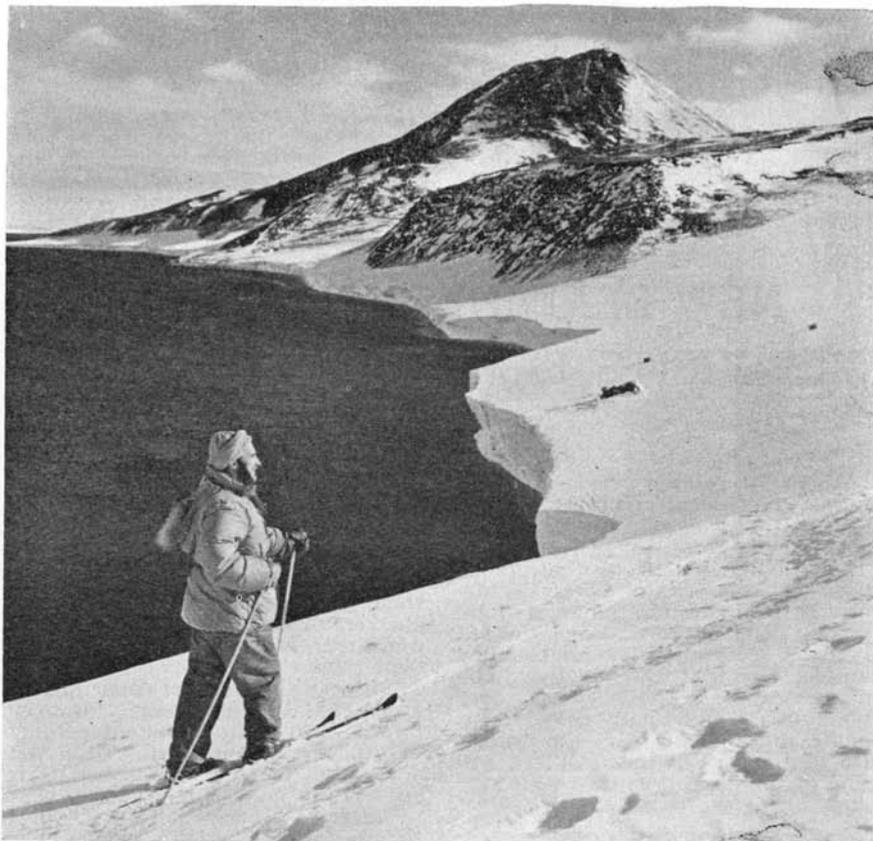
P.R.O. John Murphy waxes lyrical over these unprecedented occurrences: "Antarctica's silent sea in front of Scott Base has come to life and shed its shell of sea-ice. The once solid sea top with stolid ice sentinels jutting upwards is now rippling water.

"Large floes looking as though they do not know what to do nudge each other, then screech as the winds jostle them about. Weddell seals seem bewildered . . . as they remain sprawled on bobbing floes that were previously part of the restful and stationary sea ice. Huge killer whales cut by the floes, sound, then arabesque through the ice leaving a trail of foam. Vehicle tracks end abruptly on the edges of ice chunks that have been dissected from highways of earlier in summer."

THAW-FALL

During a warmer-than-usual summer, Charlie Hough was taking his turn in clearing away the weakening ice with pneumatic drill and shovel when he found a £1 note frozen into the ice which had accumulated over the past few years.

The Governor-General, Sir Bernard Fergusson, who was holidaying in the Bay of Islands, phoned the men at Scott Base as they were recovering from their Christmas dinner. Lady Fergusson and Geordie also spoke.



ICE BREAK-OUT

Looking from Scott Base across the ski-slope towards Observation Hill. Instead of the normal run out, below the Bren-gun-carrier in centre, the slope now ends in a 20-25 ft. drop to open water.

Photo: A. C. Bibby.

THE OLD HUTS

Writing to "Antarctic" on February 12, Scott Base Leader Mike Prebble says, "The three historic huts are in excellent condition. Ray Greeks is going to make up a new outer door for the Cape Royds hut as the old door blew off. Cape Evans, except for some drifting in the porch is in good order and so is Hut Point." The cyclone netting fence which was erected round the Hut Point hut has been removed

because it destroyed the desired "lived in" appearance. The hut door is kept locked but the key can be obtained from the O.C. McMurdo or from the Leader, Scott Base. Many people have been shown through the hut during the summer by New Zealand Public Relations Officer John Murphy.

Vince's cross on Hut Point is being left in its present position, which, while slightly precarious, is scenically and historically the most fitting place.

SKI-HIGH

Mr Roy Turner of Mt. Ruapehu has been elected patron of the Scott Base Ski Club, the southernmost in the world. "Your election", wrote Scott Base Leader M. M. Prebble, in a letter to Mr Turner, "is a gesture of our appreciation for the excellent instruction and guidance you gave us while we were

training on Mt. Ruapehu.

"This is the world's most southernmost ski club and has a membership of only 50."

With his letter, Mr Prebble included the distinctive "and very rare" identification patch of the club. It featured an Adélie penguin fitted with red skis and ski sticks on a navy blue background.

NEW ZEALAND FIELD PARTY RE-VISITS FAMOUS FOSSIL SITE

ALAN C. BIBBY

About 575 million years ago, huge numbers of coral creatures died at the bottom of a sea which then covered the continent of Antarctica. Their bodies settled into calcareous ooze and the fleshy parts disintegrated. Cataclysmic changes took place: the land rose out of the sea—rivers scoured valleys and eddied among lush forests—active volcanoes spewed liquid rock over wide areas—and finally the ice ages came, purging life from the Antarctic continent. But the fossilised outline of the coral creatures remained exposed to the polar winds.

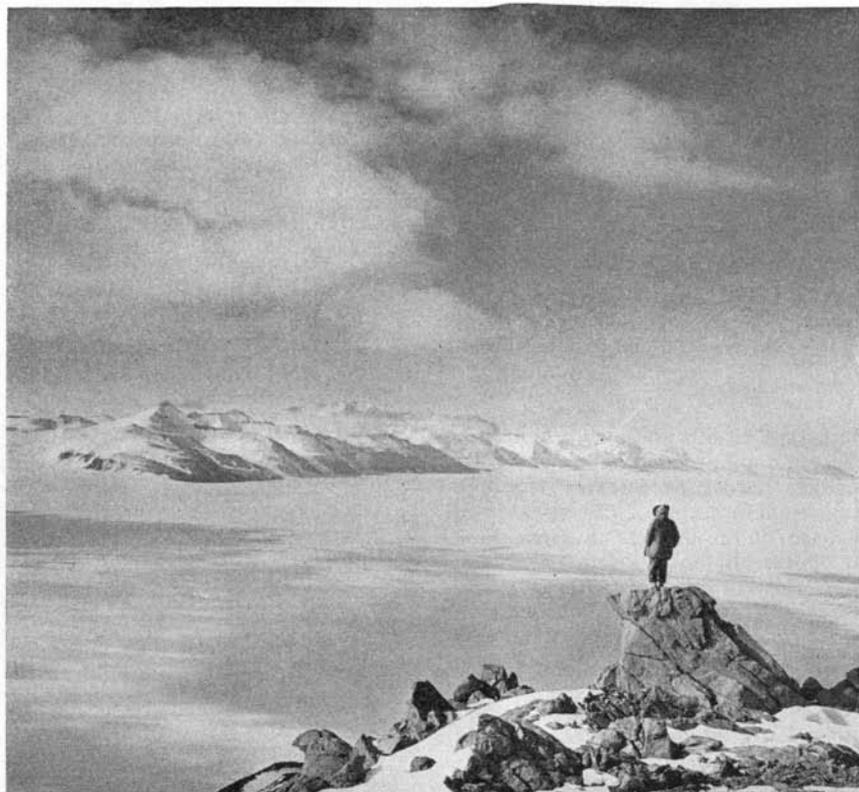
EXPLORERS COME

In 1908, a four-man party led by Shackleton hauled heavy sledges up the Beardmore Glacier to the nunataks which lie on the extreme edge of the Polar Plateau. They stopped at Buckley Nunatak and investigated a small outcrop of limestone jutting out of the ice, the only limestone seen during their 500 mile journey. Despite the lack of a trained geologist in the party, they found small symmetrical markings imbedded in the rock later identified as the coral fossil "Archaeocyathinae". The existence of primeval life only 300 miles from the Pole captured the imagination of geologists and laymen alike. A long-standing controversy arose, and it was to seek further evidence bearing on this dispute that New Zealand geologists went to the same

area this summer.

In 1911-12, Captain Scott's ill-fated party followed Shackleton's route to the head of the Beardmore and managed to reach the Pole. On their return to the Darwin and Buckley Nunataks, Dr E. A. Wilson and Lieut. Bowers "hunted over and over for Archaeocyathinae and found nothing except one minute fragment". They made, however, one of the most important geological discoveries in Antarctica. Wilson found fossil plants called Glossopteris in coal seams and insisted on carrying back 35lbs. of specimens—a scientific labour which was to severely tax their slender resources of strength. This was only three days before Scott wrote that they were "in a very critical condition", and six weeks before they died. Survivors of the expedition found their bodies and the specimens, realising with profound satisfaction that the "fossils were the best preserved of any yet found in Antarctica".

The Glossopteris genus is widely distributed throughout the world and enabled geologists to relate Antarctic rocks to the rocks in Australasia, South Africa, India and South America. Further fuel had been thrown on the argument whether Antarctica had ever been linked to the southern continents collectively known as Gondwanaland.



HIGH UP ON THE BEARDMORE

View from 7,869 ft. Mt. Bartlett (84°58'S.) across the western stream of the Beardmore Glacier towards the Marshall Mountains, on left. The Cloudmaker (84°20'S.) on extreme right.

Photo: A. C. Bibby.

GEOLOGISTS FOLLOW

Another fraction of a geological second passed. Fifty-three years after Wilson collected his *Glossopteris* specimens, the N.Z. 1965-66 Southern Party (senior geologist D. Young, geologist R. Ryburn, field assistant A. Rayment and field leader A. Bibby) stood at 85° South. Our man-hauling sledges, polar tents and primuses were almost identical with those used in the "heroic age" but there the similarity ended. A ski-equipped Hercules airlifted us into our base

camp and we enjoyed efficient clothing, adequate food, radio contact and almost perfect weather. Unexpectedly easy terrain and settled weather enabled the geological survey of the nunataks to be completed in under a month.

On December 11, two days after our put-in flight, Rod Ryburn found our first *Glossopteris* specimens in the glacial moraine below Mt. Darwin. It took another day to fill in gaps in our first reconnaissance and confirm that *Glossopteris* and *Archaeocyathinae* were not to

bell and Priestley Glaciers. The best part of a week was spent here. No descent into the Priestley was made. In one 24 hour period katabatic winds built up sastrugi which made travelling difficult.

The party got back on to the Campbell Glacier just before Christmas. Working down the glacier they left depots at strategic points and visited potentially interesting outcrops. Most of the time was spent on the south-west side of the glacier, with occasional forays across to the opposite, north east, side.

They now traversed Browning Passage between the Campbell and the Priestley, ascending the Boomerang Glacier for some miles en route. Once on the Priestley, the party went up as far as its junction with Corner Glacier, back to the pick-up point north of Cape Canwe, and on down the Priestley to Inexpressible Island and the Nansen Ice Shelf.

A colony of about 150 penguins was seen on the southern tip of Inexpressible Island. They now moved up the Priestley again past Vegetation Island and were picked up on January 11 and returned to Scott Base.

BIOLOGISTS BUSY

This summer at Scott Base, with an English field assistant, Anthony Rayment, Ian Stirling, of the University of Canterbury, started a three-year project on Weddell seal population dynamics and behaviour.

Mr Stirling and a United States scientist assisted with the killing of 50 seals for feeding to the Scott Base dogs during the winter. Many parts of the seals will be used for biological examination and blubber samples will be sent to New Zealand for testing the presence of D.D.T. in Antarctic fauna.

AT CAPE ROYDS

R. Kirk, who was awarded a bursary last November by the Canterbury branch of the New Zealand Antarctic Society, studied the geomorphology of the nearby sea beaches when not doing routine meteorological work.

Between daytime meteorological observations every six hours, Mr Kirk slept so as to be able to work through the night on the beach and therefore obtain a more continuous study of the animal and bird life in the area.

Another of his tasks was reading the instruments at Rocky Point, an outlying weather station some three miles from the Cape Royds base.

Dr E. C. Young, Canterbury University biologist, with field assistant R. H. Blezard returned to Scott Base from Cape Bird on February 15. They had been studying penguin and skua life at the rookeries on Cape Bird for three months. On the same day R. Kirk, Canterbury University geographer, returned from Cape Royds, where he had been since November. To assist Ian Spellerberg R. Vickers, who is to winter at Scott Base, went to Cape Royds.

WHAT PENGUINS EAT

Mr F. C. Kinsky, ornithologist at the Dominion Museum, Wellington, spent nearly three months at Hallett Station continuing his studies of the Adélie penguin and its feeding habits.

Mr Kinsky spent four days at Scott Base, and flew by helicopter for a four hour visit to Cape Crozier to see the Emperor penguin rookery there. He was flown to Cape Hallett on November 8. Except for a short period when H. J. Cranfield was also carrying out biological work, he was the only New Zealander at the station, although Dr

Choate, an American biologist at present lecturing at the University of Otago, was at Hallett carrying out an N.Z.A.R.P. project.

Mr Kinsky after collecting, dissecting and analysing the stomach content of selected Adélie penguins, estimated that far and away the major portion of the Adélies' diet consisted of euphosia, with smaller quantities of fish and amphipods.

SKUA DEATH ROLL

Mr Kinsky was concerned at the heavy mortality this season at the skua colony at Hallett. Out of a



Imprint of a leaf (approximately half-size) 270 million years old found on Mt. Bartlett by the New Zealand Southern Party.

Photo: A. C. Bibby.

be found in situ at Darwin Nunatak. We then manhauled our two 600lb. sledges across to Buckley Nunatak and made a series of day trips from a base camp to have a close rock look at nearly all the exposed rock faces. Mts. Bowers, Buckley, Bartlett and "Brighton Rock" were climbed in the process. The elusive limestone outcrop reported by Shackleton was found, along with good fossil impressions, and *Glossopteris* and other Permian fossils kept cropping up in such quantity that they began to lose their former power to produce wild cries of EUREKA! Other evidence of the lush vegetation that once flourished there were found including coal seams up to 14 feet thick and fossilised tree trunks.

On New Year's Eve, with surveying and geology completed, we started hauling back to Darwin and the pick-up point. A Hercules landed beside us on January 7, bringing with it the hot exhaust fumes of civilisation.

Our survey will not make geological history but it should settle the 50-year-old controversy that has centred around these 75 square miles of Antarctica. Not many parts of New Zealand get such close attention.

NORTHERN PARTY

CAMPBELL GLACIER AREA

One of the first New Zealand teams in the field since the change-over from topographical and geological reconnaissance to the detailed geological examination of a particular limited area was the four man party led by D. R. Lowe which spent six weeks in the general area of the Campbell Glacier, northern Victoria Land, about 250 miles north of Scott Base, an area where the major place names recall the exploits of Campbell's Northern Party during Scott's Last Expedition.

Using two Polaris toboggans drawing three sledges, the team was flown to Half-Ration Neve at the head of the Aviator Glacier by U.S. R4D aircraft, D. R. C. Lowe and R. J. Cavaney on November 25, D. R. Bates and R. G. Adamson on the 28th, a third R4D coming in soon afterwards with additional fuel. They were greeted by worsening conditions—a five day blizzard, which pinned them down with winds of up to 60-70 knots.

As soon as the conditions permitted, they headed about 10 miles east to the Navigator Nunatak and spent a day there placing movement stakes on the Aviator Glacier, a project which had been suggested by Gair three years before. Particular attention was given to an apparent volcanic flow from Mt. Overlord on the northern side across the Aviator Glacier to Navigator Nunatak. Returning to their put-in point, the team now headed south driving their toboggans across a 9,000 ft. pass south west of the Neve between the Cosmonaut and Campbell Glaciers on the north east side of the Campbell.

After travelling 30 or 40 miles they worked on to the Campbell Glacier about eight miles above Mc-Lea Nunatak. Descending the Campbell they examined the tributary glaciers on its south west side. At the head of Recoil Glacier they climbed to 10,000 ft. under the escarpment of Mt. Hewson and up to the plateau between the Camp-

total skua population of about 400 birds he found in December alone no fewer than 37 dead adult birds. He strongly suspects poisoning, but hopes that analysis of the stomach content will establish the cause of the deaths.

BREEDING LOSSES

The skuas fared badly too in regard to the breeding figures. There were some 150 breeding pairs but only about five per cent were successful in raising chicks. This was chiefly due to the weather. A 48-hour storm on November 30-December 1 destroyed 75 per cent of the nests known at the time, and though most of the birds re-laid, these eggs were not hatched until mid-January, too late in the season for the chicks to survive. To make matters worse, a heavy snow-fall began on January 21, and it was still snowing when Mr Kinsky left on the 23rd. By that time there was a 12 inch layer of snow on the spit on which Hallett Station is built.

By contrast, the breeding result for the Adélie penguins was exceptionally good. The difference is explained by the fact that even in such a heavy snow-fall the penguins can sit it out, and in most cases survive even if completely snowed under. But the skua as soon as any considerable quantity of snow falls on its wings, abandons the nest.

Returning from a run with the dogs to the Cape Crozier area at the end of January, a New Zealand party encountered unusually difficult surfaces in the Trough (between Cape Mackay and Cape Crozier), with snow two to three feet deep and so soft that the dogs found it quite impossible to pull the sledge.

For a project supervised by Dr Patterson, a scientist from California, four New Zealand university students in December were "hired" to dig a trench 180ft. long, 7ft. deep and 5ft. wide in the Polar ice-cap at Byrd Station. The snow at this depth was estimated to have been deposited about 1850.

"ENDEAVOUR"

The naval supply tanker "Endeavour" left Devonport, Auckland, on December 1 to spend four months travelling between Lyttelton and the bases at McMurdo Sound and Scott Base, with supplies and men.

An American icebreaker was already standing by to clear the tanker a passage through the Antarctic waters.

The captain, Commander L. E. Hodge, was making his first visit to the Antarctic as Captain. He joined the vessel in October. About half of the crew have been to southern waters once or twice previously.

The vessel left New Zealand from Lyttelton on December 11 and reached McMurdo Sound on December 22. The vessel carried 650,000 gallons of diesel and aviation fuel for the United States McMurdo Station as well as 36 tons of cargo for Scott Base, and one and a quarter tons of parcel mail for McMurdo station.

Hard work by all hands, plus the 24-hours-a-day summer daylight, resulted in the unloading being completed in 10 hours.

IN TROUBLE

"Endeavour" suffered damage by ice when coming out of McMurdo Sound on December 27 and one of her shafts and propellers needed replacing when the vessel reached Wellington on January 9—on one propeller.

Originally "Endeavour" was to make an oceanographic cruise before the second supply run to the Antarctic on February 7. This cruise was now out of the question.

