ANTARCTIC

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INVETERATE ENEMIES

A penguin chick bold enough to frighten off all but the most severe skua attacks.
Photo: J. T. Darby.

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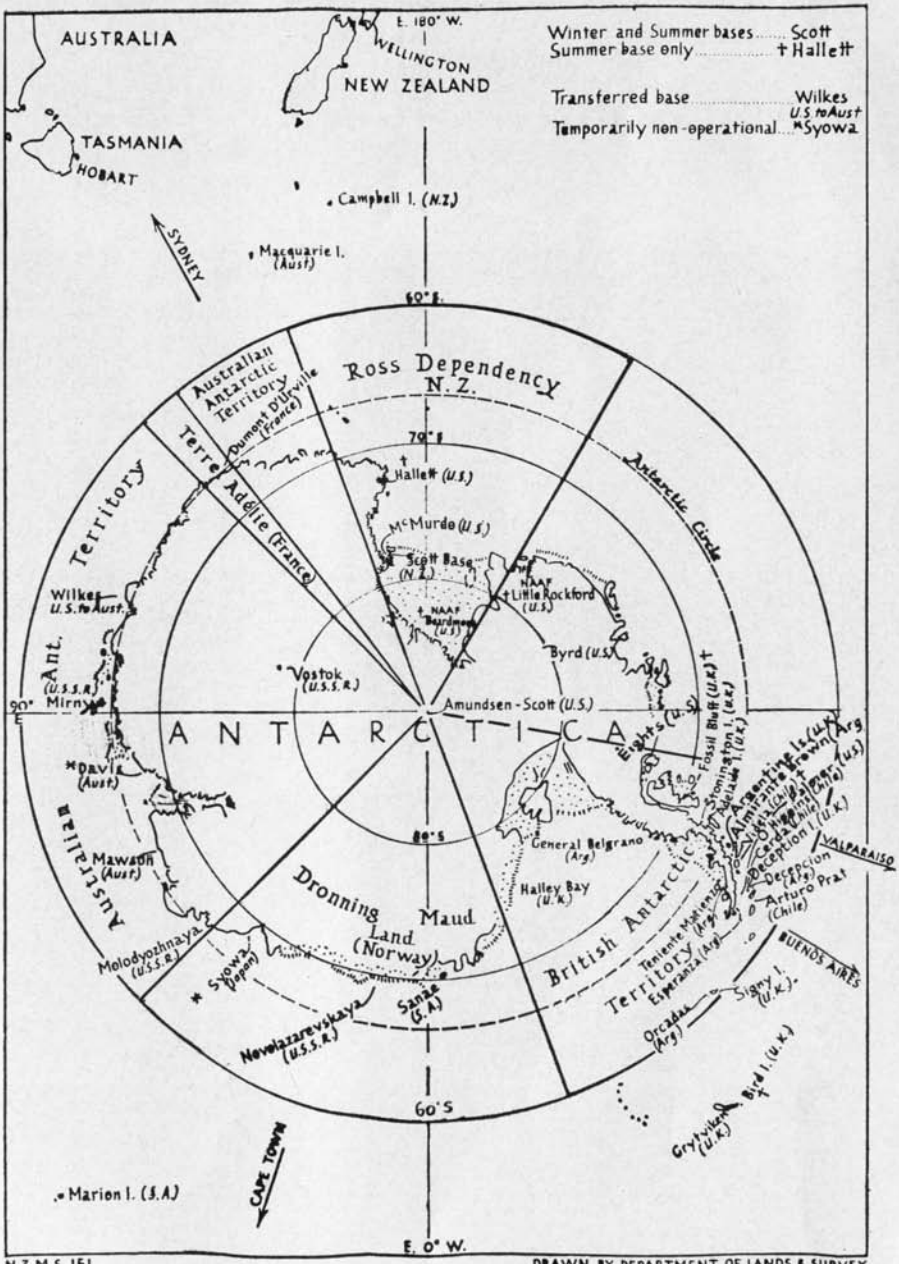

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NEW ZEALAND'S FIRST DECADE IN ANTARCTICA

by D. N. Webb

[*The following article was written in the days just before his tragic death by Dexter Norman Webb, who had been appointed Public Relations Officer, Scott Base, for the* 1966–1967 *summer. His fine summing-up of the past decade of New Zealand Antarctic activity has been left untouched. It indicates how expertly he had grasped the facts of a complex situation and how skilfully he was able to weave them into a story which the layman can read with ease.*—Editor.]

New Zealand will celebrate a decade of science and exploration in Antarctica, at Scott Base this coming 1966–67 season.

What was originally intended to be merely a temporary base to house the historic Commonwealth Trans-Antarctic Expedition of 1957–58 by Sir Vivian Fuchs and Sir Edmund Hillary, and the scientific staff for the International Geophysical Year of 1957–58, has now become a "permanent" and plays a big role in New Zealand's scientific research programme.

Scott Base was opened officially on 20 January 1957 with a flag raising ceremony. Captain H. Ruegg then the Ross Dependency Administrator, officially opened the building and A/B R. Tito, Waitara, hoisted the flag. The Ross Dependency Post Office had been opened a few days earlier.

With the successful completion of the T.A.E. and the I.G.Y., New Zealand maintained the base, and the "'Kiwi" has been the predominant emblem on Pram Point on Ross Island, McMurdo Sound, Antarctica, since then.

One of the major achievements of New Zealand has been the mapping of the 182,000 square miles of the Ross Dependency (excluding the Ross Ice Shelf, an area as large as Spain). Together with this topographical work, a massive geological reconnaissance has been completed, and specialised geological studies have been made in the past three years.