Ice conditions were the heaviest in years and three U.S. ice-breakers were continuously engaged in keeping the 10-mile channel clear. The ice was so thick that "Endeavour" had to follow directly behind the U.S.S. Burton Island to get through.

The ship, besides her normal complement, carried 12 civilians. She received a battering on the way to Wellington from a severe storm but was never in any danger. Despite

the damaged propeller she averaged seven knots during the 14-day trip—one that usually occupies nine days. Her crew were not able to be in Lyttelton for New Year's Day as originally planned.

Inspection on the floating dock at Wellington revealed that the damage was not as great as was feared. Officers believed the screw and shaft had suffered more damage than it actually had, because of the excessive vibration during the trip back.

The Navy had two spare shafts and propellers sent down from Auckland, but inspection indicated

that only the propellers needed replacing.

Ice also damaged the propellers of the United States Navy cargo ship *Private John R. Towle* but she was luckier than the "Endeavour". Pieces broken off each of the four propeller blades balanced and caused little vibration, and the ship was able to travel to Wellington at its normal speed of 14 to 15 knots.

SECOND VOYAGE

"Endeavour" left Lyttelton on her second trip south on February 9, reached McMurdo on the 23rd and was due back in New Zealand on March 7.

Victoria University Geological Research in the Dry Valleys

By Edward D. Ghent

The tenth Victoria University of Wellington expedition consisted of four geologists who successfully completed a detailed study of bed-rock geology in parts of the Taylor and Victoria Valleys.

The party consisted of:

Dr Edward Ghent (Leader/Geologist)

Robert Henderson (Deputy Leader/Geologist)

Ian Smith (Geologist)

Graham Hancox (Geologist)

The research programme was carried on from three base camps: Mt. Falconer area (above Lake Fryxell, lower Taylor Valley), Lake Bonney (middle Taylor Valley) and Lake Vida (Victoria Valley). Five weeks were spent in the field, including two and one-half weeks at Falconer, one week at Lake Bonney and one and one-half weeks in the Victoria Valley area. Logistic support was provided by U.S. Navy VX-6 helicopters.

The V.U.W. party arrived at Scott Base on the sixteenth of November, but owing to transport difficulties, did not reach the Mt. Falconer area until November 27. The U.S. Navy VX-6 Squadron at McMurdo Base kindly provided large scale

photographs of the Mt. Falconer area. An area of approximately eight square miles was geologically mapped on a scale of one inch = 700 feet. The Mt. Falconer area was selected as being particularly suitable for the study of pre-Beacon petrology and structure because of the good rock exposures and the ease of accessibility.

The party was moved by helicopter to Lake Bonney on December 17 and proceeded to study granite rocks in the areas north and south of the snout of the Taylor Glacier and in the Nussbaum Riegel area. Reconnaissance work by previous university expeditions indicated that these areas were particularly suitable for detailed study of some of the granitic rocks. In addition, the level of Lake Bonney was measured at Bonney hut.

On December 22 Henderson returned to Scott Base and from there back to New Zealand, and on December 23 the remainder of the party was moved by helicopter to Lake Vida in the Victoria Valley. Here the party investigated some granite-schist contacts, collected a section through a 1,400 foot thick dolerite sill, and also collected

numerous samples of wind-faceted boulders (ventifacts).

On January 2 the party returned to Scott Base and arrived back in New Zealand on January 4.

Because much laboratory work remains to be done, we can at the present time present only those conclusions which were arrived at on the basis of the field work alone.

In the Mt. Falconer area the following generalised sequence of rocks, from oldest to youngest, was delineated:

- (1) light to dark grey biotite schists and gneisses
- (2) granite gneiss
- (3) dark-grey dikes (lamprophyres and microdiorites)
- (4) Mt. Falconer granitic pluton
- (5) dark-grey dikes (lamprophyres)

Both sets of dikes (3) and (5) as well as the Mt. Falconer granitic pluton (4) cut across structural trends in the schist (1) and granite gneiss (2). Since the structural trends of the dikes and the granite pluton are approximately parallel, it is likely that the emplacement of all of these bodies was controlled by a stress environment of similar geometry. Dark-grey dikes (3) are cut off by the granite pluton and angular blocks of lamprophyre have been stretched and flattened by movement of the granite and new minerals have crystallized within the blocks. At present, we are studying mineralogy, chemistry and texture of all of these rocks in the laboratory.

In the Lake Bonney area an earlier group of granitic rocks, which are gneissic in some areas, contain potassium feldspar crystals up to 7.5 cm in maximum dimension. These crystals often contain inclusions of plagioclase, quartz and biotite which are zonally arranged. These crystals contain a unique record of the sequence of crystallization. An understanding of the processes responsible for the chemical and textural features of these

potassium feldspar crystals and their inclusions provides us with a potential key to the chemical and physical details of the crystallization of the granite body as a whole. We plan to do a detailed mineralogical and chemical study of these crystals and their inclusions.

This year's university expedition completed the first highly detailed mapping project ever attempted by a V.U.W. Antarctic party. We feel that the reconnaissance stage for V.U.W. Antarctic geological research has ended. Geological problems uncovered by previous expeditions can only be solved by detailed work by personnel with specialised interests. Such detailed work will not only provide solutions to problems posed by reconnaissance work, but also will point the way to new avenues of future research. We will obtain both a better understanding of the geological evolution of the Antarctic continent as well as a better understanding of the geological evolution of the Antarctic continent as well as a better understanding of some geological processes which can be more profitably studied in Antarctica than in New Zealand. Much valuable geological research remains to be done in the Dry Valleys!

WINTER STATIONS IN DRY VALLEYS ?

Preliminary consultations are in progress regarding the setting up of a small winter station in one of the Dry Valleys west of McMurdo Sound, where British explorers were active in the time of Scott and Shackleton, and where Victoria University of Wellington men in particular have carried out extensive studies in more recent times.

It seems likely that an international team of United States, Japanese and New Zealand scientists will establish a base, probably a small prefabricated building like the biological laboratory at Cape Royds, somewhere in the vicinity of Lake Vanda in the Wright Valley, early in 1967, preparatory to wintering over there that year.

PETER SCOTT VISITS ANTARCTICA

Captain Scott's son, Mr Peter Scott, eminent ornithologist and artist, and renowned for his exploits in many other fields, arrived in Christchurch on January 6, and flew in a United States plane to McMurdo on January 12. He was accompanied by two members of the B.B.C. who went to the Antarctic to film an hour-long documentary for television. It will be shown on the B.B.C.'s weekly current affairs programme "Panorama."

"For years my ambition has been to take part in activities that were not connected with the Polar regions," said Mr Scott, now 56 years of age.

"But when this trip was suggested by the B.B.C. I decided that this vanity could no longer continue."

Mr. Scott, vice-president and chairman of trustees of the World Wildlife Fund, is intensely interested in the conservation of wildlife. He is also chairman of the B.B.C. nature programme "Look."

While in the Antarctic, as well as visiting the South Pole and other places of interest, Mr Scott spent some time at New Zealand's Scott Base. On the evening of January 17 he was guest of honour at a dinner there, and the following night camped out in a tent on the ice-shelf. Sharing his tent was Roger Bates of Wellington.

AT CAPE EVANS

"The most exciting part as far as personal emotions were concerned," he said, "was my visit to Cape Evans, which was my father's base in 1911. The hut has been marvellously restored, and the corner where my father had his writing table, his books on the wall behind, is exactly as it was in the famous photograph where he is sitting, pipe in hand, writing in his diary . . . It was a really great thrill for me to sit in the same place." Mr Scott spent about eight hours in and about the old hut, which was built

in 1911, became almost completely filled with ice, and was restored by the New Zealand Huts Restoration party in 1961, 50 years later.

IN CHRISTCHURCH

During his short stay in Christchurch, Mr Scott was one evening the guest of the Canterbury Branch of the New Zealand Antarctic Society, when he was presented with an Antarctic Society tie.

When Mr N. F. Griffiths, chairman of the branch, expressed the hope that Mr Scott would wear the tie on occasions, Mr Scott promptly removed his Wildfowl Trust tie, and put on his new tie. He wore it for the rest of the evening.

During the evening Mr Scott met the only three survivors in New Zealand of the crew of the "Terra Nova" during his father's last expedition to the Antarctic. They were Messrs. W. Burton and W. McDonald (Christchurch), and M. McCarthy (Lyttelton).

Mr Scott visited 14 Kinsey Terrace, Sumner, where his parents stayed for about four weeks before Captain Scott sailed from Lyttelton.

U.S. AND N.Z. GEOLOGISTS' EXPEDITION

It had been planned to send a combined United States-New Zealand party, including two experienced geologists from each country, into the northern Victoria Land area next summer to straighten out various terminological and other discrepancies which have arisen following New Zealand and American journeys into this still comparatively little-known area.

However, heavy U.S. commitments have made it necessary to postpone the combined expedition till the 1967-68 season. The party plans to use helicopters for movement from area to area.

A fortnight's conference of meteorologists from seven countries opened in Melbourne on February 24 for the first meeting of the Working Group on Antarctic meteorology.

Massive French Summer Programme Involved 74 Men

The operations of Expéditions Polaires Françaises in Adélie Land during the 1965-66 summer have been of particular importance, and go far to justify the statement of veteran Polar ship-master Vilhelm Pedersen of "Thala Dan" that the French Dumont d'Urville Base is built "not for the present but for the future."

"Thala Dan" was scheduled to make three round trips between Hobart, Australia, and Base Dumont d'Urville, Adélie Land.

- (1) Hobart, December 7: at Dumont d'Urville, December 13-29.
- (2) Melbourne, January 10, 1966: at Dumont d'Urville en route to Wilkes and Davis Stations, January 18.
- (3) Melbourne-Dumont d'Urville-Hobart, leaving Dumont d'Urville probably in the first week of March.

At the Adélie Land base, between the first arrival and the final departure for the season, were 74 men, comprising 20 who had wintered during TA 15, 29 who are to winter over as TA 16 this year, and 25 members of the 1965-66 summer party.

In overall charge of the initial operations was Paul-Emile Victor, veteran Polar explorer and Director of Expéditions Polaires Françaises, who has been in charge of summer activities in Adélie Land every summer expedition since 1955.

The summer party, with Robert Guillard as operations chief and Marcel Renard responsible for the disembarkation, included four men who had wintered in the Antarctic in earlier years, and six who had previously participated in summer operations.

The new (1965-67) winter team under René Merle includes nine who have wintered before and two who have taken part previously in summer activities. It is Merle's fourth expedition.

THALA DAN

"Thala Dan" left le Havre on October 17 with only one expedi-

tion member on board. Most of the 29 men who are to winter over left Paris by air on November 29 to join the ship at Hobart. The remaining members of TA 16 rejoined their team-mates in Adélie Land, travelling by air to Australia to board "Thala Dan" on her second round trip early in January.

In addition to "Thala Dan's" initial cargo, six and a half tons were shipped aboard MS "Velay" on December 5 at le Havre, to be transferred to "Thala Dan" at Melbourne before the third round trip.

In view of the importance of the building programme, unloading had an absolute priority over all other activities. Four motor-boats were available (the "Thala Dan's" two and two loaned by the Lauritzen Company), a ten-ton and a two-ton sledge and weasels, if necessary the glaciological team's amphibious vehicles, and of course the helicopter.

Unloading began on December 13 and was completed by December 29. All the available transport was in fact brought into use in order to complete the task and so free the ship as soon as possible.

During January and February "Thala Dan" effected the relief of Australian stations before returning to Dumont d'Urville to embark the men of TA 15 and the summer party and return them to France at the beginning of March.

The "Thala Dan" which had made a brief call at l'Île des Pétréls on January 18 was again off the Adélie Land coast on March 1 at 20 hours local time. M. Jean Vaugelade, Mlle Christiane Gillet and M. Haize of the National Space Studies Centre were on board. "Thala Dan" was due to leave a few hours later to

*(Continued foot of column one
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BUILDING PLANS

During the disembarkation period, the new winter team and the summer party lived on the ship. Later, use was made of the new garage while the old Marret Base, reconditioned and supplied with cooking facilities, was used for meals.

While the winter party was discharging the 970 tons of cargo, a big building programme was undertaken by the summer party, including the erection of three buildings with their respective equipment, the siting of three scientific shelters, the installation (to be spread over two years) of a new pumping and sea-water distillation station, repairs and additions to the ionosphere station, including a 73 m-high pylon, and the foundations for the firing of the Dragon rockets in the following summer.

Among the scientific apparatus to be installed are a new sounder and riometer for the ionosphere station, equipment for the seismological station and a new photometer for the night-sky observations. A new automatic telephone station has also been installed.

THE INLAND ICE

During the summer operations Claude Lorius, who led the 1964-66 expedition, headed a glaciological team of five men on the polar ice-cap. This group had at its disposal three weasels, one fitted with a BLU transceiver, and lived in a caravan with full cooking facilities. The motor-boats ensured transport to and from the base on l'Île des Petrels and the Alouette II helicopter was available in case of emergency. The helicopter team of four men from l'Armée de l'Air was headed by Lieut. J. C. Marecot.

The past few months have been intensely busy ones at Dumont d'Urville Base. The helicopter, an Alouette II of l'Armée de l'Air, was used to carry out a topographical and glaciological photographic coverage and to ensure the trans-

port of goods. Between January 1 and February 28 it flew a total of 145 hours and carried 603 tons of cargo.

Technical and scientific work has been carried out as planned, sometimes days in advance of the time set, thanks to the men's hard work and relatively favourable weather conditions. Some examples: a message dated February 19 announced that the floor of the new dormitory had been laid, that 11 kilometres of cables for the electrical supply of the laboratories had been laid, and that the beacon atop the 72,80 m. mast was functioning. The glaciological field party had returned.

ANTARCTIC SPACE PROBE

At Hobart M. Victor gave some particulars of the purpose and nature of the French plan to launch a Dragon rocket into space from Adélie Land early next year. An important element in the massive French summer programme was the building of a launching ramp for this, the first launching of a rocket into space from the Antarctic.

The immediate aim of the rocket programme is to investigate anomalies in ionospheric conditions over the Dumont d'Urville Base. M. Bernard Mollet, of the French National Committee for Space Research, who is in charge of the rocket programme, explained that the rockets he would be using were standard scientific Dragons about 15 feet high with a maximum altitude of 400 miles. He would, however, only be using them in the 50 to 90 mile bracket. "Our Dumont d'Urville base is practically at the South Magnetic Pole," he said, "quite a special point in the Antarctic, especially as far as the physics of the upper atmosphere is concerned. Some ionospheric anomalies have been consistently observed at our base and not at others in the Antarctic or anywhere else."

bring the summer party and the members of TA 15 back to Australia.

In association with the rocket probe the French party will build a 250-foot radio mast for the nor-

mal sounding of ionospheric layers.

France is expected to spend £500,000 on the rocket programme in the next two years.

WINTER PROGRAMME

The main activities of the wintering party will be in the fields of radio-electric phenomena, magnetism, optics, upper atmosphere physics, meteorology, seismology, radio activity and animal biology.

Among the men wintering will be a construction team which will complete the planned building programme. Among the more important of their tasks will be interior work in the Summer Party dormitory and the daytime living quarters (mess-room, kitchen, photo lab, recreation room), and the completion of the rocket-firing installation.

CAPTAIN BOWS OUT

Captain Vilhelm Pedersen, the Danish skipper of the Danish-owned "Thala Dan" will be experiencing his ninth and last Antarctic summer before retiring. He brought his wife and two children, aged 13 and 7, with him from Denmark to Australia. When they return to Denmark about May 1, Captain Pedersen will be taking a shore job with a sea insurance firm.

SEAMAN PRIEST

One member of the French expedition is **Father Jean-Paul Coelenbier** of Pontigny, who is both seaman and priest. He manned the expedition's workboats during the summer operations at Dumont d'Urville as well as conducting Church services on Sundays. In France he is attached to the Missions to Seamen. His dual role results from the post-war movement for "worker priests" within the Catholic Church.

FINAL FAREWELL

Mrs. M. L. Stephensen of Hobart has become well-known for her labour of love in meeting, entertaining and farewelling members of French expeditions in Tasmania en route to or from the Antarctic, over the past 20 years. On December 7 for the last time she said goodbye

to a French party bound for the south.

Mrs Stephensen left Tasmania on January 17 to settle in Queensland near her daughter and son-in-law. In February, 1963, she was honoured for her work by being given a free trip to and from France in the "Magga Dan". She was away for 10 months.

ROMANCE IN THE OFFING?

Who said the romance has departed from Antarctic exploration?

When "Thala Dan" left Hobart on December 7 a Danish seaman took off one of his heavy working gloves, wrote something on it, and threw it at the feet of a blonde girl bush-walker from the mainland. She picked it up and made to throw it back, but he signalled her to read what he had written and keep the glove.

Standing on the Elizabeth St. pier, in jeans and sweater, she read it, blushed and beamed. She was still smiling five minutes later when "Thala Dan", horn blaring, was heading down river for the Antarctic.

(See Illustration opposite)

Foreground: Laboratory no. 1 constructed of prefabricated panels of polyester-glass fabric on a timber frame, with metal floor and up-rights. Notice the scientific apparatus below the masonry posts; on the roof a safety balustrade; to the right the meteorological tower. Lab. no. 2 similar in construction to the above is out of this picture to the left.

Middle Distance: left to right—the new generator house, of similar construction to the laboratories; old (IGY) generator house, the original base and met. tower, provisions storehouse.

Background Right: Meteorological shelter and pylons of the ionosphere antenna.

Background Centre: the floating tongue of the Astrolabe Glacier.

Beyond: the coast of Terre Adélie trending to the east as far as the horizon, with icebergs calved from the Zelée Glacier.



Expéditions Polaires Françaises.

Photo: J. P. Suinot.

ANTARCTIC STATIONS

5

BASE DUMONT D'URVILLE

66°40'S—140°01'E

Our illustration shows a general view of Base Dumont d'Urville looking roughly South-East during the period of Summer activity.

This French base is situated in Adélie Land far to the south of Australia, and is the nearest to New Zealand of all the major Antarctic

stations. It is located on l'Ile des Petrels (Petrel Island) in the Point Geologie archipelago, and is in the immediate vicinity of the Antarctic Continent and Astrolabe Glacier.

The Point Geologie archipelago is the first part of the Antarctic which was sighted by the French navigator J. S. C. Dumont d'Urville, on January 20, 1840. Just as the wildly spinning compasses on the "Astrolabe" and the "Zelée" indicated that the Magnetic Pole must be quite near, to the south, land was sighted. A boat's crew pulled to shore on one of a group of rocky islets and

a proclamation was made taking possession of the territory for France. Geological specimens were gathered, hence the name *Pointe Géologie*. D'Urville named the land *Terre Adélie* after his wife.

After a failure in 1949 to break through the pack off *Adélie Land*, a French expedition in January, 1950, built a base, *Port Martin*, 66°50'S, 141°05'E, to the west of *Cape Découverte*, exactly 100 years after d'Urville's discovery of *Adélie Land*.