The consolidation of Scott Base from a temporary structure into a permanent establishment for scientific study is taken a stage further this coming season with the provision of new electric generating equipment designed to double the capacity of the existing units at Scott Base. Not only is New Zealand in Antarctica to study science peculiar to Antarctica, but also to become a major part in the world wide net work of stations following science generally observed from established scientific stations and observatories.

In ten years, a good indication of thousands of years and even hundreds of thousands of years of the earth's climatic history has been gained through a study of glaciology in Antarctica, including a close survey of various glaciers, the ice and snow structure, and the movement of ice and snow.

However, probably the biggest accomplishment scientifically has been ten years of geophysics. The Antarctic is an extremely good location for receiving seismic waves resulting from earthquakes in other countries of the world. Thus the continued study of seismology in Antarctica has provided valuable material giving added knowledge on the mechanics of earthquakes.

Communications have benefitted considerably through studies in this southern continent. Upper atmospheric research in the ionosphere has now permitted the prediction of optimum periods and frequencies of world-wide radio communications. Closely allied with ionospheric research has been studies of the aurora and geomagnetism. The

nature of the upper atmosphere and the changes in it caused by particles streaming in from outer space is a particularly important aspect of the Antarctic scientific programme.

The continuation of biological studies has provided a wealth of data on plant life, natural animal life and micro biology. Just as with other scientific studies, the Antarctic has been termed one of the world's greatest natural laboratories because of its isolation and lack of interference from outside influences. As with newly introduced programmes in previous years, this year D.D.T. will be sought in samples of flora and fauna to be collected during the 1966–67 season. This will include samples of plant life, as well as birds, mammals and fish.

From a practical point of view, the greatest changes which have taken place in the Antarctic have been methods of transport. As far as New Zealand is concerned, this ranges from the wooden hulled M.H.N.Z.S. "'Endeavour" of 1956–57, taking 14 days for the journey from Lyttelton to McMurdo Sound compared with only seven hours accomplished today by Royal New Zealand Air Force Hercules aircraft flying from Christchurch to the same area.

This change in transportation over 2500 miles of some of the worst seas anywhere has meant corresponding changes in the environment of Antarctica as far as humans are concerned, with "home comforts" more readily available, but mainly the near abolition of the feeling of isolation which accompanied earlier conditions. The Antarctic has been brought so much closer to the world in the past ten years, particularly in view of the mid-winter flights undertaken in the past year. These now have been scheduled for coming years, whereas they were emergency flights only.

In the field, dog teams are still being used to a limited degree by New Zealanders, but motor toboggans and other tracked vehicles have been developed and are far more capable of providing necessary surface transport.

Local flying in the Antarctic by single-engined light aircraft has now been completely superseded by helicopters, and more recently by turbo-powered helicopters.

In ten years a complex programme needing provisioning on a large scale, and logistics to support it, has grown up around a complete division within the D.S.I.R. at Wellington. The Antarctic Division of the Department of Scientific and Industrial Research, Featherston Street, Wellington, is responsible for detailed planning and implements New Zealand's programme in Antarctica. This Division employs all the staff, obtains supplies and equipment and directs operations.

Personnel at Scott Base will this year observe the passing of the first decade with a small ceremony yet to be arranged. In addition, an application to the Post Office has been made for the use of a special franking mark to be used at the Ross Dependency Post Office at Scott Base for the cancellation of the special Ross Dependency stamps on mail from the Base.

TEN YEARS OLD

The tenth anniversary of the opening of Scott Base on January 20, 1957, was celebrated at a function attended by thirty-five New Zealanders and about forty Americans.

At half past four Mr. J. Holmes Miller, a Wellington surveyor, lowered the New Zealand flag. He was deputy leader to Sir Edmund Hillary when Scott Base was built. The Antarctic Division D.S.I.R. Superintendent, Mr. R. B. Thomson, then raised the flag.

A wreath was placed by Robert Rae at the memorial plaque to Lt. Tom Couzens, the only New Zealander killed in the Antarctic. Lt. Commander D. C. Oakley, the United States Navy chaplain from McMurdo station, led a short memorial service.

A buffet dinner of roast sucking pig, baked fresh whole salmon, crayfish tails and curries was served. As a centre piece for the table Chef Bryan George (Christchurch) carved

a four feet high penguin out of ice and a four gallon punch bowl was hollowed in a slab of ice.

Captain J. Bersik represented the United States Navy Operation Deepfreeze and spoke of the relationship the United States enjoyed with New Zealand in Antarctica. Mr. Eddie Goodale (USARP) congratulated Scott Base on its ten years of scientific research and also spoke of the co-operation that was beneficial to the work of both nations in Antarctica.

SMALL BASE FOR A SMALL NATION

Speaking at Scott Base during a visit to the Antarctic this summer, the retiring Director of the physics and engineering laboratory of the Department of Scientific and Industrial Research, Mr. W. H. Ward, said that the New Zealand base had been kept "deliberately" small.

"This gives a better integration of the sciences being studied and is more suited to the New Zealand way of life," he said. "We are accustomed to working better in small units, or alone — more so than nations further from their pioneering days.

"Scott Base completes New Zealand's chain of scientific stations from near the equator to within the Antarctic circle. This makes us the only country with direct control over such a wide scale of studies in many sciences, and also gives us a lot of responsibility.

"Antarctica is the only large piece of clean, natural laboratorv left in the world. Large areas of it are hardly affected by man. The uses for it cannot yet be fully foreseen, but it is desirable that Antarctica be kept clean for further scientific research."