The archipelago (50 miles west of *Port Martin*) was visited by a field party of *André F. Liotard's* expedition, and by *Michel Barré* in 1951, and the discovery was made of an immense Emperor penguin rookery of 12,500 birds. For this reason the French expedition of 1952 led by *Mario Marret* erected there on *l'Île des Petrels* a small base which is still used today during the summer campaigns. When during the relief period the *Port Martin* base was destroyed by fire on January 23, 1952, the small party of four which under *Marret* was to winter among the penguins was reinforced by three other men including Australian *Robert Dovers*, and so a base on *l'Île des Pétreles* was occupied year-round for the first time, in a hut 16 ft. by 13 ft.

There was no French team in the Antarctic after the relief of *Marret's* party on January 14, 1953, until with the advent of the *International Geophysical Year* a team under *Robert Guillard* lived at *Pointe Géologie* in the embryo *Base Dumont d'Urville* from January 1956 till they were relieved by *Bertrand Imbert's* party in January 1957.

Since then the base has been greatly improved and enlarged, especially from 1963 onwards, and has been continuously in occupation. The usual wintering party has consisted of 20 men of *Expéditions Polaires Françaises*.

The principal scientific work at the base is in the fields of geophysics (upper atmosphere, middle and lower atmosphere, terrestrial magnetism) and biology.

AIR CUSHION VEHICLES IN ANTARCTICA

The use of the hovercraft, or as it is more correctly named the *Air Cushion Vehicle, A.C.V.*, in the Antarctic appears to be drawing nearer. In a well-informed and soberly written article in an ACV supplement to the November issue of "*Flight International*," *J. R. Green*, *Operations Officer* of the *British Antarctic Survey*, points out that the ACV has not yet been tested in Antarctica, where objectives, problems and weather are all different from those pertaining in the Arctic.

Mr Green, speaking from experience, depicts vividly the intolerable delays which can easily disrupt a whole season's programme in the Antarctic Peninsula area. "If you have ever been on a ship stuck in ice you will know what it is to feel frustrated. There's the land only 50 miles away but it might as well be 5,000! An ACV could do it in an hour: the ship might take six weeks".

Mr Green takes full cognisance of the difficulties and the many unknown quantities involved, but he sees other immense advantages in the use of the ACV: scouting for a route ashore, rapid, safe deployment of personnel, easier supply and transfer of field parties, and he concludes that efficient ACV's with a 2-ton payload could supersede most forms of mechanical surface transport in the Antarctic, while smaller ACV's with a payload of 1,000lb could replace the dog team in all but the steepest and most broken areas.

After pointing out the need for such modifications as the provision of a ski-type understructure and improved braking-power, *Mr Green* concludes, "What is important is that a dialogue should begin now between those with first-hand knowledge of the conditions and a pressing need for ACV's and those in a position to design and build them".

CHANGING PATTERN OF SOVIET ANTARCTIC OPERATIONS

The summer of 1965-66 has seen several innovations in the annual Soviet relief plans, and a further development in the enhanced status of Molodezhnaya Station.

This season the "Ob" arrived in Antarctica in the middle of spring. No previous expedition has left Russia so early in the year—in October. "Ob" left Leningrad about the 25th and in 45 days anchored in Mirny roadstead. The "Ob" stopped only once on this trip—at Dakar, where she replenished her stores.

Only 140 members of the expedition travelled aboard the "Ob", the remainder arriving in Australia by plane towards the end of the year.

AT MIRNY

New buildings are going up at Mirny in spite of the fact that this is its last year as the Soviet Antarctic "capital". The most important building is the fuel storage building. The prefabricated fuel containers were stored in large rolls in the "Ob's" holds and these will be assembled in Mirny. For the first time in Soviet Antarctic history a tanker will arrive in Antarctica. This "guest visit" will provide the station with fuel for several years.

SO FAR BY AIR

On December 29 a Russian Ilyushin-18 four-engined jet aircraft carrying men for the 11th Soviet Expedition landed at Perth airport, Western Australia.

The 55 passengers were transferred to the "Ob", which after being delayed for over a week by bad weather, left Fremantle for the Antarctic on January 2, her second voyage between Australia and the Antarctic this season. Before leaving again for Mirny "Ob" took on stores and fuel, and loaded scientific equipment brought from Russia.

Fifty Russians who had wintered over at Soviet stations returned from the Antarctic on "Ob", and

on December 30 left on the Ilyushin aircraft on the return flight to Russia.

The arrival of the 55 men brought out to Australia by air and to Mirny on "Ob" brought the expedition up to full strength. Members of the party disembarked at the Mirny base and the "Ob" then sailed to Molodezhnaya station and on to the Novolazarevskaya area for a series of oceanographical explorations.

The other members of the 11th expedition, who were taken to Mirny by the "Ob" early in December, were already settling down in Antarctica. Biologists, who include skin-diving among their accomplishments, had already collected specimens from the sea bed near Mirny.

TO VOSTOK

Some members of the expedition were flown from Mirny to Vostok station, in the area of the Pole of Cold, and relieved explorers who had spent more than a year in Antarctica.

On New Year's Eve a group of American and New Zealand explorers spent three hours at Vostok. The group included the head of the wintering party at the U.S. McMurdo station and the Leader of New Zealand's Scott station. With them were three American geophysicists, two of whom were to spend a month at Vostok, while the third will work with Soviet scientists for a year.

MOLODEZHNYAYA

Molodezhnaya will soon become the centre of Soviet Antarctic scientific research. At present a new power station is under construction there and nearing its completion is the new mess-room, while some of the Arbolite houses have already been occupied. The houses are being built, unlike those at Mirny, on

piles, so that the snow can blow through underneath instead of piling against them. Apart from the usual research in the fields of geodesy, geology, astronomy, hydrology, etc., this year the Russians will carry out microbiological research for the first time. Scientists are probing for the best sea approaches to Molodezhnaya in view of the more important rôle planned for this station in the future. Search has also begun for a suitable airfield site, and an area of 11,000 square miles is being surveyed. Active prospecting is going on for economic minerals.

SKIN DIVERS

Three members of the Leningrad Zoological Institute will be the first aqualungers of Antarctica. M. Propp, A. Pushkin and E. Egorov will lower themselves down to 30 m. where they will take samples of water and soil in order to study the conditions of life of micro-organisms.

A number of "AN-6" planes and two specially built truck-tractors have been taken south. Thirty pilots, technical and mechanical experts, will assist the scientists in their research work. Some 2,000 meteorological balloons will be launched.

The Soviet Hydrometeorological Service reports that it is proposed to build a radio meteorological centre at Molodezhnaya, which should ensure the adequate two-way exchange of aero-meteorological information between the Soviet bases and those of other nations. At present this material, which is necessary for the qualitative analysis of weather maps, is received only irregularly on some links.

The new party includes a group of American scientists. One of them, geophysicist John Taylor, will winter with the Russians (Leningrad geologist Lev Klimov will spend a year with the Americans at McMurdo). Hungarian and Polish scientists will also operate from Mirny.

Snow tractors with sledge trailers have set out for Vostok Station with food and supplies. Their journey out and back will cover 1800 miles across the ice-covered plateau.

ICEBERG AGROUND

An iceberg five times the size of London has run aground near Russia's South Polar base, Molodezhnaya, in Enderby Land.

The part of the iceberg above water is about 87 miles long and has an area of some 2,700 miles.

Russian explorers are trying to discover where the berg broke away from the Great Polar Ice Shelf so they can trace its track through the Antarctic waters and estimate its speed.

LITTLE KNOWN AREAS

The huge Lambert Glacier situated to the south of MacRobertson Coast has been studied very little owing to the fact that it is not easily accessible. It has always aroused much interest among Russian geologists and now for the first time the region has been included in the geological research programme.

A party of Soviet geologists flew over 1000 km to reach it and collect sufficient data for new geological maps. Two "AN-6" plans transported a party of 14 geologists on New Year's Eve. The party camped 1100 km south-west from Pravda Coast. Commonwealth Mountains and the southern slopes of Prince Charles Mountains, 680 miles south-west of Mirny, were studied for the first time from the plane. One newly discovered mountain was named New Year Mountain and it was here that the party celebrated their 1966 New Year's day. Interesting geological data were collected in the inner regions of the continent. An Australian geophysicist, John Hay, joined the field party and visited with them the Manning Nunataks and Loewe Plateau. Until then Australian scientists had never visited these parts of Australian Antarctic territory. Data obtained on this trip will be used in the compilation of new geological maps of Antarctica. At the end of the assignment the party went on to Molodezhnaya via Mawson to continue from there research work in Enderby Land and the Napier Mountains.

"OB" DAMAGED

While delivering the members of the 11th Expedition to Mirny the "Ob" suffered slight damage. The ship suddenly sprung a leak in the first hold and began taking water. Soon a number of skin divers and other members of the crew repaired the damage. This occurred when the ship was trying to force its way through fast ice surrounding Pravda Coast. Two "AN-6" planes were delivered to Mirny aboard the "Ob". They were assembled and began operating on the spot between the ship and Mirny. V. Borisov and I. Stepanov piloted the "IL-14" for the first time from Pravda Coast to Molodezhnaya in Alasheev Bay.

OASIS STATION

Seven years ago the Russians handed over to Poland their Oasis Station situated 370 km west of Mirny in the Banger Oasis. Last year the Polish Academy of Sciences asked the leaders of the 11th Soviet Expedition to inspect the station which had remained mothballed in the meantime. During January this year an "LI-2" piloted by I. Stepanov headed for the station with the following passengers on board: L. Dubrovin, director of Mirny; V. Borisov, head of the flying squad of the 11th Expedition and B. Maitchak, a Polish journalist.

The plane landed on an ice-covered lake several miles from the station. Suddenly the ice which had appeared quite solid from the air began to crack and the plane began to slide down and finally hung on a slope while the occupants scrambled out. They reached the station on foot and from there informed Mirny of what had happened.

A plane was dispatched under the command of N. Vahonin, but unfortunately it could not land anywhere owing to bad weather conditions. It dropped fresh supplies to the party and returned to Mirny. On the next day the same plane landed safely and rescued the stranded party.

A TRAVELLING PENGUIN

During the 10th Soviet expedition last year, a banded Adélie penguin was seen at Molodezhnaya. It had travelled over 350 km from the Japanese Antarctic station Showa, across fast ice and drifting blocks of ice. The penguin had been banded there six years ago (November 15, 1959).

MORE ABOUT THE "OB"

It is ten years since the "Ob" and the "Lena" headed for the first time towards the shores of the Sixth Continent where Soviet scientists and explorers established an Antarctic observatory and named it Mirny. "Ob", a huge floating laboratory, is still taking an active part in the study of Antarctica. During these expeditions the "Ob" travelled 325,000 miles, 35,000 of these in heavy ice. She has crossed the equator 20 times. From the data collected by the marine staff on board 15 nautical charts and 10 general maps have been compiled.

Forty-thousand foreigners have visited the ship during her many stopovers in foreign ports.

During her 11th expedition the "Ob" is under the command of a young master, E. Kupri, who will be taking over from N. Sviridov. During the summer the ship underwent a thorough overhaul. During all these trips, tests and experiments were carried out in Antarctic waters while the overland parties continued the work initiated by their predecessors in the fields of geophysics, geology, and glaciology.

S.C.A.R.

The ninth meeting of S.C.A.R., the Scientific Committee on Antarctic Research, is to be held in Chile in September. This meeting will mark the successful completion of 10 years of co-operation in the scientific study of Antarctica: a striking contrast with the constant quarrelling over territorial rights which marked the 10 years following the second World War.

VISIT TO VOSTOK

M. M. Prebble

(Leader, Scott Base, 1966)

On December 28 I was invited by the USARP Representative at McMurdo, Mr Kendall Moulton, to visit the Soviet Antarctic station, Vostok. The flight was made in a USN ski-equipped Hercules aircraft to take three USARP scientists who are operating VLF, riometer and earth current studies at Vostok. One of the American scientists will winter with the fifteen Russians at Vostok, while the other two American scientists returned to McMurdo at the end of January.

McMurdo and Scott Base are Vostok's closest neighbours in Antarctica being 800 miles distant, while Mirny the main Russian supply base, is 1,000 miles away on the Queen Mary Coast. The flight to Vostok took three hours and the aircraft remained at Vostok for three hours to enable the pilot, Commander Morris, the aircrew and the Chief of Staff, Captain Bersik, time to look over the station and meet the Russian scientists. Although Vostok is at the same latitude as Scott Base it is situated on the polar plateau of East Antarctica at a height of 11,500'. The wintering over team is flown in from Mirny early in the season, as are some lighter supplies. However, the main fuel resupply of Vostok is accomplished by tractor train,

POLE OF COLD

Life at this Antarctic station is similar to life at Scott Base in that the main work is accomplished in the field of upper atmosphere studies, but dissimilar domestically because of its location. Vostok is also known as the "Pole of Cold" and temperatures during the winter plummet to -128°F , making danger of frostbite to the extremities as well as the lungs imminent if more than 15 to 20 minutes are spent outside. Although temperatures fall to twice as low as at Scott Base, the wind at Vostok

rarely rises above 20 knots, yet on the other hand it is rarely absent.

The station consists of one central complex with partitioned rooms. Four 9KVA generators keep the temperature inside at a comfortable level, and a lot of the base has the quaint, rustic, atmosphere of a back country sheep station. Faded wallpaper, ornate crockery, scenes of village life in the U.S.S.R. combine to give Vostok a cosy "lived in" appearance. Outside, the featureless plateau extends for thousands of miles and the station buildings are well drifted in. The vehicles present were two large truck-type machines, with tracks over the wheels, which have apparently been responsible for the major re-supply of all Soviet inland stations.

While at Vostok we partook of a sumptuous buffet dinner including various Russian dishes and caviar. Using a USARP scientist who had previously wintered at Vostok as an interpreter, various toasts were proposed to international co-operation in Antarctica. I presented the Russian leader with various publications on Scott Base and the work of New Zealand in the Antarctic and extended to him and his team good wishes from all at Scott Base for the winter of 1966.

Mr Prebble is the second New Zealander to visit the Russian station.

In 1962-63 the Antarctic Division (D.S.I.R.) superintendent (Mr R. B. Thomson) visited Vostok but he went the hard way. As leader that year at the Australian Antarctic station, Wilkes, Mr Thomson led an 1800 mile seismic traverse in vehicles from Wilkes to Vostok.

The return trip took him four months, and at that time the Russian station was temporarily uninhabited.

(see "Antarctic" Sept. 1963)

Australian Reliefs Hampered By Winds And Ice

AIRCRAFT DAMAGED

The "Nella Dan" sailed from Melbourne on December 29. On January 2, the Beaver aircraft on board the "Nella Dan" was severely damaged when it was struck by a giant wave during a 70 knot storm 700 miles south-west of Tasmania. Five feet of leading edge of the starboard mainplane was crushed in. Arrangements were made to ship a new wing on board the "Thala Dan" for delivery to the "Nella Dan" at Wilkes Station. For two days the "Nella Dan" was hove to in mountainous seas.

SHIPS IN DIFFICULTIES

On January 22 a freak storm struck the "Nella Dan", then anchored at Wilkes, Antarctica. Rising from dead calm to fifty knots in five minutes, the wind broke adrift the ship's motor boat and the expedition's rubber landing pontoon which were tied alongside the ship, and swept them out to sea.

The launch, MacPherson Robertson, was lowered and piloted by Dr Law, who was accompanied by Macklin, Dr R. L. Oliver (of New Zealand and now a geologist of Adelaide University) and Second Mate Granholm of the "Nella Dan", set off in pursuit of the escaped craft. They recovered them both after a rough trip in nasty seas while the "Nella Dan" weighed anchor and followed to facilitate the rescue. All were hoisted on board safely.

HELP AT HAND

Meanwhile "Thala Dan" had difficulty penetrating the pack ice belt north of Wilkes. On January 23, 60 miles north-west of the station, Captain Pedersen asked the "Nella Dan" for helicopter reconnaissance. Captain Gommessen took "Nella Dan" through open water thirty miles out

towards "Thala Dan" and then John Treatt flew Dr Law in the helicopter across the pack ice towards "Thala Dan". Conditions around the ship were uniformly difficult, but reconnaissance found a more encouraging area 10 miles south towards which the ship battled.

Heavy cloud came across fast as the helicopter took off for the return flight and, flying low, it was guided to "Nella Dan" by the ship's searchlight, arriving at midnight. "Nella Dan" then returned to Wilkes.

ICE TROUBLE

Earlier the "Thala Dan" had dropped off seven French scientists at Dumont d'Urville in Adélie Land.

The "Thala Dan", carrying the 1966 Australian expedition to Wilkes, reached the station at 1.20 a.m. on January 5, after a very strenuous three days of breaking through a 65-mile belt of pack ice.

The ship, led by D. F. Styles, Assistant Director of the Antarctic Division, spent most of these three days manoeuvring through ice covering nine tenths of the surface of the sea in immense floes, two to five miles across and up to 29 feet thick.

The ice was evidently old bay ice which had broken out from among the icebergs stranded on the Great Petersen Bank which stretches out into the sea north of Wilkes. The floes were heavily hummocked and snow-covered.

"Thala Dan" had had to stop in the pack in a storm for 13 hours on January 22, when visibility dropped to less than 200 yards. For the following several hours the ship was nipped between two large floes and hauled herself out with the aid of her ice anchor after Dr Law had made the ice reconnaissance by the helicopter. Emerging at last into open water inside the pack at 8.30 p.m. on January 24, "Thala Dan" reached Wilkes five hours later.

WILKES

On November 15, a field party returned to Wilkes Station after a tractor train journey of 500 miles.

The party was led by Lanyon, the others being Allen, Seismologist, Forecast, Weather Observer, Holmes, Radio Technician, and Wiggins, Diesel Mechanic.

They left Wilkes on October 1 with three D4 caterpillar tractors, one weasel, one snowtrac, and two living caravans. The weasel was fitted up as a seismic laboratory for the measurement of ice thickness on the Antarctic plateau by the reflection of sound waves.

The purpose of the journey was to carry out glaciological studies and ice depth measurements over a domed portion of the Antarctic Continental sheet about 2000 square miles in area. The men established 32 seismic stations, recording a maximum depth of ice of more than 10,000 feet. Gravity at 472 sites and elevations at 2360 points were measured and observations were made of snow accumulation and stratification along the route.

SNOW DRIFT BEATEN

The present American-built Wilkes Station, of which Australia has custody under an agreement signed with the United States in 1939, has been endangered by encroaching ice. Wind-borne snow has collected against the building, thawed, and then frozen into solid ice which encases the huts.

Wind tunnel research in Melbourne has led to the design of buildings for Wilkes which will not become iced in.

The Supply Department's aeronautical research laboratories used its main subsonic wind tunnel to test building designs which would prevent the snow accumulating.

The successful design provides for the erection of the buildings on stilts. The buildings are linked together in a straight line, presenting to the prevailing winds an appearance like the leading edge of an aircraft wing.

Russian and French Antarctic workers are reported to have adopted the Australian design.