Mr. Ward's opinions were upheld by another of this year's visitors, **Sir Thaddeus McCarthy,** the first Supreme Court judge to visit the Base.

"Scott Base has established a major name for itself in the Antarctic and amongst the many people who travel through McMurdo Sound," he said. "The base itself is small, compact and well designed; tidy and functional.

"The Americans are full of admiration for the way the base is run, by the quality of the men we send down there, and the work they are doing. Much of this impression appears to be due to the great care taken by the Antarctic Division of the D.S.I.R. in the selection of the New Zealanders to man the base."

A MERRY CHRISTMAS

New Zealand's southernmost citizens celebrated Christmas with a seven-course dinner. The meal began with chilled fruit juices, and ended two hours later with cigars and liqueurs.

The chef, Bryan George, prepared the meal for the 40 men. It included crayfish thermidor, roast chicken and turkey, and baked ham with cauliflower, potatoes, and kumeras. This was followed by a traditional steamed pudding with brandy butter sauce. The mess room was decorated and the chef wore his white hat, jacket and bow tie.

At Scott Base, each man usually looks after himself at meal times, but, for this Christmas dinner the waiters were the assistant chef, R. Rae, Queen's Scouts D. Goulden, A. Mort and D. Hunt, and D.S.I.R. technical trainee J. Williams.

Field parties working close to base returned for Christmas dinner. Special supplies and mail were dropped to the three field parties in distant parts of Antarctica. A radio link was arranged between Scott Base and the parties at Cape Hallet, Mariner Glacier and Aviator Glacier.

"We all sang carols, and each party in turn responded, singing a carol back to us," reported Scott Base Leader Colin Clark. "We enjoyed hearing their voices again."

On a special radio-telephone schedule in the afternoon the Governor-General called the Base. "Lady Fergusson and Geordie also spoke," said Mr. Clark, "and wished us a

Merry Christmas. We made sure that we had one."

The men at the base then telephoned their wives and families.

NEW GENERATORS

Two new 65 kva Caterpillar-powered generators were installed at Scott Base early in the new year under the supervision of Mr. J. L. Grimwood, a Ministry of Works overseer, assisted by P. McKane, N. Gilmor and Brian M. Judd, who has spent two consecutive winters at the base, 1964 and 1965. Also assisting were two men who will winter at the base this year, R. J. Sopp (diesel mechanic) and C. M. Rickards (electrician).

Each of the new generators, taken south on "Endeavour", weighs two and a half tons. After they had been hauled two miles on sledges from ship-side to base, levers, rollers and brute force were used to manoeuvre them into position. The new generators will give enough electrical power to run the base and its scientific equipment for many years to come. An elaborate waste heat exchange system is being coupled to the generators to heat huts and boil water for washing.

The new generators came into service on January 3. All precautions have been taken to preent inflammable fuel oils soaking into the generator hut flooring. Before the new machines were installed, parts of the hut were re-lined with fireproof wall-board and a new floor covering was laid.

During the change-over, power restrictions had to be imposed. A large electric toaster was replaced pro tem by the top of the kitchen stove. At certain periods the use of all electrical equipment was restricted to ensure radio contact with parties out in the field, and with New Zealand.

R. Barraud, M.O.W. draughtsman, made a survey of all the equipment and took a photographic record to bring plans of the base up to date.

The old Lister-powered units have been installed in the auxiliary power-house in N Hut.

"ENDEAVOUR"

The New Zealand Antarctic supply ship "Endeavour" (Commander W. E. Hodge, R.N.Z.N.) after taking on fuel and stores at Wellington left Lyttelton on December 10 for the first southern voyage of the 1966–67 summer. "Endeavour" was at McMurdo December 21–23. From the ice-front where the ship berthed it was about two miles to Scott Base, and the 38 men then at base worked practically non-stop for 15 hours to transport, unpack and store the cargo, which had to be hauled on sleds and trailers across the steep road to the base.

Leaving for New Zealand on the 23rd the vessel ran into trouble following "Staten Island" through the pack, and did not reach Port Chalmers till January 3. Both screws were damaged by ice and she was in dock for repairs until the 11th. She had come most of the way on one engine to avoid excessive vibration.

In Wellington from January 14 to 24, the ship was on the 25th instrumental in rescuing three fishermen from the disabled "Miss Tracey", and was then at Lyttelton until she left on a short oceanographic cruise south of New Zealand with scientists from the N.Z. Oceanographic Institute, lasting four or five days, and her second voyage south to McMurdo.

After two days at McMurdo (February 18–19) she left for New Zealand, reaching Wellington on February 28.

WINTER PARTY 1967

R. G. Rae: Campbell Island, 1958–60 and 1963–64.

Assistant Cook, Scott Base, 1960–61 summer.

Assistant Maintenance Officer, Scott Base, 1965–66 and 1966–67 summers.

W. R. Orchiston: Field Assistant, Scott Base, 1966–67.

This brings the total wintering personnel at the base for the 1967 winter to 12.

NEW HAZARD

The unusually extensive ice breakouts of the past two summers in the McMurdo Sound area have brought new problems for the New Zealanders at Scott Base. Since the base was built ten years ago, the ice-shelf fronting it remained stable, 100 feet or more thick, until the 1964–65 season. But as early as late November last year there was already more open water than usual, and much of what ice there was, being only a year old, was only about eight feet thick.

On November 27 it was reported: "Weaknesses, melt-holes and cracks are already showing and in front of Scott Base seals have pushed up through the ice earlier than usual." Which all means that out from Scott Base, instead of thick ice over which there are normally "highways" for the haulage of heavily laden sledges, there is either ice of doubtful stability, or open water.

An accurate prediction of the breakout is not possible, so a constant watch has to be kept on the ice.

Since man began permanently occupying the McMurdo Sound area 10 years ago the breakout has been creeping further south each season. Some theories attribute this to the effect of ice-breakers causing a premature break-out in November; yet the extensive breakout recorded in Scott's diary was only slightly exceeded last season.

THEORIES

In a study of the McMurdo Sound ice breakout, Mr. A. J. Heine, of the Antarctic Division, writes that the main factor affecting breakout around the southern end of Ross Island is a combination of heavy sea swell, followed by strong winds from the south. The sea hinges ice up and down, then floats it away from the shelf, particularly where there are already weakening cracks.

"Further north of McMurdo Sound these ice slabs jostle together as pack ice and subdue the power of the swell on the ice edge.

"Although complete weather observations are made, no correlation is noticeable between these records and ice breakout patterns," says Mr. Heine.

PROBLEMS

When the ice broke away from in front of Scott Base last summer 70 to 80-knot southerlies whipped sea spray over the base buildings, which are 25 yards from the coast.

Humidity in Antarctica is so low that metals do not need protection from rust and now salt spray has corroded copper and steel fittings, particularly between outside instruments and the science laboratory.

The Antarctic division superintendent (Mr. R. B. Thomson) has decided that some sea rescue equipment be installed at Scott Base this summer. "There is a full range of mountain and crevasse rescue equipment at the base, but now the open water is a new hazard to be prepared for," said Mr. Thomson.

Scott Base leader, Mr. C. M. Clark (Christchurch), said that when open sea appears in front of the base buoys and rope will be mounted near the coast.

HELPING HAND

Ever since 1962 a team of experienced New Zealand mountaineers has provided training for United States Antarctic personnel in snow and ice techniques and safety procedures in the Antarctic environment. The 1966–67 team was led by Chief Inspector L. D. Bridge and comprised R. Cawley, A. Hubbard, R. Barraclough, A. Bibby, and J. Hayton. The instructors are not paid but regard this service as a holiday chore. As the leader put it: "This is one small thing we can do to repay the U.S. people for their support."

The Americans say, "The value of the training for scientists in the field could not be measured." Some 200 have passed through the course.

The New Zealand instructors have found that normal ice pitons are too long for Antarctic ice work: they shatter before they can be driven in. The team now uses short rock-climbing pitons.

MAIN NEW ZEALAND FIELD PARTIES MAKE INTERESTING DISCOVERIES

The two major field trips from Scott Base this summer were both primarily geological in purpose and limited in respect to the area covered on the ground. Both were designed to fill in gaps left between areas examined by previous expeditions.

CANTERBURY UNIVERSITY

The four-man University of Canterbury team at Cape Bird, Dr. E. C. Young, J. Peterson and D. Proctor (zoologists) and J. T. Darby (technician), returned to Scott Base on January 29 after eleven weeks at Cape Bird. Dr. Young was very happy with the results achieved. The team was picked up by a helicopter from the "Staten Island".

The other two men, I. Stirling and R. East, both zoologists, visited either singly or as a pair, Franklin Island, Cape Hallett, Cape Bird and Marble Point, inspecting seal concentrations along the Victoria Land coast as far as Cape Hallett.

[See the article *The Long Hot Summer* on page 440.]

A NEAR THING

Ian Stirling, a University of Canterbury doctorate student, escaped injury when a helicopter lost power and crash-landed on an ice floe near Hallett Station on January 23. He was on a routine flight from the ice-breaker "Glacier", taking a census of Weddell seals.

The pilot, Lieutenant-Commander A. B. Callison, was thrown clear of the machine on impact and was not injured.

Mr. Stirling, a married man with a threemonth-old daughter, remained strapped in the two-seater helicopter as it rolled three times across the floating ice shelf. The aircraft was wrecked and no attempt will be made to salvage it.

The two men were picked up by a second helicopter from the "Glacier" and the New Zealander continued his research.

INTERTIDAL LIFE

Dr. Craig Kensler, for the Marine Fisheries Research Division, investigated the marine life of the intertidal zones and selected ice-free localities along 400 miles of the Victoria Land coast and northern Ross Island. He discovered several new inhabitants of interest living in crevices in the zone between high and low tides, minute marine snails ranging in size from 0.5 mm to 3 mm.

Dr. Kensler is an American who obtained his Doctorate at the University of Wales. For his thesis he studied the animal life in the intertidal zone along the shores of northern Europe and northern Africa.

OTHER PROJECTS

By the end of January the re-surveying of the ice movement on the McMurdo Ice Shelf was virtually completed.

Fat samples from skuas, seals and penguins have been collected at Scott Base, Cape Royds and Cape Bird for D.D.T. sampling by the Chemistry Division, D.S.I.R.

Also awaiting shipment to New Zealand are jars of water melted from snow collected at the U.S. Plateau, Byrd and Pole Stations and on Mount Erebus. These water samples will be analysed for tritium at the Division of Nuclear Sciences.

T. Choate from Otago University and B. Willis spent several weeks at Cape Hallett studying Adélie penguin and seal populations for the Dominion Museum, returning to Scott Base on January 14.