REBUILDING

The rebuilding of Wilkes station is necessary because the present prefabricated buildings have become very dilapidated. The rebuilding is estimated to cost £250,000 over four years.

A building party will work at the station for five weeks before being picked up on the "Nella Dan's" return voyage.

The ship is due back in Hobart in mid-March.

When "Nella Dan" left Melbourne on December 29, one member of the 40-man team on board was Dr Koshiro Kizaki, a geologist.

The expedition's leader, Dr Philip Law, said representatives of other nations had accompanied Australian teams as observers, but Dr Kizaki was the first non-Australian to be an official member of an expedition.

Twenty-seven members of the expedition are going to Mawson for a year.

1966 PROGRAMME

We have some details of the plans for the 26 men at Mawson and the 27 at Wilkes for the 1966 year.

At each of these stations the current observatory programmes of scientific observations in meteorology, geomagnetism, cosmic rays, upper atmosphere physics and seismology will continue.

From Mawson a survey party will travel 160 miles to Stinear Nunataks to link these features by tellurometer with Depot Peak, the most southern part of the accurate survey from Mawson. The survey will then be extended fifty miles further south to embrace the northern ranges of the Prince Charles Mountains.

Glaciological studies of the Plateau ice within fifty miles of Mawson will be made during a number of field trips. The work will be concerned mainly with measurements of the accumulation of snow, of the movements of the ice sheet, and of the crystal structure of snow and ice at different places and depths.

Glaciological studies at Wilkes will be concentrated upon an area about 150 miles in diameter, immediately east of Wilkes, which constitutes a dome of ice similar to the great Antarctic ice sheet in miniature. Measurements involved will be accumulation of snow, changes in elevation, changes in position of the coast and surface movements of the ice.

UP TO DATE

The latest news from Wilkes is this letter from the new leader Alan Blyth at the end of January.

"After an eventful trip on the "Thala Dan" and an even more eventful visit to the French base, Dumont d'Urville, we finally struck the pack ice outside Wilkes. Four days and sixty miles later we rapidly approached Wilkes. With the departure of the old party, the entire personnel were kept busy with unpacking and organising the usual chaotic situation.

"The mechanical team are engaged in a rush programme concerning the proposed nine-weeks field trip in early March. Huddy and Williams have already begun their unlimited number of trips to the distant transmitter hut. Sillick and Nicholson are busy breaking away blue ice with a rock drill, hoping to re-open the corridor connecting the main camp to their workshop before winter."

WAITING FOR RELIEF

At Mawson Station the 1965 party patiently waited for relief and leader Woinarski wrote at the end of January:

"Unexpectedly we can bring you another month's doings. This opportunity has presented itself due to the sea ice which has successfully delayed first the "Nella" then the "Thala". This has put forward our changeover date to the first week in February—hence the newsletter.

"January proved to be one of our

most eventful months, with two parties in the field, returning John Haigh's visit to the Russians, and their return visit to Mawson. These, plus an intense programme of station maintenance, made the month literally fly. We are now eagerly awaiting the advent of the little red ship and its cargo of news from home. With only three days to go before she berths, a great deal of last-minute polishing up is still going on, but the station is looking a picture, and we are all rather proud of our efforts.

"Haigh's visit to the Russian geological field party gave him an opportunity to learn a few facts about Russian living standards in the field. They have much bigger tents than we do, use fur sleeping bags, have far less variety in their meals, smoke strong, coarse cigarettes, drink vodka and are pretty much like you and me. On their return visit we found them very pleasant fellows and rather partial to our hospitality. There was much trading of hats, with Ritchie winning out in the end. He had to get a birthday present, somehow or other! The field party returning from Depot Peak met the Russians at Gwamm on their way back to their aircraft. A pleasant half-hour's fraternising took place during which Corry entertained the visitors with rides on the Polaris, much to their obvious delight.

"The spring trippers had many tales to tell on their return. They were relieved to find that the four-man, two-dog team they met at Twintop was not a search party out looking for them. This party, Bennett, Lachal, Martin and Vrana, spent a most exhilarating week or so climbing in the Masson and David Ranges. On their last night out, Vrana learned to his cost that the Antarctic wind is a force to be reckoned with, when a 90-knot wind lifted him off his feet to end up against a boulder some 15 yards away. Doctor Cameron at last had a chance to demonstrate his technique and Vrana is now hobbling around the station with a plaster cast on his leg—nothing broken, just torn ligament attachments."

SEVENTH JAPANESE EXPEDITION SETTLES IN AT SHOWA

Showa, the base for six Japanese Antarctic expeditions (1956-1962) but unoccupied since February, 1962, has been re-opened.

The new 7,760 ton icebreaker "Fuji" left Fremantle on December 11, and met the Antarctic pack ice line at 63°S, 84°E on December 20. She was so powerful that she could easily advance through closed pack, and reached the rim of fast ice some 30 miles north of Showa Station on the 30th. The first helicopter flight to reopen Showa Base was successfully accomplished on December 31 when Shikolsky S61A carried nine men including Mr M. Murayama (leader of JARE VII) to the station. The buildings and vehicles were all well preserved after four years' absence. Ice conditions this season were very favourable for helicopter operations. There were three major air-lift periods until January 26. Finally the ship moved to fast ice extending from Ongul Island, on which the base has been established, for a distance of about 200 metres. It was about 1.6 km from the base itself.

On board "Fuji" were 182 crewmen, 40 members of the Japanese team, five observers and three press-men. About a third of the team, whose average age is 34, have been members of earlier expeditions.

UNLOADING

A total of about 400 tons of cargo was airlifted including about 14 tons of oversnow vehicles and sledges. There were about 220 air flights. Extension of buildings and setting up of scientific equipment were also carried out one after another. At 1 p.m. on January 20 the re-opening ceremony was held, when Hinomaru (the national flag) was hoisted high up on the wireless tower and Kimigayo (the national anthem) was sung in the chilly air.

A major problem was how to land the heavy snow-car (9 tons) which was newly built for the long inland trip scheduled for the wintering team. So "Fuji" tried to get nearer to the station against hard fast ice for a week, during which a further 30 tons of goods were transported by air. On the 27th she fortunately found a lead, and could reach within a mile of the station. The snow-car was landed and driven on fast ice. The scheduled supplies to the station were successfully transported. The 400 tons of material unloaded is the largest quantity ever by a Japanese expedition. JARE I unloaded 151 tons, II none, III 57 tons, IV 154 tons, V 121 tons and VI very little. The ship stayed at the mooring site from January 26 to February 1. After surveying the coastal area, she left the ice edge in order to make oceanographic observations.

WINTER PARTY

On February 1, 18 wintering members were left at the station as well as five summer party personnel who were picked up later. Routine observations of surface synoptic meteorology, ionospheric physics, seismology and tide were commenced at 0000 hours (local time), of February 1.

The summer party is led by Mr Masayoshi Murayama and the wintering party of 18 is led by Dr (Med.) Akira Muto. The wintering party consists of 5 geophysicists (ionosphere, aurora and nightglow, geomagnetism, tide, gravity etc.), 3 meteorologists, 2 biologists (one is Dr T. Matsuda who visited the Russian stations and inspected Showa

Station in 1965), 2 radio operators, 2 mechanics, 2 logistic supporters and one cook. The wintering party is expected to travel over the continent toward 75 degrees S. lat.

Oceanographical observations were made in Lutzow-Holm Bay, during which some expedition members including Mr Murayama and Captain Honda visited neighbouring stations by helicopter; the Soviet Molodezhnaya Base on the 3rd, where they met the crew of the "Ob" (an "intimate friend of the Soya") and the Belgian Roi Baudouin Base on the 9th, where they were also warmly received. The five men who had supported the wintering team at Showa Station finally returned to the "Fuji" by air on the 7th.

The "Fuji" was to leave the Antarctic coast on February 16. and after calling at Cape Town between February 24 and March 3 will return to Tokyo on April 8.

NEW BUILDINGS

The old Showa Base is being greatly enlarged. Eleven new buildings are being constructed, all connected by covered-ways. Some of the new buildings are pre-fabricated. The first structure erected this year will ultimately serve as a warehouse, but accommodated the 40-man team while further building operations continued. It has an area of approximately 80 sq. m.

The second building erected, an oval structure of light metal, with an area of approximately 70 sq. m., houses the generating plant. The two 45 k.w. generators were expected to start operating within 48 hours of installation. Other new buildings are a refrigerating room (10 sq. m.), a wireless transmitting building (30 sq. m.), a communication building (47 sq. m.), an ionospheric observatory (41 sq. m.) and rooms for measuring the changes in terrestrial magnetism and for the observation of earthquakes. Finally, there are to be mobile observation rooms which can be mounted on sledges and transported anywhere.

WINTER PROGRAMME

The wintering party's main research, in addition to the usual meteorological recordings, will be in the fields of:

Superstratospheric Physics: aurora, noctilucence, ionosphere and terrestrial magnetism, all of particular significance since 1966 is the International Quiet Sun Year, when sunspots are least active. A newly developed instrument will filter the light of the aurora into six different colours and continually measure the changes in strength of the respective lights.

Biology: intensive studies on the lichens and plankton living under the Antarctic ice fields. The mobile observatories mentioned above will be used for this purpose and also for close observations at penguin colonies.

All meteorological observations, temperature, humidity, atmospheric pressure, wind velocity and direction, will be completely automatic and continuous. One device, an electronic computer, will record the average wind velocity and direction every ten minutes. A plant-growing device will enable the men to grow vegetables at the Base, including spinach, lettuce and radishes. The device, which employs artificial rays and chemical fertilisers, has been successfully tested in Japan, and should ensure an abundance of green vegetables during the long winter night.

AND FOR SPRING

When spring comes, trips will be made into the interior to make preliminary observations for the establishment of an advance base, Showa 2, a few years hence, and for a projected journey to the South Pole in the near future.

A large-size snow-car has been constructed for these probes into the Antarctic hinterland. It is 5.5m. long, 2.7m. high, and is equipped with a 140 h.p. engine capable of a maximum speed of 25 km. per hour. It can operate at 60° below zero C. and can cross a crevasse two metres wide.

of maintenance of the base kept at high level by the 1965 expedition under the command of civil ingénieur Winoc Bogaerts, in spite of the heavy snow accumulation on top of the building.

The unloading of the 1966 expedition material (350 tons) started on January 14. The two miles of bay ice at the bottom of the bay was very insecure owing to small leads of water. This imposed the use of only the light Muskeg tractors to pull the sledges loaded with material to the top of the shelf where the snocats were awaiting them. On January 17 all the bay ice and the slope at the bottom went away and Captain Nielsen succeeded in putting "Magga Dan" alongside the shelf to continue unloading operations. The Hanomag tractor was then safely unloaded and was driven immediately to the base to dig with its blade two 40 metres long, 3 metres wide tunnels which were covered with arched corrugated plates for the storing of material.

The diesel engineers of both the 1965 and the 1966 expeditions were kept very busy with the replacement of the motors of two of the three 20 KVA generators.

AIR OPERATIONS

On January 19 unloading was over. In the meantime the summer activities went along very well in spite of a few days of bad weather. The aviation team under the leadership of Lieutenant Bernard de Biolley had 130 flying hours: vertical air photographs of the coast between 24° and 28° East—personnel transportation especially for the surveyors who were landed along the coast at six different places for astro fixes—cargo transportation to the mountains for the February and October trail parties.

The oceanographers made echosoundings in the different coastal bays, took tide measurements, gathered plankton and made fish collections. Special Summer programmes in Solar Particles and Radiations monitoring and in at-

mospheric electricity were successfully carried out. The biologists studied and collected 30 emperors and 8 Adélie penguins for study of the mycose disease.

TAKE OVER

The official ceremony of taking over the Base took place on February 4. "Magga Dan" sailed on the same day and arrived in Cape Town on the 15th. The members of the 1965 expedition and of the Summer Campaign were flown back by the Belgian Air Force to Brussels where they landed on February 20 and were officially welcomed home by many Belgian and Dutch authorities. Only biologist Van den Sande remained on board of the "Magga Dan" to take care of the penguins. The ship is expected in Antwerp on March. 24.

TRAIL PARTY LEAVES

Latest news from King Baudouin Base indicated that Leader T. Van Autenboer left the base for a two months' trail party with one other geologist, two surveyors, one radioman and one mechanic. They are travelling with two dogteams, a Polaris Toboggan and two snocats.

The Japanese ice-breaker "Fuji" paid a visit to King Leopold III Bay on February 12. The Leader and the members of his expedition went aboard and were welcomed by Mr Muruyama, leader of the Japanese expedition, and by Captain Honda. Then Leader Muruyama and three members of his expedition went to Base Roi Baudouin where the remained two days. Souvenirs were exchanged.

Baron Gaston de Gerlache, Chairman of the Belgian-Dutch Antarctic Committee did not go to Base Roi Baudouin this year. He was the guest of the Chilean expedition and visited with them in December and January their bases in Greenwich Island, Deception Island and Palmer Peninsula. He sailed on the "Yelcho" for a week in the de Gerlache Strait discovered by his father, Baron Adrien de Gerlache, on the "Belgica" in 1898.

New Belgian-Dutch Team For Base Roi Baudouin

Eighteen men, twelve Belgians and six Dutchmen, left Antwerp by air on December 27, with a summer party of 20, for the relief of the Roi Baudouin Base (70° 26' S., 24° 18' E.).

The 18 men of the 1966 Expedition, with the 15 men of the Summer Campaign (amongst them four Dutchmen) and the US Navy observer Lt. Myers boarded the "Magga Dan" in Cape Town on January 1, 1966.

M.S. "Magga Dan" had left Antwerp on December 5 with three members of the Summer expedition in charge of an oceanographic programme between Antwerp and Cape Town. On board also were 13 huskies, an Otter and a Cessna 180 aircraft, one jet-powered helicopter Alouette, two snocats, one Muskeg and a Hanomag heavy tractor.

Leading the expedition is geologist Tony Van Autenboer, who on two former occasions wintered at Roi Baudouin base and surveyed the Sor Rondane mountains, more than 200 kilometres inland. In addition, Mr Van Autenboer has taken part in many summer expeditions in the Arctic and in Antarctica.

Other polar veterans are the pilot de Biolley, head of the aviation team, the meteorologist Gordts, the biologist Van de Sande, the doctor Buis, the mechanic Pierre, and the topographers Mousset and Van der Salm.

The winter team relieved at the end of January the 1965 expedition commanded by W. Bogaerts and will complete the 1965 expedition's programme. The summer programme includes the mapping of a coastal portion provisionally mapped during the 1960 expedition.

The expedition was organised in Belgium under the responsibility of

the Belgium/Netherlands Antarctic Committee, chaired by Baron de Gerlache. This Committee is assisted by a scientific committee under Professor Paul Bourgeois. The average budget of an expedition is around 25 million Belgian francs, to which the Netherlands contributes 8 million. The Ministry of National Defence gives substantial assistance to the expeditions, both in personnel and in equipment.

The expedition's aircraft comprise:

- 1 Cessna 180
- 1 Alouette II
- 1 Otter

For land transport the expedition has three sno-cats, two muskegs, three Polaris toboggans, two AS 24 vehicles, a bulldozer and two teams of dogs.

The old, unoccupied Roi Baudouin Base built in 1960 has heating and lighting facilities, and could in an emergency be occupied by 20 men with enough food and fuel for eight months.

On the 10th the ship entered pack ice in latitude 67°40'S, and was stopped for 10 hours. After an air reconnaissance with the helicopter she was able to resume her route and arrived in King Leopold Bay on the 13th. Captain Hans A. J. Nielsen, Master of the "Magga Dan" had for the second time a lucky journey South. This year's journey was even shorter than last year's. The new winter expedition leader, veteran geologist Tony Van Autenboer, was flown immediately to King Baudouin Base. He was very impressed by the very good state

50 YEARS AGO

In March, 1916, the 28 men of Shackleton's Trans-Antarctic Expedition were being borne on a vast ice-floe by wind and current from the Weddell Sea, where the "Endurance" had been trapped and eventually sunk, northwards along the east coast of the Antarctic Peninsula towards South America.

On March 25 carpenter McNeish wrote in his diary:

There is a blizzard on at present I prophesied this yesterday as there is never a fine day in these latitudes but there is eight bad ones against it. Our floe is beginning to look dangerous now as it is beginning to crack in many places but it is generally the way. Through putting off till tomorrow what can be done today. Our bill of fare now

had to put to sea again for three days owing to bad weather but returned to complete the job in good time. Going north she found no ice and is due to reach South Georgia on February 9, five days earlier than expected.

The latest news from the South Shetlands is that they have visited most of the sites previously selected for study, and several others found to be of interest. Amongst these was Dee Island where the remains of a petrified forest was discovered, much of it embedded in a cliff face.

ANTARCTIC VANDALS

Whilst assisting with this work H.M.S. "Protector" visited the old base in Admiralty Bay. When last visited by one of the Survey's ships the hut was in good condition with the windows boarded up, the doors closed and everything generally ready for occupation either by summer field parties or anyone in need of shelter. "Protector" reports that she found the hut in a shocking state with all windows broken and the interior littered with empty bottles and beer cans. Her Captain said it looked as though a jolly good party was under way when someone blew the whistle and the party broke up in a hurry. Let us hope that, one day, those responsible will find themselves in need of shelter.

for breakfast:

½lb. of meat and half a cup of watery milk.

Lunch

1 sledge biscuit + 1 tinned her-ring.

Dinner

½lb. of dog pemmican or ½lb. of boiled meat and 6 cubes of sugar.

Sunday, March 26, Lat. 63-1 South, 58.27 West. Temp. plus 4, light NW wind. Nothing doing only trying to sleep away the hunger. We are going on a shorter allowance tomorrow ½lb. of dog pemmican and a cup of milk for breakfast. Lunch 1 biscuit and 3 cubes of sugar. Dinner ½lb. of boiled seal meat of which there is not 2 ounces of nutirement, so we are longing for open water. Joinville Island is still in sight, but it is no good to us as we can't move over the rough hum-micity ice.

Monday 27th: Lat. 62-57 South, 53-10-15 West, Temp. plus 4. We are 5 months on the floe today and there is a(s) much chance of us getting of(f) it now as there was at the start, in fact less as we have not the dogs and as the leads open they freeze over. I only hope for good SE gales so as to jam us in the straits and not let us drift out to sea.

Thursday, March 30: We had a rude awakening this morning . . . as our floe started to break-up. Well we got the boats and sledges shifted and was going to have breakfast when cracked again under the James Caird. But we got her over before she fell in the ditch. . . . While at breakfast a sea leopard came up and went to sleep peacefully but it was his last sleep . . . we got the boats sledges shifted stomach and we are having them for breakfast tomorrow.

Ten days later the floe had become so small (a triangle with sides 90, 100 and 120 yards) that they took to the boats and after six more days of cold, hunger and thirst they made a landing on desolate Elephant Island.

CHILEAN STATIONS RELIEVED

The annual operation for the relief of the Chilean Antarctic bases, all in the area of the Antarctic Peninsula (still called O'Higgins Land by the Chileans!), began on December 4, when the "Yelcho" (Capitan de Corbeta don Victor Henriquez) sailed south from Valparaiso.