MARINER GLACIER GEOLOGICAL SURVEY

by J. E. S. Lawrence*

The New Zealand Northern Party planned to work for up to nine weeks on a U-shaped journey round the head of the Mariner Glacier in Northern Victoria Land, 300 miles North of Scott Base. From the air, this place looked impressive; from the ground it was alpine scenery to perfection, rock and ice peaks rising to over 10,000 ft all round, steep passes and high neves; dominating the Eastern side of the glacier was the great ice dome of the Victory Plateau, and to the West, above the icefalls, the shelf of the Supernal Massif hid the Meander Glacier, and the neve leading to the twin spires of Mount Murchison over 13,000 ft high. The coast lay 50 miles to the East.

The task of the expedition was to make a detailed geological survey of the area, and to establish the relationship between the sediments to the North, and the granitics to the South. It was hoped that an exposed contact might be found between these two groups.

On November 24 at 0800 hrs., the Northern and Southern parties both left Williams Field for a reconnaissance flight. The C 130 was conspicuous by a dilapidated grey mare stencilled just aft of the crew door. After first a touchdown, they landed at 8,500 ft on the Evans Neve at the requested Put-in Point. Surfaces were satisfactory for a loaded Hercules, and they took off, and returned to Base. Twelve hours later, the plane again landed on the Evans Neve, this time with four toboggans and six sledges loaded with over 12,000 lb of gear. The two parties slept for a few hours at a communal site, then moved off independently that afternoon.

The Northern party sledged 8 miles to The Pleiades, a group of volcanic peaks above the icefalls at the head of the Mariner. Leaving a substantial dump, they travelled 25 miles to the North-west into the mountains, camping in a high cwm under the 3,000 ft N.W. face of Mt. McCarthy. This fine rock peak, and its retaining ridges gave three days' profitable geologising and climbing, though rock towers on the West ridge stopped them from reaching the summit of McCarthy. The rock was sedimentary, as expected, though scattered volcanics abounded

On December 2, they traversed to the South, and up through a steep pass into the snowfield behind McCarthy. This cirque provided some astonishing scenery; three days were spent on exploring it, geologising, and the climb of McCarthy by the South-east ridge. The party moved further South on the 6th, up the long climb to the Victory Plateau. The natural gateway to the Plateau 166° 53′ E., 72° 41′ S., was reached at 9,550 ft after a rise of 2,500 ft in just over four miles. Journeys were made from this base camp out on to the Plateau; the weather began to deteriorate, and the caravan retreated down to 6,600 ft when a storm started that lasted three days.

The toboggans and sledges were dug out on December 15, and the camp moved eight miles to a suitable position near the eastern edge of the Glacier from which the exposed nunataks could be worked. It was soon established that the contact did not lie on this side of the Mariner, and so the journey commenced back to the Dump, geologising through the Pleiades on the way. These hills yielded the first traces of granitics, though they proved hard to explore, since the surfaces encountered were either

* Field Leader.

blue ice or large sastrugi, and for three days there were strong winds. The Dump was reached on the 20th, and the following day, in poor conditions, progress towards the Retreat Hills to the West was stopped after only twelve miles, by crevasses and whiteout. A further five miles when the weather improved saw the party encamped at the foot of the highest peak in the Retreat Hills. From this base, they geologised, and climbed the high peak by the N.W. ridge. Christmas was spent here; a welcome airdrop of mail and equipment was received only a few hours before the blizzard which lasted for five days.

The next part of the route lay up the Eastern side of the hills, and a further dump was established at the Southern end. The Mount Supernal massif was reached on the 31st; a small dump was left at the foot and loads were relayed up to a height of 11,300 ft at a camp high in the cym behind the N.W. ridge. This mountain was granite: it was climbed on New Year's day, one rope continuing on over the summit to complete a traverse of the peak.

A prominent peak could be seen directly to the North, and about seven miles away, which appeared to be a darker rock, though still on the same side of the glacier. The party journeyed back down the mountain, picked up the dumped stores, and then drove North to the Southern tip of the peak. It was now apparent that the contact was close; the rock was Robertson Bay Group, but had large granite sills running through it. The peak, 10,400 ft, was climbed, not without difficulty, and all the exposed rock explored. The actual contact was found a day later, clearly defined at the foot of the main South-east ridge of Mount Supernal.

An unfortunate minor accident to the Senior Geologist* forced a prolonged stay at the Retreat Hills Dump on return, and it was decided to return to the Evans Neve. A pick up date of Friday, January 13, was arranged with Base.

The journey back to the Neve was plagued by poor visibility; and on the day of the landing, semi-whiteout conditions allowed the plane to only briefly sight the flares from overhead. It landed some miles to the North-east. Neither plane nor toboggans could see each other, since visibility was down to one mile. By occasionally stopping and cutting the toboggan motors, it was possible to home in onto the sound of the C 130's engines, and it was with considerable appreciation of the skill of VX 6 squadron U.S. Navy that the party finally climbed aboard under the welcome sign of the "old grey mare".

* Graham Hancox: his leg was scalded.—Ed.

WEALTH FROM THE ANTARCTIC SEAS ?

Professor G. A. Knox, head of zoology at the University of Canterbury and a New Zealand representative at the S.C.A.R. meeting recently held in Santiago, Chile, said on his return that provided strict control can be assured and necessary research undertaken beforehand, the Special Committee on Antarctic Research and the Special Committee on Oceanic Research may recommend exploitation of pack-ice-area products to the 12 Antarctic Treaty powers.

These products include krill, the planktonic crustacea on which the baleen whale feeds, which is an exceedingly rich source of protein, and the fur seal.

Both Russians and Japanese had done preliminary estimates on krill as a source of protein and its harvest could be economic, Professor Knox said.

Pelagic seals could also offer a rich return of furs provided control was strictly enforced.

"But," Professor Knox emphasised, "both committees were adamant that much research must be done before any such propositions are formally recommended."

AVIATION GLACIER SOUTHERN FIELD PARTY

The Aviator Glacier team, R. Chisholm (leader), S. Nathan and F. J. Schulte (geologist) and I. Stewart, were flown with the Mariner Glacier party on November 25 to a common put-in point on the Evans Nevé in 72° 45′ S., 165° E., at an altitude of 8,500 feet and some 250 miles north of Scott Base.

The Evans Nevé feeds both glaciers, which flow into the Ross Sea, the Mariner in approximately 73° 30′ S., the Aviator in 74° S. The Aviator flows in a S.E. direction for about 50 miles before discharging into Wood Bay.

Over a period of seven weeks, using two motor toboggans, the Aviator party sledged about 500 miles from the put-in point, down the ridge between the Campbell and Aviator Glaciers, to the coast near Mount Melbourne en route.

VOLCANIC ACTIVITY

During an ascent of the 8,900-ft. mountain they found volcanic activity on Mt. Melbourne.

"Steam issues from small craters, the surrounding ground beneath the surface is too hot to touch and there is a smell of hydrogen sulphide," the geologists say.

They drove the toboggans to within a thousand feet of the summit, which was exposed rock. About the summit was unweathered volcanic scoria and distinct lava flows. The main craters were old, with smaller ones around their edge.

Unweathered cinder cones showed that there was volcanic activity in the last few hundred years. Ice pinnacles six to 10 feet high, and from five to 20 feet in diameter, marked places where steam issued from the ground.

"We knocked at one of these ice formations with an ice axe and found them hollow, the space inside being large enough for all four of us to climb in," Nathan said.

There have been earlier suspicions that there might be some volcanic activity on Mount Melbourne. In his diary for 21st February, 1904, on the return volage of "Discovery" from Scott's first expedition, Dr. Wilson wrote:

"Mount Melbourne was quite clear today and appeared to have a filmy mist hanging in the main crater, exactly as we have often seen in Mount Terror, which always makes us think they are not quite asleep."*

The party were picked up on January 13 by a "Staten Island" helicopter from where they were camped on a 700-ft. high cliff at Cape Washington, and transferred to the icebreaker lying a mile off shore.

Although not part of their project the party visited an Adelie Penguin rookery noted by the Borchgrevink expedition at the turn of this century and not visited since. The party counted 4,500 birds. The chicks were not as advanced as the ones at the Cape Hallett rookery farther north.

The icebreaker stopped for a day at Franklin Island, where the geologists gathered samples of basalt which contained a type of rock thought to have been brought up from the interior of the earth by vocanic activity.

Accompanied by two zoologists, Wood and Stirling, who had been on the island four days, the team returned to Scott Base on January 14.

[We hope to publish a fuller report by Ross Chisholm in our next issue. — Ed.]

THE VERSATILE KIWI

A new organist has been appointed at the Chapel of the Snows, McMurdo, the well-known religious centre for the U.S. Naval Support Force, Antarctica.

He is Chris M. Rickards, fitter-electrician at New Zealand's Scott Base. Before coming to New Zealand at the age of 12 Chris lived in England, but before that he lived as a small boy in Uruguay, where he was born.

There should be no lack of volume in the McMurdo Church services — Chris is a Power Station Electrician.

* Edward Wilson: **Diary of the 'Discovery' Expedition to the Antarctic Regions 1901-1904. Blandford Press, 1966.**

Geologists In The Dry Valleys

The history of Antarctica from twenty thousand years ago, at the end of the last Glacial Age, was sought this summer by Professor H. W. Wellman of the Victoria University of Wellington. Holding ninety per cent. of the world's ice, Antarctica is an important part of the glacial story.

Professor Wellman, with geology student Andrew Duncan, worked from November 23 to December 14 in the dry valley region, about a hundred miles north-west of Scott Base. These valleys are the largest ice-free area of Antarctica and Professor Wellman says it is the only place where there is a hope of getting any history.

"During the past three million years there have been times of glaciation and inter-glaciation. The present period is one of inter-glaciation and at times of glaciation temperatures are about six degrees colder," says the professor.

"In most parts of the world it is clear to geologists what happened at the end of the last glaciation, twenty thousand years ago. However, there is no knowledge of what happened in Antarctica, which is important to know for the history of the world. It was thought by Scott's expeditions fifty years ago that more ice covered the dry valley region during the last glaciation than today, but this is doubtful; there could well have been little difference."

Everything about the dry valleys is mysterious and scientists get no help from experience gained in temperate regions. Professor Wellman says it is useless to expect processes of warmer climates in the dry valleys.

Snow-capped peaks from six to seven thousand feet separate the narrow dry valleys, with glaciers creeping down the sides and stopping abruptly a few thousand feet before the valley floor. As in any tropical desert, this frozen desert has sand dunes blown to heights of a hundred feet and there are permanently frozen salt lakes.

A main feature of erosion is "salt fretting". Crystallisation of salt breaks the rock, then winds carry away the fragments.

"The environment of these valleys is unique to the world," says Professor Wellman. "Temperatures are rarely above freezing point, yet in other parts of the world where temperatures are about, or below, freezing point, valleys are permanently covered with ice or snow. Generally the snowline descends as one goes south from New Zealand, down to sea level at sixty degrees south; then it appears to rise again, giving parts of the dry valleys a snow line higher than the lowest in New Zealand."