"Yelcho" reached Punta Arenas on December 12 and was joined by the icebreaker "Piloto Pardo" on the 15th. It was anticipated that after a second voyage the whole operation would be completed by March 10.

Selection of the new base personnel began as early as July and a rigorous selection was made from personnel of the three Armed Services and from the scientific personnel of the Universities.

In charge of the whole relief operation was Capitan de Fragata don Mario Poblete. In addition to the inspection of bases and the change-over of wintering personnel, scientific observations were carried out during the traverse of the Bransfield, Gerlache and Grandidier Straits, Marguerite Bay and other parts of the Pacific Coast of the Antarctic Peninsula. "Yelcho" carried fuel and supplies as well as building material for the reconstruction of a hut at Bernado O'Higgins Base which was destroyed by fire nine years ago.

BERNADO O'HIGGINS (63°19'S, 57°54'W) on the west coast of the Peninsula was inaugurated in 1948. A new dormitory and a hospital were scheduled for construction here and studies were planned in meteorology and seismology. The new Officer Comamnding is Teniente Sr Oscar L. Bustamante. The wintering team will number eight.

AT ARTURO PRAT (62°29'S, 59°38'W) on Greenwich Island in the South Shetlands, established in 1947, eight men will winter over under Capitan de Corbeta Sr Ernesto L. Taucan. Repair work is being carried out and meteorological observations made.

PEDRO AGUIRRE CERDA (62°56'S, 60°36'W) on Deception Island will be under the command of Commandante de Esquadrilla Sr Roberto S. Bahner. Here a more

extensive programme is planned, embracing repair work, radioactivity, meteorology and glaciology. During the summer scientists from the University of Chile will be engaged on a programme comprising volcanology, seismology and ecology. Aguirre Cerda Base was established in 1951.

A penguin census will be carried out at all three bases.

Gonzalez Videla Base is at present occupied as a summer station only. It is situated on Paradise Bay on the Danco Coast, in 65°49'S, 62°51'W.

FIRST VOYAGE COMPLETED

On New Year's Day "Yelcho" arrived back at Punta Arenas with the teams which had wintered over at the three bases. There was the usual emotion-charged welcome home.

Captain Henriquez told reporters that after a 44-hour crossing of Drake Strait the ship entered Antarctic waters on December 16. Drake Strait was an old friend for the ship's crew as they had spent some time in its often stormy waters in March and April, while participating in Operation Mar Chile IV. The strait was again friendly. However, said the captain, "In the vicinity of the Antarctic we encountered great bergs, regular monuments rising to a height of 80 or 90 metres. They were lined up like soldiers on parade."

When the ship reached Pedro Aguirre Cerda at 6 a.m. she met the Argentine vessel "Bahia Aguirre". But after an hour's stay to distribute mail, fruit and vegetables, the first the wintering team had had for a year, "Yelcho" proceeded to Arturo Prat naval base. This rearrangement of programme was made because of threatening adverse weather conditions. As soon as mail and supplies had been delivered, the ship returned to Pedro Aguirre

Cerda, which is well-sheltered from the prevailing winds. Here petrol was unloaded, urgently required in view of the building operations which are referred to above and which were soon begun.

Christmas Day was spent at Arturo Prat and the opportunity was taken to allow men to communicate by radio with their friends in the motherland.

The expedition re-opened Gabriel Gonzalez Videla Base, which had been closed for some time. They found the station intact, and without even a trace of dust. They set the "refrigerating" and communication systems going and unloaded petrol. To their delight they found the mess-room table laid for breakfast and were very soon taking advantage of this fact.

AT PALMER STATION

"Yelcho" now visited the United States Palmer Station on Anvers Island on the west coast of the Antarctic Peninsula. The weather was rough and visibility poor. A small party went ashore by boat at midnight, their arrival being a complete surprise to the Americans at the base who, in response to knocking, opened the door—to confront a group of Chilean sailors.

It had been hoped to visit a nearby British base but this was impossible as the sea was completely frozen over.

IN GERLACHE STRAIT

At the first Chilean base visited the "Yelcho" company were delighted to meet Baron Gaston de Gerlache, Director of the Belgian Antarctic programme. On the return voyage he traversed with them the route followed by his father, Adrien de Gerlache, who in 1897, in these waters, led the first expedition ever to winter in the Antarctic. Gerlache Strait is of course named after him. This was an emotional experience for Baron de Gerlache, who was moved to tears as the ship passed features bearing the names of his relations. He expressed his deep gratitude to the Chilean Government for giving him the opportunity to make this journey.

SECOND VOYAGE

"Yelcho" left Chile for the south again about a week after her return from this first voyage, with more cargo for the bases, and in order to service the various Chilean beacons.

The summer working parties were scheduled to return to Chile by air, the Army and Navy personnel by aircraft of Linea Aerea Nacional, the Air Force men by a transport of their own service.

CHILEAN CLAIMS RECALLED

In a long article published on October 31, the Chilean newspaper *El Mercurio* recalled that November 6 was the 25th anniversary of the promulgation of Decree no. 1747, by which Chile in 1940 laid claim to the sector bounded by the meridians 53°W and 90°W of Greenwich.

No specific mention is made of the northern limit of the claim, but the map accompanying the article bears out the usual assumption that it coincides with the southern limit of Chile itself. The decree does specifically refer to "all the lands, islands, islets, reefs, pack-ice, etc., known or still to become known and the corresponding territorial waters" as constituting the actual physical features to which the claim refers.

The writer declares that Chile's claim to sovereignty is based on "historical, geographical, administrative, legal and diplomatic titles". Unlike the claims of other countries, including New Zealand, Chile's claim is not based on discovery and occupation. Chile's primary contention is that Chile was a colony of Spain, and that the Spanish monarch Charles V laid claim to the Antarctic lands right to the Pole, which were governed in his name by the Captain General of Chile.

When Spain granted Chile her independence in 1810 it is claimed, all these claims passed to the infant nation.

The "geographical" aspect concerns the contention that "Chile and the Antarctic are joined by a submarine ridge".

Argentine Aircraft Makes Forced Landing In Far South

A period of several days intensive search ended happily when the crew of an Argentine plane which force-landed south of the Weddell Sea was discovered alive and well.

On September 30, 1965, the crew of a Cessna AE 205, returning from the southernmost scientific base Sobral, south of the Weddell Sea, towards General Belgrano Station (77°58'S, 38°48'W), where the aircraft was based, found this station closed because of fog and had to return to Sobral. Here the same conditions prevailed and a landing was impossible.

The pilot, Teniente Eugenio Goetz, decided to make another attempt to land at Belgrano, but during the flight it became necessary to make an emergency landing in an area where snow drifts were piled up and the resultant crash broke the aircraft in two. Fortunately none of the four crew members was injured.

They had food for 20 days, a portable sledge, and survival kit. They were unable to establish their exact position because of adverse weather conditions but made radio contact with Belgrano and reported the accident.

At 5.30 p.m. on the same day a rescue team left Belgrano for the site of the crash but was forced back by climatic conditions. Early next morning another rescue bid was attempted. The weather was so bad that a search plane could not be sent out from the Matienzo Base, but the rescue team managed to reach Shackleton, the abandoned Weddell Sea base of the Trans-Antarctic Expedition.

On October 2 the weather improved and at 11 a.m. the Douglas DC 3 TA-OS aircraft of the Argentine Air Force left Matienzo Base (64°58'S, 60°03'W) far to the north. Meanwhile the team of the crashed plane had been able to establish their position, 20km. south of Belgrano. Leaving the wrecked aircraft they set out on foot for Belgrano, where it was hoped that transmis-

sion would be easier than at the very rugged terrain where the crash occurred. At the same time another team left Belgrano for the scene of the accident and linked up with the first team, which had arrived at Shackleton the day before.

Next day, the 3rd, the Douglas plane from Matienzo landed at Belgrano at 3 p.m. to refuel, and despite some mechanical troubles left immediately to make a thorough search. Neither aircraft nor ground patrol had succeeded in finding the personnel of the crashed plane.

On October 4 the Douglas DC 3 again set out from Belgrano, with the Base Commandant Mario L. Olezza and Colonel Jorge E. Leal, Chief of the Antarctic Division of the Army Staff. After eight hours' flying, at 2.30 p.m., Lieutenant Goetz and his companions were sighted 25 km south of the extreme eastern point of the Gran Grieta, obviously completely lost as a result of the fog and the impossibility of obtaining accurate astronomical observations. The rescue plane dropped survival kit and radio equipment, and the men were told to remain where they were.

At 6.15 p.m. a rescue team left Belgrano under Captain Gustavo Giro. Nearly three days later at 2.45 p.m. on the 7th, Captain Giro returned to Belgrano with the crash personnel safe and sound.

THREE NATIONS CONCERNED

The American Palmer Station, on Palmer Peninsula, was visited by the Chilean Naval vessel "Yelcho" on Christmas Eve. The "Yelcho" was on her way to supply the Belgian-Dutch Antarctic expedition. On board was Baron A. de Gerlache, the president of the expedition.

POLAR TREK

Buenos Aires gave a demonstrative welcome on February 8 to the Argentine Army team under Colonel Jorge Leal who are reported as having made "the first Argentine land expedition to the Pole."

The party left Belgrano Station (77°53'S) on October 26, 1965, reached Sobral, the furthest south Argentine base, in 81°4'S, 40°36'W, 420 km from Belgrano, and covered the remaining 900 km to the Pole to arrive there on December 10.

The team comprised, in addition to Colonel Leal, Captain G. A. Giro, R. Seppi, J. Ortez, J. A. Rodriguez, A. H. Carreon, A. F. Perrez, I. D. Zacarias and A. O. Moreno.

The team of ten men using three sno-cats drawing eight sledges took six weeks to cover the 600 miles, from Belgrano to the Pole which they reached a day earlier than expected. For much of the time they had temperatures of 20° below zero, but the weather improved as they neared the Pole. For 58 hours shortly after the arrival at the Pole radio contact with their base was lost.

THOSE DOGS

News that the Japanese team at the re-opened Showa Base has two dogs recalls the world-wide interest aroused when two of the 15 Karafuto dogs left behind when the base was evacuated in 1957-58 were found alive the following summer (see "Antarctic" March 1958, p. 239, March 1959, p. 27). Readers will be interested to know that one of these dogs, Toro, after three and a half years in the Antarctic, is now enjoying a comfortable life on the campus of Hokkaido University in northern Japan. Jiro died during the Antarctic winter, 1960. His stuffed body may be seen in the Japanese National Science Museum.

In our next issue

**MEET 4 VETERANS
of the
DISCOVERY EXPEDITION
1902-1904**

LAW MOVES ON

The head of Australia's Antarctic programme, Dr Phillip Law, will be the first vice-president of the newly-formed Victoria Institute of Colleges. The Institute was established last year by the Victorian Government as a co-ordinating body to admit to membership as affiliated colleges any institutions in Victoria, other than the universities, which offer tertiary courses. Dr Law, who is at present in Antarctica, will take up his appointment in April.

Dr Law will be the chief executive officer of the institute, with responsibilities similar to those of the vice-chancellor of a university.

Dr Law, 53, at present Director of the Antarctic Division of the Department of External Affairs, has been over the past 25 years scientist, administrator and author of many scientific publications.

Some years ago he held a teaching position at the University of Melbourne, membership of the council of the University of Melbourne and of the interim council of Latrobe University.

WOMEN AN ASSET

Women would be a definite asset in Antarctica, but it would be a few years yet before facilities were available for them, an American scientist said in Auckland on February 7.

"I would certainly like to see women in Antarctica," said Dr T. O. Jones, director of environmental sciences and Antarctic programmes at the National Science Foundation, Washington.

As an example, he pointed to the United States research ship "Eltanin", which took on four women a year ago for a 60-day expedition in the Antarctic region. "That ship improved one hundred per cent the day women went aboard," he said.

As in the "Eltanin", women in Antarctica would be scientists doing research studies.

Although he could foresee women there for a few weeks during the summer, Dr Jones felt the six-month winter residence would be out of the question.

BUSY SUMMER SEASON ENDS AT UNITED STATES BASES

STATION NOTES

McMURDO

December was ushered in at McMurdo with a record fall of 10in. of snow in 48 hours, accompanied by 75-knot winds which halted all air operations. Yet two weeks later there was so little snow about that ships coming into the Station were asked to pump 5000 gallons of fresh water ashore for local consumption. Not that ships found the entry easy. A large ice-floe in McMurdo Sound blocked the shipping channel and had at one stage trapped the ice-breaker "Burton Island."

On watch 24-hours of the seven days of the week are members of the McMurdo Fire Station, ten in all, and all graduates of fire-fighting schools. Fire in the almost totally dry climate of the Antarctic is perhaps the greatest threat to man, destroying as it could his shelter and his supplies, without which he could not exist for any time at all. McMurdo's Fire Brigade has been trained in the use of Ansul, a dry chemical powder compound which effectively replaces the usual foam extinguisher, which freezes up in the bitter cold. Automatic alarms in the Station's buildings blink lights in the Fire Chief's office: an alarm bell in the Fire House produces the same results as alarms in any Fire Brigade building, with men sliding down the pole and rushing to man trucks fitted with water and Ansul. Less than 5 minutes later, on an average, the fire has been put out. As well as fire-fighting the men are divided into three eight-hour shifts for fire prevention, patrolling buildings, checking oil stoves, looking for fire hazards and checking fire extinguishers.

Wherever there are men, it seems, there are clubs, and McMurdo

Station is no exception. Remote and isolated as it is, McMurdo can boast of a number of clubs, ranging from its Playboys Club, an after-work meeting place for sailors; the Bamboo Hut (or, officially, the Staff Lounge); Harold's Club of Reno, another partitioned-off section of the Navy's living quarters, and finally, the Ross Hilton Hotel, by necessity the best hotel in Antarctica, where Hilton Hotel towels, matchbooks, bathmats, etc., from all over the world are proudly displayed. The hotel stationery boasts of "the traditional elegance of the deep, deep, deep South" and advertises various features such as the Shiver and Shake Room, the Cold Compress Cocktail Lounge, the Barren Vista Room and the Deep Freeze Rathskeller (men only, at luncheon).

A sketch of the planned new accommodation for McMurdo has just been released showing a compact two-storey building, described as the largest building ever erected in Antarctica, with an over-all length of 315ft. and width of 165ft. The building, a 250-man barracks, barber shop, ship's store, dining hall, laundry and mechanical equipment area, will be prefabricated and provide 68,000 sq. ft. of floor space.

SOUTH POLE STATION

An explosion shattered both the silence of the "night" and the balloon-inflation shelter at the Pole Station on January 31 when static electricity, it is surmised, ignited a weather balloon filled with some 100 cu. ft. of volatile hydrogen gas. No one was in the shelter at the time. Although the hydrogen generation room of the station was fortunately not damaged, the shelter was destroyed, its walls demolished or

deformed, its door hurtling ten yards away and its roof blown off and deposited beside the remains of the shelter. No other buildings were damaged. The wreckage will have to be razed before it collapses across the station's ionosonde antenna, and no weather balloons can be released until a new facility has been constructed.

The 19-man wintering-over party at the most southerly station in the world said farewell to civilisation with the departure of the last aircraft for the 1965-66 season on February 20. Six scientists and 13 navy men remained behind to conduct scientific research into ionospherics, earth magnetism, seismology, meteorology and cosmic rays. Amongst the scientists are an Australian and a Swede. One at least of the navy men will not be altogether sorry that summer is over. He is Hospital Corpsman Second Class Denis Sullivan who became postmaster, an office only existing during the summer months, at the Pole Station for this summer season and has, since October 24, 1965, cancelled more than 35,000 letters with South Pole cachets for collectors in more than 40 countries. Sullivan now has a new hobby—stamp collecting—and already has more than 100 stamps from letters requesting the Pole cachet.

Accidental death struck a U.S. Navy serviceman at Amundsen-Scott South Pole Station in February when he was crushed between a tractor-pushed sled and a C130 Hercules during unloading operations. He was Mr Andrew Burl Moulder.

PALMER

Eights was closed down on November 14 after three years of operations, but work at Palmer Station on Anvers Island off the Antarctic Peninsula is to be maintained for another year by the Ohio State University (glaciology) and the Bernice P. Bishop Museum (ecology of land anthropods).

In January Palmer was re-supplied by "Eastwind" and "Wyandot", which also gave support to biological research in the Antarctic Peninsula area. This included an ecological survey of spiders, mites and similar insects, the distribution of marine fungi and of the parasites of Antarctic cephalopods.

HALLETT

Hallett Station (72°18'S, 170°18'E) which was closed down as a year-round station after the 1964-65 season, was re-opened as a summer station only on September 6, when an LC-U7 from McMurdo flew in nine Americans to lay out an ice runway and reactivate the aerological equipment. The station was fully operative when the first planes flew in from Christchurch to McMurdo on September 30.

Admiral Bakutis visited the Station on October 8. In addition to the aerological work, the main summer projects have been in the fields of biology, including endoparasitic studies of vertebrates, a study of parent-chick relationships among Adélie penguins, a study of insects and their ecology, and for a brief period the ecology of algae.

As noted elsewhere, a group of New Zealand biologists was also based on Hallett Station, formerly a joint U.S.-N.Z. base.

Weather satellite photographs have shown several errors in relief maps of Antarctica. Mt. Siple, used by pilots as a navigational aid is shown to be some 45 miles away from its mapped position, the Kohler Range is in fact non-existent (but perhaps a misplacing of another range by an early expedition), while the shape of the Filchner Ice Shelf is now more clearly depicted. Nearly 300 pictures have been studied by the U.S. Geological Survey. Geologist at the Goddard Space Flight Centre, Dr Paul Lowman, says that one Nimbus photograph covered a million square miles and can be used for geologic and ice-pack reconnaissance, topographic mapping, forestry, hydrology and oceanography.

PLATEAU STATION ESTABLISHED

The record, so far, in high-speed housing development has been reached in the Antarctic this season. And in a place 11,500ft. above the sea, 600 miles deeper into the heart of Antarctica than the South Pole itself, where the eight inhabitants of this, the latest U.S. station in the continent have already seen their last aircraft for the year disappear into a distance made even more definite by their isolation.

The new station is Plateau Station, a scientific outpost for the collection of information about the earth's magnetic field, aurora australis, VLF radio emissions near the earth, and Antarctic weather. The remote site of the outpost was chosen in part to enable scientists to learn more about the extremes of cold weather in the heart of the continental ice sheet, where temperatures may drop to an incredible 125°-130° below zero. Radio communication will be the occupants' only link with reality for some nine months.

The station components, manufactured in Canada, were Deep Frozen to the Plateau and assembled into a unit for the four scientists, under the leadership of Stanford University radio scientist Robert Flint, and a four-man naval support group headed by navy doctor Lt. James Gowan, who will have near-perfect conditions for research into the physical and psychological effects of inescapable close-quarters living for a considerable length of time—provided he too is not over-affected by those conditions.