The professor worked in both the Wright and Taylor valleys. In the Taylor Valley, at Nusbaum Riegel, were two other Victoria University geologists, Ian Smith and Vincent Neall. They were investigating dyke swarms, which are narrow intrusions of igneous rock, presumed to have come up through cracks in the older rocks. "Where these intrusions cross they are offset, so this pattern will be noted and samples taken for further work back at the university laboratory," said Mr. Smith. He and Neall were in the dry valley region until December 23. Both V.U.W. teams were airlifted from Scott Base by helicopter and camped in tents, from which they worked by back-packing their equipment.

Will a New Zealand station be set up in the Dry Valleys? See the article on page 449 in this issue.

THE LONG HOT SUMMER CAPE BIRD 1966-67

by E. C. YOUNG*

The Antarctic unit of the University of Canterbury worked in two areas this year and most of the guff below is about the lot working at Cape Bird, about 50 miles north of Scott Base at the northern end of Ross Island. This group concentrated on terrestrial ecology — the other, working from Scott Base itself, looks into the politically more exciting topic of seal abundance and movement.

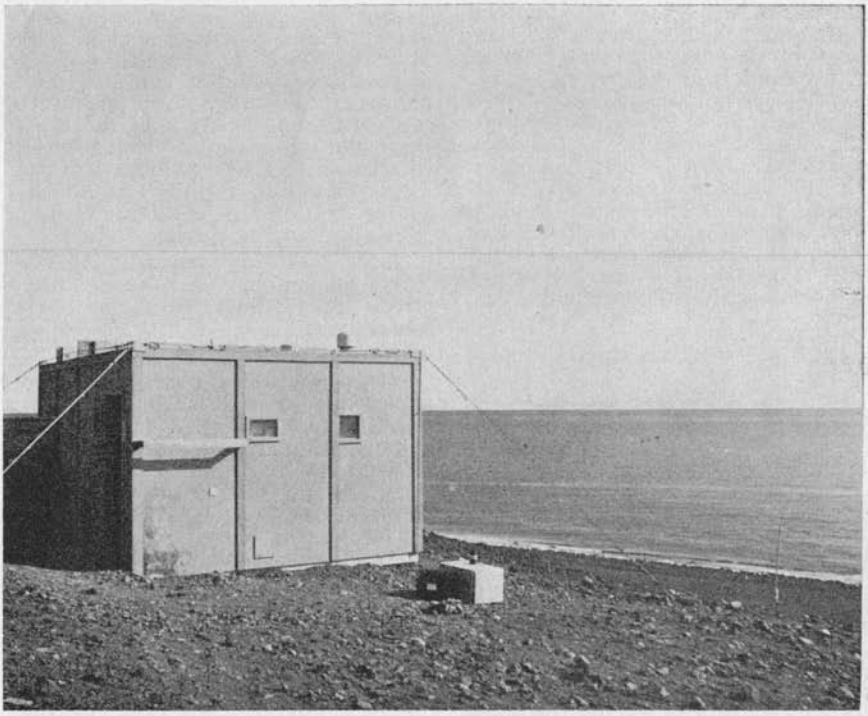
Last year Reg Blezard and I went off to Cape Bird without great expectations and lived comfortably enough in two tents, beautifully sited on a shelf overlooking part of the northern penguin colony and the Sound beyond. It did not take long to discover that we had stumbled on one of the better Antarctic areas for weather, and for convenience for the study of birds and arthropods, and after a week or two the first plans had been sketched for the development of a grandiose research station on the site. It is very pleasing to be able to report here that the station now exists. At the moment it takes the form of a large plywood box embellished with all the refinements of civilised man but it is hoped that the caretaker's house and private laboratory of the original plans will soon be erected. (Without a house a wife's isn't possible and without a wife even the best Antarctic living seems to lack something.)

The laboratory had been prefabricated overwinter at Scott Base and erected at Cape Bird in October. It was a very welcome sight when John Darby and I arrived in the middle of the night on November 14. Few modifications were made to it and it housed the four-man party very comfortably indeed. The Cape Bird weather was right up to expectation this year. Most wind came from the north and was seldom stronger than 10 knots. What makes for smugness is that while sunbathing or working in calm sunshine at the rookery the Sound was, as often as not, being beaten by strong southerly winds. These normally approach to a mile or so of the rookery but provide a relief from monotony by sweeping closer for short periods. It is thought that the northerly we enjoy is the backlash of the southerly sweeping around Cape Crozier. As in the previous summer no working days outside were lost to weather — a record surely hard to equal in any area of the world.

I spent all summer again looking into the problem of dependence of skua on penguin and the effect on the penguin of skua predation and disturbance,. This involved banding and plotting the territories of the 200 or so skua pairs at the northern rookery. The territories of many pairs lacked penguins and these birds fished at sea for the entire summer. Those with penguins in their territories "protected" from 15 to 2,000 breeding pairs. That is, essentially the same situation exists here as at the very much smaller rookery at Cape Royds. The feeding behaviour during the year was also the same as at Royds and again no skua pairs were able to feed throughout summer exclusively from their territory — at times too little food was available there and they fished at sea.

This second summer has allowed a great amount of detail to be fitted into the general account — which is largely arithmetical. Details of the amount of food taken by each skua each day, which birds are aggressive predators and which mere scavengers, and how the behaviour of individual birds varies through

* Dr. Young describes himself as "Caretaker, Cape Bird".



The Harrison laboratory from the North: late summer.