Safety precautions against disasters brought about by weather or fire include provisions for a two-year isolation and an emergency shelter and food within a quarter-mile of the main buildings.

SOFT SNOW

An unforeseen additional difficulty faced by naval units constructing Plateau Station was the surprising softness of the snow sur-

face. Where there is usually snow compacted by wind and its own weight, at Plateau Station not only was the surface snow so soft that vehicles, aircraft and men sank into it disconcertingly easily, but even 10ft. down, where the weight of snow above would normally have compacted deeper levels, the snow remained soft. A Hercules aircraft hit a soft spot and its skis had to be dug out, and six Jato bottles were used before it was able to leave the ground on departure. The thin atmosphere at that height also hindered work, and left many of the visitors to the official opening ceremony dizzy and gasping. Station and construction personnel soon adapted themselves to the atmosphere, which is equivalent to that at a normal 13,000ft. altitude, the extreme dryness and cold exaggerating the rarity.

Plateau Station, planned for two years' operation, was the destination for the American traverse party crossing Queen Maud Land from the Pole of Inaccessibility.

At the end of January the 27 Seabees of the construction team had returned to McMurdo and all that remained to be done was the completion of the bulk fuel storage.

IN THE PENSACOLA MOUNTAINS

A major scientific assault on the remote Pensacola Mountains was completed in February, with seven separate projects comprising 18 scientists, 12 army and 8 navy personnel and a co-ordinator from the National Science Foundation combining to make up the largest summer group ever put into the field.

All members of the group, whether topographic engineers, geologists, seismologists, geomagneticians, palaeontologists, entomologists, helicopter pilots and crews, or support personnel, doubled up



PLATEAU STATION

One of the eight pre-fab huts being unloaded from the Hercules aircraft which brought it from McMurdo.

Official U.S. Navy Photo by G. V. Graves.

on their jobs to help the completion of the survey. The five-man team of topographic engineers from the U.S. Geological Survey, assisted in more ways than scheduled by helicopter crews, travelled 516 miles and established geodetic control for mapping some 15,000 square miles of Antarctica, taking gravity readings for the seismologists and collecting soil samples for the entomologists. Seismologists travelled about 550 miles making gravity measurements, with the help of the engineers, measuring ice ranging from 1,600 to 10,000 feet in thickness. Geologists collected information expected to throw more light on the mountains' geological history and relationship to other mountains, while a glaciologist investigated ice features and meas-

ured movements of markers in the thick ice sheet over an area laid in 1962.

Continental drift theories may be strengthened or weakened by the examination of tillite drifts for comparison with similar drifts in South America, Africa, India and Australia. Amongst the samples of soil brought to the entomologist from every area visited by other team members were found three species of mites and one of spring-tail. Invaluable experience was gained by the multiple discipline field party in the versatility of army turbo-helicopters and in the problems of logistic support, which will aid in the planning of a similar programme designed for the coastal region of Marie Byrd Land next year.

SCIENCE

GLACIOLOGY

The recent, perhaps only several hundred years old, advance and retreat of glaciers west of the Ross Sea and the present northward march of 1800ft. a year of ice near the seaward edge of the Ross Ice Shelf have been estimated by U.S. scientists working in the field this season.

Geologist Dr. Wakefield Dort, Jr., from the University of Kansas believes that some of the land forms in Southern Victoria Land—moraines, curved ridges of rocky debris deposited by retreating glaciers—are not more than a few thousand years old, possibly only several hundred. Instead of retreating in the period following their formation, as they did in the Northern Hemisphere, the Victoria Land Glaciers, says Dr Dort, advanced, despite the far warmer conditions. This, he thinks, was caused by the greater evaporation allowed by the non-freezing of the Ross Sea, evaporation of water then deposited as snow in the mountains west of the sea. The snow became deeper, formed ice and caused a minor glacial advance. It was not until the weather became colder again, freezing the Ross Sea and therefore starving the glaciers of snow and ice that the moraines he investigated were formed, as the glaciers then retreated.

Estimation of the apparent movement of marker poles in the Ross Ice Shelf, placed in the 1962-63 Antarctic summer, has led Egon Dorrer, glaciologist from Grand Valley State College, Michigan, to believe in the northward movement of the Shelf at the rate quoted. Not that this guesstimate suggests that the whole shelf is expanding northwards. Large pieces of the seaward ice break off to become icebergs, the shelf is constantly fed from icecap based glaciers and the forward edge of the shelf has remained comparatively stable for a number of years.

METEOROLOGY

Weather satellites, Tiros 9 and 10, have this season been used for the first time in forecasting Antarctic weather, a feature of paramount importance to the continent. Storm centre positions, types and positions of clouds, and ice formations, re-lays back to earth from each of the satellites have been correlated with normal ground data. The satellites' information is gathered by special receivers in the northern hemisphere and transmitted on to the meteorological facility at McMurdo Sound. This facility receives weather information from stations of every country involved in Antarctic research, and it is now able to give a comprehensive survey of Antarctic and near-Antarctic weather. A special receiver is planned for McMurdo's weather facility to receive satellite data direct.

RADIO REFLECTION FROM D-REGION

Ward Helms, a young University of Washington electrical engineer has succeeded in bouncing a low frequency radio signal off the lowest region of the ionosphere. Helms transmitted signals of from three to 30 kilocycles from a 20-mile-long antenna laid out on the Antarctic icecap about 12 miles from Byrd Station. The signal was reflected from the lowest or "D" region of the ionosphere and received by a Stanford University antenna at Byrd Station.

Helms said the success of the very low frequency "sounder" would make possible an investigation of the variation in electron density in the "D" region with height and time as well as studies of what happens in the region during such events as aurora and magnetic storms.

Similar studies of higher regions of the ionosphere have been conducted for several years using a sounder of higher frequency. The high frequency sounder could not be used to study the "D" region because the radio waves passed through that part of the ionosphere and were reflected (actually re-radiated) from higher regions.

The sounder designed and constructed by Helms requires an extremely long antenna to transmit the long very low frequency radio wave. Helms said such antennas could not be used on solid ground because they were very inefficient. The long antenna near Byrd Station is much more efficient because it is lying on top of more than 8,000 feet of ice, a poor conductor of electricity.

The "D" region of the ionosphere is responsible for the relatively poorer radio reception during the day than at night apparent to radio listeners. When high energy particles from the sun penetrate to that region it absorbs more radio waves of medium and high frequency, the frequency range of commercial radio stations. During the night the particles do not enter the "D" region and such radio signals penetrate to higher regions where they are reflected back to earth.

U.S.N.S. "ELTANIN"

"Eltanin", the "floating laboratory", has completed her 20th and 21st cruises, which were predominantly in the South Pacific. The ship left Auckland (N.Z.) on September 13 and after a southern foray reached Valparaiso on November 12. Cruise 21 took her to Juan Fernandez (Robinson Crusoe's Island), then along the 40th parallel to 120° W, then due south to 65° S and back to Punta Arenas. Cruise 22 took "Eltanin" into the South Sea (January 14-March 18) and back to Punta Arenas. She is then expected (on cruise 23) to visit New Zealand about the end of May.

SATELLITES

The density of satellite traffic up there in space is proven by the tracking of 9,823 satellite passes by the McMurdo Geodetic Satellite Observatory between its going into full operation at the end of February 1965 and the end of December. This observatory, supported by a grant from the National Science Foundation is part of a world-wide network aimed at determining,

eventually, the exact shape of the earth, by studying its gravitational field. By monitoring a continuous signal transmitted by each satellite, tracking instruments can detect the most minute changes in radio signal frequencies as the satellite is drawn nearer to or pushed further from the earth in response to variations in the strength of the gravitational field. Already it is known that the earth's pear-shaped form, flattening at the Poles and bulging at the Equator, has four other bulges or "corners" rising some 60yds. above its normal surface near Ireland, South Africa, Peru and New Guinea.

Six satellites are currently being tracked full time by the McMurdo Observatory, plus two more part time, and these numbers are likely to change with the launching of more satellites in polar or near-polar orbits. The existing satellites were all built for the Navy or NASA, and all carry equipment beyond the transmitter used for geodetic purposes.

IN PROSPECT

Although scientific activity in the Antarctic bases would next year be somewhat restricted, several important projects will be carried out, according to Dr T. O. Jones, director of environmental sciences and Antarctic programmes in the National Science Foundation. A Dry Valley station is under consideration to study winter conditions in these apparently ice-free areas; ice drilling near Byrd Station should begin next season on a heretofore unknown scale, with electric drills melting through 8000ft. of ice, allowing cores to be brought up for investigation into temperature and other changes through the ages; topographical mapping of Marie Byrd Land will be started, working from the aerial photographs already taken; Plateau Station will continue full running, being, to Dr Jones, the greatest achievement in the Antarctic, a last frontier, the place from which there is nowhere else to go but the moon. There will be no traverse next summer season, or until routes for the 1967-68 traverses have been settled.

FOUR YEAR TRAVERSE CONTINUED

The second leg of the projected 5000-mile, four-year survey of Queen Maud Land came to a successful conclusion with the arrival of 11 scientists in three large tracked vehicles at Plateau Station at the beginning of February.

All major goals in this 830-mile traverse had been successfully accomplished by the scientists, said the leader, Dr E. E. Picciotto from the Free University of Brussels, Belgium, currently on leave to the Ohio State University. Surface topography had been studied, measurements of the depth of the ice cap under the traverse route made, along with studies of the land underlying it, and studies carried out of the ice, the weather and the earth's magnetic field.

NEAR DISASTER

Not one of the traverse's 47 days had been lost to bad weather and only one day to a minor breakdown, but tragedy had threatened some members when the front tracks of their vehicle broke through a snow bridge over a crevasse in an area supposed to be crevasse-free. It was winched out by the other Snocats, and the crew of a navy airplane preparing to drop supplies warned the group of another nearby crevasse field, instructing the vehicles around the menace. All but one of the supporting airdrops was successful, only one parachute failing to open, even eggs and tomatoes being dropped.

One of the biggest successes of the traverse, said Dr. Picciotto, was the operation of a new radio sounding device which provided a continuous indication of ice depth and sub-ice rock surface profiles. This was a great improvement on the previous examination on a spot basis by slow and cumbersome explosion seismology methods. Seismic soundings and gravity measurements were still used.

Though the temperatures throughout the traverse ranged from 30°-50° below zero, soft snow was the main handicap, while all those taking part are reported to feel better at the end than at the beginning.

Complete analysis of data collected will be carried out in the United States and Belgium, while the vehicles used were flown to McMurdo for overhaul in preparation for their use during the third leg of the traverse, planned for 1967.

LOGISTICS

During the month of January alone four ski-equipped C-130s of the U.S. Navy's Antarctic Air Squadron VX-6 flew a total of one and a half million hours, with each aircraft averaging 12 hours in the air for each of the 31 days. And this despite two of the 'planes spending seven days undergoing routine checks in Christchurch, New Zealand. The winner of the "heavy hauler" title chalked up 466.6 hours, an average of 15.5 airborne hours a day.

One and a half thousand tons of cargo, fuel and food were transported to inland stations in the Antarctic to support scientists and their studies and to provision them for the winter isolation.

On the wrong side of the ledger were three mishaps ranging from minor to tragic. A broken engine starter-motor shaft immobilised a ski-equipped Hercules assisting in the establishment of the Plateau Station; a similarly equipped DC-3 suffered damage when its starboard landing gear collapsed during a landing in the Ohio Mountains on a scientific mission from Byrd.

TRAGIC CRASH

In February came the cruellest blow of all when a C47 from VX-6 crashed at Mile 60, east of Roosevelt Island, in partial white-out conditions, killing all six members of its crew. The C47, a modified version of the DC-3, was one of the last three of its type still in use in Antarctic operations, and was on its way from McMurdo to pick up a group of geologists and transfer them to another site. It stalled and dived almost vertically into the snow, where fire and exploding Jato bottles destroyed all but the tail section. Those killed were:

Lieutenant Harold M. Morris, pilot; Lieutenant William D. Fordell, co-pilot; Lieutenant-Commander Ronald Rosenthal, navigator; Petty Officers Richard F. Simmons, Wayne M. Shattuck and Charles C. Kelly.

The crash was reported back to McMurdo by another VX-6 aircraft which had landed just ahead, and the bodies of the killed men were flown back to U.S. for burial.

WINTER FLIGHT ?

The U.S. Navy intends to make another mid-winter flight to the Antarctic, following the successful mercy-flight in June, 1964, to evacuate a seriously injured Seabee. Making the announcement, the commander of the U.S. Navy Antarctic Support Force (Rear-Admiral F. E. Bakutis) said it was likely that the flight would be made in 1967 by a VX-6 ski-equipped Hercules although the possibility of a Starlifter being used had not been ruled out. The navy's ski-way 14 miles from McMurdo, "good for at least ten years" is expected to feature in the proposed flight.

THE SHIPS

The annual task of breaking a channel through the ice to McMurdo Station was begun by the Navy's icebreakers "Glacier" and "Burton Island" at the end of November, 1965, "Glacier" being on her eleventh consecutive, and last Deep Freeze mission as a Navy ship. On her return to her

home port in Boston, Glacier will change her flag and her colour and enter the U.S. Coastguard Service. This changeover will also be effected by "Edisto", "Atka", "Staten Island" and "Burton Island."

A 26-mile channel from McMurdo Sound to Winter Quarters Bay was cleared by these two ships, plus "Atka", but this season has since brought very concentrated and sluggish ice, as a result of continued fine, calm weather. The ice, once broken through, remained stubbornly in position, presenting the breakers with two huge icebergs, one of 300ft. by 200ft., with 80ft. above the water line and estimated at weighing in the vicinity of 10,000,000 long tons. The iceberg blocked the channel most effectively to the five inward-bound merchantmen supplying this summer's U.S. Antarctic operations, and it took the combined efforts of the three ice breakers a day's pushing to shift the iceberg three quarters of a mile towards the sea.

At the end of December "Burton Island" made a fortnight's cruise along the Victoria Land coast as far as Cape Adare, while a study of seals and plant life on the mainland and off-shore islands was made by U.S. scientists. Also aboard were some New Zealand scientists from Cape Hallett, some of whom were landed at the Possession Islands to further studies of penguins and bird life. "Burton Island" returned to New Zealand with Mr F. C. Kinsky, Dominion Museum ornithologist, who had spent three months at Cape Hallett making a biological study of penguins and skuas.

The first U.S. ship to visit Palmer Station this season was the Coast Guard icebreaker "Eastwind" which was expected there on January 5 with the first mail since last season. The cargo ship "Private John R. Towle" damaged her propeller in the broken ice in McMurdo Sound.

Two weather picket ships, U.S.S. "Calcaterra" and "Thomas J. Gary" have served Antarctic operations this season. "Calcaterra" suffered a broken-down crankshaft in her generator and sent for a replacement from Philadelphia.

SUB-ANTARCTIC STATIONS REPORT

MACQUARIE ISLAND

(Australia)

Forty-eight scientists, soldiers and sea scouts left Melbourne on December 6 in the "Nella Dan."

The party included two U.S. scientists, four women biologists and two Queen's Scouts.

Dr. Law said they were "headed for a place where the climate was like Melbourne at its worst every day of the year."

Nineteen of the scientists, mainly biologists, replaced the 18 men manning the Macquarie Island base in 1965. Three more stayed for the "summer" period of three months.

The rest of the expedition stayed only for the "changeover period"—six days, during which the new complement was shown the ropes and supplies unloaded.

Three army DUKWS were used to unload the many tons of supplies.

RABBITS

Scientists will carry out a "killing programme" on Macquarie Island next year. It will be aimed at eradicating thousands of rabbits which have overrun the island and are destroying the vegetation.

Rabbits were introduced to the island as a source of food for shipwrecked mariners, long before it was manned by Australian scientists.

They multiplied virtually unchecked and are now a serious problem.

RELIEF

The M.V. "Nella Dan", bringing home members of the 1965 Macquarie Island party, berthed at Melbourne on December 22. In addition to thirteen members of the 1964/65 expedition party who have spent a year on Macquarie Island, the ship brought back two scouts, two physicists, eleven biologists and seven army Dukw crew who have made the round trip to the island.

The relief was delayed by bad weather. Several attempts were made to land materials for a new hut at Bauer Bay on the west coast before the job was completed and this was accomplished at the expense of damaged boats and pontoons.

A number of elaborate biological studies will be carried out. These include breeding studies of seals, penguins, albatrosses, and skuas. During the six day visit of "Nella Dan" for the relief in December, a number of visiting biologists including two from U.S.A. worked on a variety of short term studies. Two of these visitors will remain on the island until March.

NEW TEAM SETTLES IN

In his first newsletter, December 1965 and January 1966, new leader Rivers says: "The time spent at Macquarie Island since our storm disrupted the arrival and changeover has given all of the 1966 party a chance to establish themselves and adjust to the environment, to new jobs, to each other and to the four 1965 members remaining with us until March at least. The island is a little more stable than "Nella Dan" but most members travelled well and enjoyed the voyage and the Danish hospitality. Many thanks and best wishes go to the previous party for their kindness and assistance during the windiest week many of us have experienced. Still, we were secretly glad when they embarked and the island became ours."

Christmas followed immediately. Chef Ricky Schmitter produced magnificent meals and gifts (some genuine and some of dubious origin) were presented to all.

Electrician Crabbe and carpenter Parker spent three weeks at the biology field station at Bauer Bay erecting new huts.

Doug Pocock, the last surviving '65 met. man, used a spare week to complete his ambition of camping in all of the island's seven field huts and also of climbing Mount

Hamilton, the loftiest peak. British-Kiwi-Aussie Dean Polson regales all with tales of his Campbell Island sojourn.

The biology group is the largest, with three wintering and six in the summer party.

When Rivers wrote, Smith and McKenzie were at Bauer Bay assisting with the huts and carrying out continuous Royal Penguin observations, Purchase, a third-trip veteran, walks vast mileages daily on the plateau studying skuas, Shaughnessy, Carrick and Simpson spent most of January at Caroline Cove, the furthest extremity of Macquarie, studying wandering albatrosses.

CROZET ISLAND **(France)**

During the quarter October-December precipitation was frequent, except for a fine fortnight in November. Work was kept going, however, chiefly painting, whenever conditions allowed. The painting of the outside walls was completed, a porch constructed for the generator house, a shelter at the upper terminal of the overhead railway completed, and the shelter at the disembarkation beach considerably enlarged.

By the end of the year there was no paint or cement left, and nothing could be done apart from the routine maintenance.

KERGUELEN **(France)**

During the period October-December, 1965, the temperatures were mild, but there were frequent rainfalls and violent winds up to 230 k.p.h., a velocity not reached since 1956.

The approach of the relief date saw a rush of activity as the countdown began: preparation of the foundations for oil-storage installations ready for the arrival of the fuel from France; new refrigerating plant ready for operation on October 15; new Port-aux-Francais telephone exchange—with 44 subscribers—opened on November 13; trial and completion of a three-point alarm system for the two fire sirens at the base, which will function simultaneously.

M.S. "Gallieni" anchored off Port-aux-Francais on December 11, after a call at Port Christmas in the north of the archipelago to land Prof. Bellair (geologist) and Hureau (ichthyologist). Between the 11th and the 20th, 200 tons of supplies were landed, bad weather slowing up the operation. "Gallieni" called again at Port Christmas on the morning of the 22nd en route for Reunion.

Work began at once. Eight oil storage tanks were set up. The reconstruction of the quay was commenced. The hospital roof was restored and more painting undertaken.

Between November 15 and 25 a five-man team which had been put in at the head of Bossière Fjord rejoined the Tillman and returned to Port Jeanne d'Arc by way of Lake Bouchier and Lake Marioz. Two of them reached the Cook Glacier Dome on November 19.

BOUVET ISLAND **(Norway)**

Fifteen men left Pretoria on December 30 to spend 13 months in the ice of Antarctica, living in huts sunk 50ft. underground.

Their aim is to find out whether it is possible to set up a weather station on uninhabited Bouvet Island, about 1,800 miles south of Capetown.

Several U.S. scientists are among the members of the expedition which is sponsored by the South African Government.

CAMPBELL ISLAND **(New Zealand)**

The Campbell Island summer weather has been most inclement: in fact it has proved to be one of the worst on record. Rain and low temperatures have prevented the usual excursions to the more outlying regions of the island.

The highlight of a quiet period was the return visit of the Russian research vessel the "Gnevny". The duration of the stay was only six hours. However it was long enough for friendships to be renewed. Visits were exchanged between shore and ship and reciprocal hospi-

tality was on the usual scale. Although, it was noticed that Kiwi personnel seemed to succumb rather rapidly to the Russian national beverage, one member of the station party was so imbued that he disdained the transport provided and decided to walk home from the ship; he proved to be mortal after all!

The last picket ship called at the end of February and uplifted two

meteorological observers R. M. F. Craig and D. Paull. These men had completed an eighteen month tour.

The picket ships USS "P. J. Gary" and USS "Calcaterra" have throughout the season provided an unfailing mail service. Supplies and personnel were carried and unloaded, often in unsuitable conditions. This co-operation and support has been much appreciated by all concerned.

Auckland Islands Expedition 1966

The scientific expedition to the Auckland Islands of which the original plans were outlined in the last issue of "Antarctic" returned to Dunedin on February 5. Owing to the mishap of propeller damage in McMurdo Sound, H.M.N.Z.S. "Endeavour" was not available for transport, and the project would have had to be abandoned had it not been for a generous offer of the Deep Freeze authorities and Lieut. Comander Earl to convey the parties both ways in U.S.S. "Calcaterra". This meant a shorter time in the field than originally planned, the ocean station duty time for the picket ship being three weeks, but in the event it proved to be worthwhile.

SOUTHERN PARTY

The southern party, with Dr. E. J. Godley as leader, after being delayed for 24 hours by high winds in Carnley Harbour, set up camp on Adams Island. Field camps established on the tops enabled the members to explore the main ridge and points on the south coast in spite of much persistent low cloud. The boat, operated by B. D. Bell and T. Kendrick, was used for trips to the adjacent main island, an extension especially important for the studies of geologist Peter Rickwood. The large collections of plants, and of insects and other invertebrates contain many new records from Adams Island and the photographs and sound recordings

of birds probably a number of "firsts". One notable capture was a small rail, an elusive bird thought to be extinct, or at least known only from inconclusive sight records.

NORTHERN PARTY

A last-minute change was made in the composition of the northern party as W. Groenestein who was to have been radio operator was unable to go. As Colin Clark was able to take over the operating duties, the replacement was R. H. Taylor, an animal ecologist from the D.S.I.R. He had already participated in two earlier expeditions to study the distribution and behaviour of introduced mammals, especially rabbits, and his programme involved field camping for several days on Enderby and Rose Islands. A special study of the large tree daisy, *Olearia lyalli*, by the botanist B. Fineran, also required field camp establishment, mainly on Ewing Island. Essential communication from Ranui Cove was maintained with a 10' 6" dinghy and outboard motor. The Dominion Museum programme in entomology and ornithology was conducted from Ranui Cove and the main work of the northern party, the restoration of the field station buildings, was completed by the sustained effort of the carpenter, K. Burn, assisted by C. Clark. This camp is now reasonably equipped for the use of future field parties. Weather conditions throughout the period ranged from

very good to very bad but there was luckily no delay in embarkation and the varied collections were brought back intact for working up.

TRAINING THE RESCUE TEAMS

For several summers now teams of New Zealand mountaineers have been training Americans at McMurdo in the techniques of ice and snow.

This year the pupils have been seven members of the tough American para-rescue team, whose job it is to find aircraft accident survivors in the "backwoods" of Antarctica and to get both the survivors and themselves back to McMurdo alive. All team members are qualified parachutists and the New Zealand-run survival school was the coping-stone of their arduous training.

The New Zealanders this summer were Wynn Croll of Christchurch, Max Pemberton of Wellington and Allan Berry of Auckland, who gave up their summer vacations to "teach" the Americans in the Antarctic. Croll, who has been an instructor on previous occasions and has also been a member of a New Zealand field party, said that he had deliberately chosen the exercise area because of the type of country. After some days spent on such techniques as cutting snow and ice steps and the use of crampons and pitons, the party moved to the slopes of Mt. Erebus in a temperature of 40 degrees below zero and a 40 mile an hour wind. Here an aircraft was presumed to have crashed and the para-rescue men had realistic practice, including rescuing men from deep crevasses. The conditions were such that it took the party four hours to cover the five-mile journey to the "crash" site.

For the first time Russian explorers are using radar to determine Antarctic ice depth and have found the ice cover to be nearly 6,000 feet in an area about 60 miles from Mirny.

WHALING SLUMP

Figures published in the December issue of Norsk Hvalfangst-Tidende (the Norwegian Whaling Gazette) highlights the spectacular decline in Antarctic pelagic whaling activities over the past few years.

FACTORY SHIPS

	1963-64	1964-65	1965-66
Norway	4	4	2
Japan	7	7	5
U.S.S.R.	4	4	3
Netherlands	1	—	—
Total	16	15	10

The numbers of chasers engaged has fallen from 190 in 1963-64 and 172 in 1964-65 to 128 in the season just closed.

FEWER WHALERS

The number of men engaged in the season 1965/66 is 11,140 as compared with 14,728 men in the preceding season. There is thus a decline of 3,588 men, apportioned as follows:

Norwegian personnel	885
Japanese personnel	1,922
U.S.S.R. personnel	700*
Other personnel	81
Total decline compared with 1964/65	3,588

* Estimated.

The decline is due to the fact that the Norwegian factory ships "Sir James Clark Ross" and "Thors-hovdi", the Japanese factory ships "Nisshin Maru No. 2" and "Kyo-kuyo Maru No. 2" and the U.S.S.R. factory ship "Slava" did not take part in the whaling operations in the present season.

There has since 1956/57 been a reduction of 6,318 in the number of Norwegian personnel alone on the whaling expeditions.

QUOTAS

The official press release from the 17th meeting of the International Whaling Commission held in London, June 28-July 2, 1965, includes this paragraph:

No quota of Blue Whale units for the 1964-65 season had been agreed at the 16th Meeting but at the Special Meeting in May 1965 Commissioners had agreed to recom-

mend to their Governments that the quota for the 1965-66 Antarctic season should be 4,500 Blue Whale Units and that further reduction should be made in the 1966-67 and 1967-68 seasons so that the quota for the 1967-68 season would be less than the combined sustainable yields of the fin and sei whale stocks as determined on the basis of more scientific evidence. At the present meeting this recommendation of the Special Meeting was implemented by an amendment of the schedule which was proposed by the Commissioner for the United Kingdom and seconded by the Commissioner for Canada. The amendment was to delete in Paragraph 8(a) the words "10,000 blue whale units in 1963-64" and add "45,500 blue whale units in 1965-66. There shall be further reductions for the years 1966-67 and 1967-68 that will assure that the total catch for 1967-68 will be less than the combined sustainable yields of the fin and sei stocks as determined on the basis of more precise scientific evidence."

On being put to the vote all 12 Commissioners present were found to be in favour of the amendment.

CONSERVATION PLAN REJECTED

As Russia has rejected a scheme to conserve sperm whale stocks, Western Australia may again see fleets of whale chasers operating off the south coast of the state.

Russia and Japan, the two giant whaling nations, had 90 days in which to ratify a majority agreement of the International Whaling Convention aimed at protecting sperm whales from fleet whalers between the latitudes of 40°N. and 40°S. Russia rejected the proposal only two days before the 90-day limit expired. Japan did not ratify the agreement within the 90 days. Both countries had voted against the Australian motion to restrict sperm whaling inside the 4,800-mile-wide belt to land-based companies.

The U.S.S.R. fleet raised a storm of Australian protest by hunting off the south coast of Western Australia in March 1965 when on the return voyage from the Antarctic whaling grounds.

WHALER IN TROUBLE

"Vodny Transport" Moscow, reported on February 5: The whaler "Komsomolets Ukrainy" lost a blade from her propeller when cruising near Antarctic shores. Instead of being towed into the nearest port, as is customary, to have a new propeller fitted, the ship's crew decided to fit a spare propeller themselves with the help of experienced skin divers. However, something went wrong with the explosive charge which was supposed to dislodge the propeller from the shaft. At the same time the weather deteriorated and huge icebergs began to threaten the ship. Help had to be summoned from Mirny. In spite of bad weather and very low clouds a plane carrying the necessary explosive charges and other equipment managed to spot the little ship and drop the well-packed material into the sea. The next day "Komsomolets Ukrainy" was able to leave the Antarctic shore with its new propeller.

WINTER FLIGHT

Readers will regret the necessity for this postscript* to the story in our September 1964, issue about the first midwinter flight made to bring out an American who had suffered a neck injury with consequent paralysis of arms and legs.

"This spectacular act of humanitarianism did a great deal to build morale among the isolated parties on the continent: unfortunately however, nothing can be done to rebuild a lacerated spinal cord." (In an article by Dr Richard U. Light in the *Geographical Review*, vol. 56. No. 1 January 1966).

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CAN YOU SPARE A COPY OF VOLUME 3, NUMBER 7 SEPTEMBER 1963

We appreciate the forwarding of a few copies of vol. 3, no. 5, enabling us to fulfil outstanding orders. Now vol. 3, no. 7 is completely sold out. If you can help, it will be appreciated.

THE VETERANS

FRANK DEBENHAM

FRANK DEBENHAM, O.B.E., geologist to Scott's *Terra Nova* Antarctic expedition of 1910-13, Emeritus Professor of Geography at the University of Cambridge, founder and first Director of the Scott Polar Research Institute, died in Cambridge on November 23, 1965, after a long period of ill-health.

He was born on December 26, 1882, son of the vicar of Boural, New South Wales. After leaving King's School, Paramatta, he went on to take an Arts degree at the University of Sydney in 1904, then taught for a period while saving enough money to return to university and gain a B.Sc. in geology in 1910. Soon afterwards, Scott visited Australia on his way south, and invited Debenham to join his expedition. He took part in the Western Journey to the Granite Harbour area in 1911-12, when in addition to his geological work, he made a plane table map of the route and many detailed measurements of glaciers—work that had an important influence on his later career. He was a member of the party which made the first ascent of Mount Erebus in December, 1912 (though not of the final assault party). He also took over the photography work of the expedition after Pönting left.

At the end of the expedition he came to Cambridge to work up his results and was in the midst of this when the Great War began. He joined the 7th Oxford and Bucks Light Infantry, becoming a major and seeing service in Salonika where he was seriously wounded.

After the war, he returned to Cambridge to continue his *Terra Nova* reports to which was added the task of working up all the expedition charts, as the cartographer had been drowned in 1915. Debenham was the only person with the local knowledge and the skill to complete the charts and so cartography, which had been his hobby, became his chief occupation. In 1919 he became Royal Geo-

graphical Society Lecturer in geography at Cambridge, a few years later Reader and finally in 1931 the first professor in the new Department of Geography, a post which he held until he retired in 1949. His interests in geography by no means ended there, for he then travelled extensively in central Africa, exploring the resources of the Bangweulu Swamp and producing an important work on the water resources of the region.

Meanwhile his interests in polar matters continued and eventually came to concrete fulfillment in the establishment of the Scott Polar Research Institute in Cambridge, of which he was founder, and between 1915 and 1946, first Director. His many published works included *Terra Nova* expedition reports and other scientific papers, popular books on the polar regions, practical manuals of surveying, and a biography of David Livingstone.

For all this, however, no one who knew Deb ever doubted but that the man himself was greater than his achievements. He was the most good-hearted of men, the most receptive of listeners, never without time to welcome, to encourage and to give practical help. He was a modest man though he knew his worth, and an honest man to whom all pretensions were equally foreign. He had a spirit that reacted with enthusiasm to every new challenge and a mind of endless inventiveness. After a lifetime of physical exertion he accepted the confinement of invalidism with uncomplaining resignation; and spent his last years sitting at his table, working, talking, reading, planning.

—Max Forbes.

J. H. H. PIRIE

Dr J. H. Harvey Pirie died recently at the age of 86. He was the geologist, bacteriologist and medical officer of the Scottish National Antarctic Expedition, 1902-4, under W. S. Bruce in the "Scotia". Dr Pirie was one of the three co-authors of *The Voyage of the "Scotia"*, contributing four of the 17 chapters, including the chapter on "Sledge and Boat Journeys."

WINTERING OVER

By ALISON SANSON

*Over Arrival Heights and above the memorial,
A white light charged with stillness
Appears, stands in the skies, moves,
And swiftly vanishes away.*

*Like a signal
A whine from the dog-lines,
And scarecrow shapes rise from the snow-drift,
Shake frozen manes a-jingle;
Glass dogs whimper at the lights re-forming.
Then old pack instinct stirs in the huskies,
One after another, their were-wolf baying
Rises along the snow slope,
Howling of fangs, torn flesh,
And ancient slaughter.*

*What is the matter?
Muffled and hooded
A man comes out to the darkness.
Through the lighted door before him
Steps his drunken shadow.
A shout from within, the door closes,
And he is engulfed under the dark horizons
Great frosts have welded to the starlight.
He breathes the air harsh as iron filings.
Ice masked he goes
Bridled by beard and eyebrows,
His big felt boots soft as bear pads
Making muffle and screech at each footfall
Over the frost-grit's dry white fire.*

*Where can he go?
The land half revealed reels backwards.
To the south sleeps the wind,
And under the bay-ice the dark sea is quiet.
Winter holds a headlock on its tides.
But what skies
What stars burning like cold blue metha.
One man under their wheeling—
Where can he go in a land
Where dark is for ever?*

*What did he come out for?
Thoughts unrelated and without emotion
Form in his mind and like an aurora
Shift, re-shape and vanish,
Playing across his isolation in a dull longing.
For cold suffers no loyalties to grieve him.
Soon nothing stirs but a weary wonder
At the stillness, the vibrant clarity
Of a land gone under the heel of the world.
Aimless he pads down to the dog-lines
Where the huskies were howling;
Then finds he has nothing to do there.*

*So back to the huts and someone playing
Blues drowsily on the piano,
The others still as he left them,
The warm, known smell of living,
His out reaching unsolved,
Work again.*

THE READER WRITES

Sidelights of Antarctic Research

Letters, preferably not longer than 500-600 words, are invited from readers who have observed some little known facet of Antarctic life or who have reached conclusions of interest on some Antarctic problem.—Ed.

FIRST YACHT ?

Sir,

With reference to the article in your issue vol. 4, no. 4, entitled "Yacht in Far South." During my sojourn at Mawson in 1963, several of my team and myself who were keen yachtsmen converted a 14-foot dinghy to a sailing vessel, complete with Gaff Sail, Lee Boards, Rudder, etc., and enjoyed several exciting and interesting tours sailing in Horseshoe Harbour and East Bay amongst crash ice and icebergs.

I have several photographs of this yacht. Perhaps we may uncover someone who has sailed a yacht below the Antarctic Circle prior to 1963.

RAY McMAHON.

[We thank Mr McMahon for this information and gladly accept his offer to provide a photograph. We thank him also for his kind comments on "Antarctic."—Ed.]

* * *

HOVERCRAFT

Sir,—

Several recent issues of "Antarctic" have carried notes on the use of Hovercraft in Antarctica. Your comments in the December issue touched upon one of the important problems associated with this new equipment, namely, the capital investment. There are two other factors in Hovercraft operations that limit their usefulness on an operational basis in today's Antarctic ex-

peditions. These are the high degree of maintenance which such equipment would require and the relatively costly fuel and related logistic support which would be involved in sustained Antarctic operations.

Hovercraft are aircraft, not ground or oversnow vehicles. Expeditions which plan to use Hovercraft must be prepared to accept the financial and logistic burdens of air operations. Thus, the apparent advantages of Hovercraft may be offset by economic considerations. In the U.S. operations in the McMurdo Sound area, for example, the high volume of cargo and passengers which might be transported by Hovercraft can be moved less expensively and more efficiently by traditional means. This situation will prevail for some years to come.

I cannot share the enthusiasm of some of my colleagues about the immediate use of Hovercraft.

PHILIP M. SMITH,

Program Director,

Field Requirements and

Co-ordination Program

U.S. Office of Antarctic Programs.

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INDEX VOL. 3 ?

BINDING ?

A must for all who have a continuing interest in the Antarctic.

See last issue p. 215.

Is Antarctic Tourism Here?

Lars-Eric Lindblad, Swedish-born New York travel agent, has organised and carried through an Antarctic tourist cruise described by one of the women passengers as "a fabulous experience."

Widely advertised as "Antarctic Expedition 1966", the "Antarctic" section of the cruise was made on a converted Argentine Navy troopship the m.s. "Lapataia". Fifty-seven passengers, all but four of them Americans and a majority of them women (one aged 86), paid the \$2,800.00 to \$3,000.00 fee, which included air transport (Boeing 707) both ways between New York and Buenos Aires. Veteran Antarctic traveller Finn Ronne, evidently (by the attention paid him in the colourful brochure) regarded as a draw-card, gave daily lectures to the tourists. A minimum of Antarctic clothing was provided: pants, parka and mittens, as well as medical attention. But the prospective tourists were advised to take "plenty of dramamin or bonamin for the crossing of Drake's Passage, which may be rough".

Actually the tour covered only the northern tip of the Antarctic Peninsula, some 600 miles from South America. After two or three days in Buenos Aires and about the same time in Ushuaia, the vessel was scheduled to cross Drake Passage on January 21. The tourists would then spend a fortnight cruising to Smith and Melchior Islands, Groussac and Palmer Stations, Deception Island (British, Chilean and Argentinian stations), Half Moon Bay, Lassere and Hope Bay, before returning to Buenos Aires via Ushuaia. Apart from a holdup of 36 hours in Tierra del Fuego for repairs to the ship's generator and the fact that conditions did not permit a crossing of the Antarctic Circle, the tour seems to have gone as planned.

Visits ashore at the various stations by the three motor launches carried were diversified by nightly

entertainment with an eight-man band and visits from station personnel. Series of optional lectures were arranged on the history of Antarctic exploration, marine biology, meteorology, ornithology, wild-life conservation, geology and glaciology. Lectures were scheduled for two hours in the morning and two hours in the afternoon. Films and slides were used to give the background for these lectures. As a trump card the promoters pointed out: "Being aboard an Argentine ship you may be sure to get plenty of the finest beef in the world", and the whole tour is described as a "fabulous opportunity to share the fascination which surrounds exploration and to be one of the few—very few indeed—to have set foot in Antarctica."

The cruise ship returned to Buenos Aires on schedule and the tourists flew back to New York on February 11. To reporters Mr Lindblad said: "This trip proved that Antarctic tourism is possible", but added: "No ship can get that far down without Navy help and no insurance company will make out a policy at reasonable rates because of the fierce winds, storms and pack-ice . . . The "Lapataia" was always accompanied by the ocean tug-boat "Irigoyen", and the ice-breaker "San Martin" was never far away".

Mr Lindblad said he was planning two more Antarctic trips for 1967, which he estimates will net Argentina about \$500,000 worth of revenue. Argentina, he says, is the only country able to exploit Antarctic tourism, no doubt because of her proximity to Antarctic bases and the relative ease with which Navy protection can be provided.

Mrs Bessie Sweeney, the 86-year-

ANTARCTIC BOOKSHELF



If you have not already got Cherry-Garrard's **"The Worst Journey in the World"** on your shelves, here is your chance. Chatto and Windus have published a new one-volume edition (1965) which is prefaced by a 30-page memoir of Cherry-Garrard by George Seaver, well-known as the author of biographies of Wilson, Scott and Bowers. The New Zealand price is 37/-.

LA POBLACION RESIDENTE HABITUAL de ANTARTIDA ARGENTINA 1904-1960 by J. C. M. Beltramino.

Dr Beltramino, well known to American and British Commonwealth Antarctic men, has made a special study of Antarctic population problems, and in this 14 page cyclostyled report published in New York last year he assembles some very interesting information about the "permanent" (year round) population of the Antarctic Peninsula area, from the establishment of the meteorological station on Laurie Island in the South Orkneys in 1904, to 1960. For some 40 years the total population in the area varied between 4 and 6, rising sharply from 1944 onwards (17,29,36, 55,82) and again between 1952 and 1958 (114,130,132,182,208,300,304). In 1958 (the I.G.Y. year) the total Antarctic "resident" population was 891.

Dr Beltramino tells us that the density of population in the Antarctic Peninsula area in 1960 was 0.00019 per square kilometre.

old, in an article written for the Associated Press said that the trip through the Le Maire Strait in splendid sunshine had been the highlight of all her travels around the world.

"ANTARCTICA"

SOME REVIEWERS' COMMENTS

Readers may like to know what is being said about the Society's new treatise **"Antarctica"**. Here, from the many (all favourable) reviews we have seen, are a few excerpts from the comments of reviewers in three major periodicals.

Times Science Review, Winter 1965. "Almost by accident the New Zealand Society has found itself organising by far the best survey yet of Antarctica and getting all the authors they might want to work for them. It began as an intended mid-century survey which, published in 1952, came at the right interval before the International Geophysical Year to make its mark. Now, with a new survey made necessary by all the research that has been done in the interval, the Society has probably acquired the job for good. No one else now would dare compete."

The review in the **Times Educational Supplement** ends, ". . . a book of wide scope, attractively written and produced, yet essentially scholarly, and one which should certainly find a place in the school library."

The **New Scientist**, which, like the **Times Science Review**, gave **"Antarctica"** top billing, said: "To 'survey the present state of knowledge' of this great area, after so much has been done there, is a major undertaking and **'Antarctica'** succeeds amazingly well in the attempt . . . **'Antarctica'** reviews all these fields remarkably well. With so broad a coverage, even a large book cannot probe any topic in sufficient depth for the research specialist in that particular field. But the volume is invaluable if that specialist wishes to find out what has been done in fields other than his own, and so set his work in context. It will also prove invaluable."

Ships of British Antarctic Survey Enjoy Ice-Free Waters

With not much ice about, the summer relief operations of the British Antarctic Survey in the Antarctic Peninsula area and at Halley Bay have gone well.

BAD START

The "**Shackleton**" reached the Falklands on November 2 and sailed for South Georgia five days later. Here she re-fuelled the Government station at Grytviken and landed a two-man geological party. Upon arrival in the South Orkneys she encountered pack ice and had to force her way through to the base on Signy Island. That she had incurred slight damage was not apparent until she ran into bad weather on passage to relieve Deception Island and to land a geomorphology and biology field group in the South Shetlands. Heavy seas forced water into the forward hold and much of the cargo for Deception and Argentine Islands was ruined. Replacement stores were promptly ordered and will be delivered before the end of the season, but the ship lost the time allotted to magnetometer work in the area of the Burdwood Bank. Subsequently, however, her programme has largely gone according to plan. Two ship seismic refraction measurements with H.M.S. "**Protector**" in the vicinity of the South Orkneys took place on time and then she helped the South Shetlands field party by moving them from one location to another.

In the meantime both the "**John Biscoe**" and H.M.S. "**Protector**" had reached the Falklands and sailed south. The "**John Biscoe**" re-supplied Signy before starting hydrographic survey in the western approaches to the South Orkneys using Hi-Fix. Though at first inconvenienced by ice she completed a valuable amount of work before returning to Stanley to re-fuel. H.M.S. "**Protector**" joined the "**Shackleton**" for seismic work and then sailed for the Bransfield Strait where she moved the South Shetlands party

about by helicopter and accomplished a long awaited survey reconnaissance of the Cape Kater area.

NO TROUBLE WITH ICE

By now it was apparent that ice off the west coast of the Peninsula was dispersing early and that the ships would have no difficulty in entering Marguerite Bay. For the three men stranded on Detaille Island this was good news. After four months of inactivity they could look forward to an early return to base by ship. Whilst the "**John Biscoe**" sailed direct for Adelaide the "**Shackleton**" diverted to Detaille Island to pick the men up. Though there was ice in the Matha Strait the passage down the coast of Adelaide Island was clear and the two ships met again in the anchorage near base. Stonington and Adelaide were accordingly relieved and re-supplied in good time. The "**Shackleton**" went north leaving the "**John Biscoe**" to take advantage of the ice free conditions by carrying on with hydrographic survey for as long as possible. The De Havilland Otter had, in the meantime, been hard at work supporting the field party working on the east coast of the Peninsula and on the plateau. With the arrival of new men and supplies it could now turn to reconnaissance and building up depots for the spring of 1966.

HALLEY BAY RELIEVED

Over at Halley Bay four of the field party returned to base in December leaving three men behind in the Heimfrontfjella to continue working until autumn. The "**Kista Dan**" arrived on January 25 to relieve and re-supply the base. She

able to the geographer, and to the non-polar scientist, who wishes to obtain a sound, balanced impression of the work of his colleagues in the far south. As a whole, the book is well-balanced, national contributions are fairly treated, the chapters are competent, accurate and well documented (and only locally suffering from the scrappiness inevitable in broad reviews), and the illustrations are good, even though some maps have suffered greatly from over-reduction. There are gratifyingly few errors. Trevor Hatherton and his colleagues are to be congratulated on providing an excellent general handbook of Antarctic research, and one that is a worthy successor to his Society's earlier manual, *The Antarctic Today*."

REPORTS RECEIVED

The Distribution of Planktonic Foraminifera in Deep-Sea Cores from the Southern Ocean, Antarctica by Donald G. Blair, Sedimentological Research Laboratory, Department of Geology, Florida State University, 141 pp.

USNS "Eltanin": Marine Geology, Cruises 9 to 15. Contributions by H. G. Goodell and Donald Blair, 152 bottom photographs, 196 pp. core descriptions and locations.

MORE N.Z. MAPS

The following have been added to the detailed maps of areas in the Ross Dependency, listed in "Antarctic", March 1965. All are in the series N.Z.M.S. 166 and were published by the Lands and Survey Department in 1965.

Freyberg Mountains: 72°-73°S, 162°-166°30'E.

Mt. Murchison: 73°-74°S, 162°-166°30'E.

Reeves Nevé: 74°-75°S, 157°30'-162°E.

Mt. Melbourne: 74°-75°S, 162°-166°30'E.

Holland Range: 82°-83°S, 165°-172°30'E.

Another recent addition is

Facilities in the Region of Scott Base 1:6,250. L. and S. 37/10.

ANTARCTIC MAPS AND SURVEYS 1900-1964

American Geographical Society

Folio 3 in the Antarctic Map Folio Series of the American Geographical Society has recently become available under the title of "Antarctic Maps and Surveys, 1900-1964". This is an exhaustive compilation of the mapping achieved by all nations in that period, illustrated for easy reference upon blanks of the continent with the necessary information as to the availability of any particular map. Naturally in so comprehensive a reference, no maps or even sample plates of maps are appended. The plates are introduced by a 3,000 word text by Geo. D. Whitmore, Chief Topographic Engineer of the U.S. Geological Survey, which organization has assisted the American Geographical Society in the production of this valuable record. Four plates record mapping achieved from 1900-1953 and a further seven plates are devoted to the period 1954-1964 including photogrammetric and control survey coverage. The tremendous progress made in the last decade is most apparent. The folio depicts the published maps of all the SCAR nations and an interesting point is that only Germany of all the other than SCAR-nations has at any time published maps of Antarctica. The most valuable and the most demanding mapping is that at scales between one mile to an inch and six miles to an inch and the index of this appears on Plate 6. Herein New Zealand merits a special inset on the continental blank indicating the publication of no fewer than 21 maps in this range in the Ross Dependency and adjacent areas, surpassed only by the United Kingdom with 29 and the United States with 22.

The American Geographical Society is to be congratulated on the merit of this further folio and will deserve the gratitude of mapping agencies the world over. Earlier folios were one covering the "Aeronautical Maps of the Antarctic" and a second covering

"Physical Characteristics of the Antarctic Ice Sheet."

J. H. MILLER.

(The folio may be consulted at the office of the Antarctic Division, 124 Ghuznee Street, Wellington).

GEOLOGY AND PALEONTOLOGY

edited by Jarvis B. Hadley.

281 pp. 122 figs 20 plates, 4 folding maps. Vol. 6 Antarctic Research Series. American Geophysical Union 1965. Price \$14.00 (U.S.).

(Reviewed by Dr R. W. Willett,
N.Z. Geological Society)

Following close on the heels of the SCAR Geology Symposium 1963 Volume comes a very welcome addition to our shelves, a number of collected papers by United States workers (ten in all) on geology and paleontology of several areas scattered over the continent. Particularly of interest are the papers dealing with the area of U.S. activity between Queen Maud Range and Edith Ronne Land.

New Zealand readers are by now familiar with the extensive geological work carried out in Victoria Land south to the Queen Maud Range in the Trans-Antarctic Mountains but will be unfamiliar with the work on Horlick, Thiel and Pensacola Mountains. Likewise, New Zealand geologists will welcome the volume for its account of the geology of some of the lesser known areas. Paleontologists too will find the fauna from the Horlick Formation of the Ohio Range fully described and illustrated.

The volume opens with a Summary of Exploration (1831-1962) of Bedrock Geology of Antarctica. This resume by John T. Anderson is extensively comprehensive, listing no less than 320 references, but restricted as its title indicates and it omits the quaternary geology of the area. This is in contrast to Harrington's review, 1965, in *Biogeography and Ecology in Antarctica*. The fact that such reviews of the geology now exist is itself indi-

cative of the extent of geological work in Antarctica and more volumes like the present one must be expected. Anderson's paper is essentially a resumé—he is not led into fields of his own speculation—and for that reason is comparable with Warren's paper on Geology in Antarctica, 1965, but more detailed and more extensive. It does succeed in what Anderson set out to do "to fulfil the need of a comprehensive synthesis of the literature . . . and a summary of the present (1962) stage of knowledge".

The Ohio Range of the Horlick Mountains, geologically a most interesting area, is dealt with fully by three papers, one in which the entire fossil fauna from the Horlick Formation (Lower Devonian) is described. William E. Lang describes the stratigraphy of the area in a well illustrated paper, which includes lengthy discussion on the Buckeye Tillite, its nature and origin and direction of ancient movement. His discussion will be of interest to all who have been concerned with the tillite problem. The fact that the Buckeye Formation meets most of the diagnostic features laid down by Schwartzbach (1963) causes Lang to describe it as a tillite. Lang accepts other tillites as such described from other localities but the lithology of the Mawson "tillite" causes him to doubt its origin. The igneous and metamorphic rocks of the Ohio range are described by Samuel B. Travers and included are three isotope ages averaging approximately 482 m.y. suggesting batholithic invasion during Cambrian to Ordovician times. James M. Schopf describes the anatomy of the axis in a petrified specimen of *vertebria* collected from the Ohio Range in 1961/62 from Mount Glossopteris Formation.

A further paper on fossil conchotraca from coal measures of the Ohio mountain is by S. A. Doumani and Paul Tasch.

A final paleontological paper by nine authors is devoted to the Lower Devonian Fauna of the Horlick Formation, Ohio Range. This, well illustrated by 18 excellent

plates, illustrates the various sections of this paper, namely Brachopoda, Byroza, Gastropoda, Pelecypoda, Crincoconarida, Trilobita and a fish plate. No less than 118 pages of this volume are devoted to the geology and paleontology of the Ohio Range.

The geology of Mount Weaver area at the head of Robert Scott Glacier is described by Doumani and Minshew. Formations are described but wisely no formation names given; they are correlated with others already described from the Trans-Antarctic Mountains.

A further contribution to the geology of the Trans-Antarctic Mountains is a study of some samples of basement complex rock collected from the Queen Maud Mountains between Liv and Amundsen Glaciers.

Two other major contributions: one the geology of the Mount Gran area and one the General Bernardo O'Higgins area. The Mount Gran paper by Minsky, Trever and Calkin, confines itself to the stratigraphy and petrography of the Beacon Sandstone Group and the Ferrar Dolerite. This is an important paper for here Minsky discusses the Beacon based on measured sections in Mount Gran area. Mechanical analyses and heavy mineral studies form a part. The second, that of O'Higgins' area by Halpeen, describes the geology of an area that has been isolated for operational reasons from the FIDS programme. The paper is, like all others in this volume, well illustrated. The final paper is by R. L. Cameron on the Vanderford Submarine Valley at Vincennes Bay near Wilkes Station, East Antarctica. This valley is about 24 km long and has a maximum depth of 2,287 metres, decreasing seawards to 1,829 metres. It is similar but deeper than that of the Northwest Fjord of Scoresby Sound, Greenland, presently regarded as the deepest fjord.

The volume is clearly and cleanly printed with excellent diagrams and each paper has a standard Antarctic locality map consistently set in the now accepted convention of 0° meridian at top of sheet and 180°

meridian at bottom. One thing is noted, that not all papers give the measurement in metres but this is an inconsistency in Antarctic geology to which we here in New Zealand must plead guilty. With more and more such volumes and special issues on Antarctic geology likely to appear surely here on the scientific continent we can use the accepted scientific measurement units.

NEW SNOW CAR

The "Snow Volks", the vehicle designed by former colonel, Parker B. Mudge, for use in the Antarctic, could not be tested this season, as previously intended, because of transport problems between New Zealand and McMurdo.

Extensive testing of the prototype Snow Volks was made in New Zealand's Southern Alps. It is not designed to replace the tracked vehicles already proven in the snow and ice but to offer a fast (35 m.p.h.), easily adaptable supplementary vehicle for the use of travel between bases, short scientific or exploratory trips by two to four men or short haul operations, with a reliable, easy to maintain and economical converted car.

By altering the hand brake of the conventional Volkswagen, braking is possible on either or both of the rear wheels, to control wheel spin in soft snow and to aid steering or as an emergency replacement for the foot brake. The fibre glass skis stood up to hard use during tests, showing very few scratches after some very rough treatment. On hard wind-packed snow rubber tyred dual wheels appear to be the answer, giving better traction than a four-wheel drive vehicle.

THE LAST LINK

Tangible contact between the men to winter at Scott Base and their friends in New Zealand was ended for the winter when U.S.N.S. "Wyandot" sailed from McMurdo on March 3. She was due to reach Lyttelton on March 9 en route for the United States.

The New Zealand Antarctic Society

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

You are invited to become a member. The membership fee includes subscription to "Antarctic."

BRANCH SECRETARIES

Wellington: W. J. P. Macdonald, Box 2110, Wellington.

Canterbury: Mrs. E. F. Cross, 34 Clissold St., Christchurch 1.

"ANTARCTIC"

is published quarterly in March, June, September, and December. Subscription for non-members of the Antarctic Society, £1. Apply to the Secretary, New Zealand Antarctic Society, P.O. Box 2110, Wellington, New Zealand.

OUT OF PRINT

Volume 1, numbers 1 and 9;

Volume 2, numbers 3, 4, 7, 8, 9;

Volume 3, numbers 5, 7.

are OUT OF PRINT. Some others are in very short supply. Copies of available issues may be obtained from the Secretary of the Society, Box 2110, Wellington, at a cost of 5/- per copy. Indexes for volumes 1 and 2 are also available, price 2/6 each index. An index for volume 3 has been prepared **and is now available.** Price 3/-.

SOCIETY TIES

The N.Z. Antarctic Society tie is now available. The design is similar to those used for the ties of kindred organisations in the United Kingdom and Australia. The dark blue background, light blue and white stripes and motif of penguins and kiwis provide a striking pattern, yet a reserved note is retained over all.

Ties are available through N.Z. and Branch Secretaries of the Society at a cost of 17/6.

The New Zealand Antarctic Society

The New Zealand Antarctic Society was formed in 1956 to promote and support all activities connected with the study of Antarctica and the Antarctic region. The Society's main activities are the publication of a journal, the organization of expeditions, and the collection and preservation of Antarctic specimens.

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ANTARCTIC

The journal 'ANTARCTIC' is published quarterly and contains articles on the geology, biology, and meteorology of the continent. It is the only journal in the world devoted to the study of Antarctica. The Society's journal is published by the New Zealand Antarctic Society, Wellington, New Zealand.

OUT OF PRINT

Volume 1, numbers 1 and 2
Volume 2, numbers 3, 4, 5, 6
Volume 3, numbers 7, 8
The 'OUT OF PRINT' books contain the first three issues of the journal. These books are now out of print and are no longer available. The Society is sorry to hear that you are interested in these books. The only way to obtain them is to purchase them from a second-hand bookshop or from a collector. The Society is not able to supply these books as they are no longer available.

SOCIETY TIES

The Society's ties are made of a strong, durable material and are available in a variety of colors. They are a symbol of membership and are worn by all members of the Society. The ties are made in New Zealand and are a popular gift for members. The Society is pleased to hear that you are interested in these ties. The ties are available in a variety of colors and are made of a strong, durable material. They are a symbol of membership and are worn by all members of the Society. The ties are made in New Zealand and are a popular gift for members. The Society is pleased to hear that you are interested in these ties.