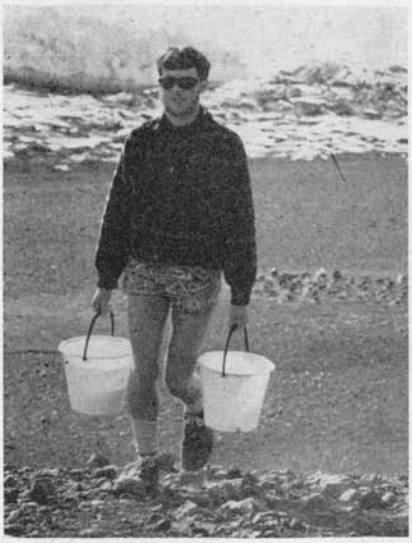
Photos: J. T. Darby.

the year, and, by fencing, how well a colony of penguins can do without skua interference, are examples. One point for limitless speculation is that, as a proportion of the eggs laid, penguins accounted for more skua eggs than vice versa; prompting the suggestion that the study would be better titled "Predation on skua by penguin during the egg stage".

Dennis Procter spent his summer glued to field glasses (16×50's for a change) watching the behaviour of skua chicks immediately after hatching to see why and when they started fighting. This work was hampered by having too few chicks too late in the summer — a consequence of the good weather early in summer that clotted brash ice into the Sound, preventing sea feeding near at hand and causing nest desertion. Through a series of experiments he has gathered strong evidence supporting the view that the fighting is triggered by hunger, and that this has only to occur for a very short period. He "proved" also just how extraordinarily sensitive breeding skua are to continuous, apparently innocuous, disturbance — especially in those pairs never worked before.

Jim Peterson started digging back into basic zoology in a programme that we hope will correlate the cycle of behaviour of breeding penguins with changes in the levels of various hormones circulating in the blood. The first problem — how to get a blood sample without hurting the penguin — has been overcome and we await the results of the analyses impatiently. The plasma samples are being processed in New Zealand which necessitates their storage over summer. He did some bird watching also. This took the form of following penguins coming on to the

rookery from the sea, watching them finding and feeding their chicks and looking into what happens when the chicks are left at the "wrong" colony at the end of the feeding chase. (Apart from a general thirst for knowledge that motivated all those working at Bird he was finding out for me whether chicks left in the wrong place would move back to their own nest areas and whether, during this passage, they are vulnerabel to attack by skuas. The simple answers are that they do and are.).



Jim Petersen in fairly usual dress carries out an all-too-common chore, conveying water from the stream.

The two projects overlapped also when I held all the chicks from a colony for one day in an enclosure at the edge of the colony. We were delighted to find that the parents returning to feed the chicks stood at the nest sites and ignored the chicks standing behind wire only a few yards away. That is, as others have concluded, the parents return first to the nest and if the chicks don't respond to their calling then that's that. (See photo.)

The last member of the party had the worst and most difficult job. This was John Darby, photographer. His major and reasonable complaints were of too much cloud and too much cold for the cameras, too few seconds of winding on the cine cameras, too little film and uncooperative models. We know nevertheless that he has a very fine film on predation in process. John and Jim also spent long evenings wandering along the beach banding Weddell Seals to support Stirling's work.

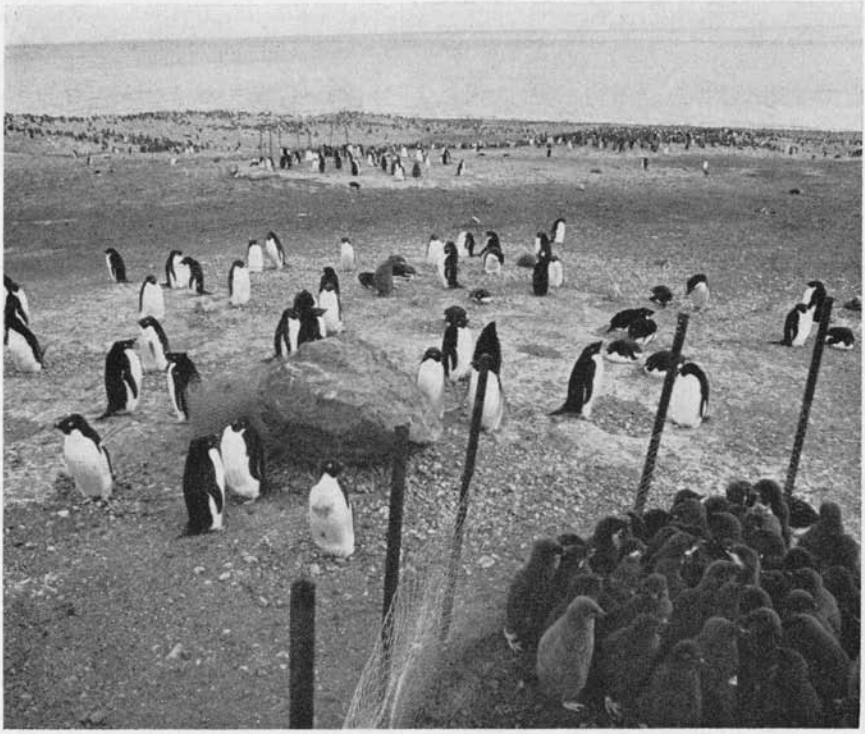
Rod East and Ian Stirling, the other official party members, worked from Scott Base throughout the summer.

Stirling writes:

"Investigations into the population dynamics of the Weddell Seal in McMurdo Sound this summer were highly productive. Many of the seals tagged in past seasons were resighted and well over a thousand more seals were tagged this summer in McMurdo Sound, Cape Hallett, Cape Crozier and Franklin Island regions. Few seals were seen in areas other than that in which they were originally tagged. Populations of seals were censused along the Victoria Land coast with the aid of helicopters from the ice-breakers 'Staten Island' and 'Glacier'. Day-to-day work on the sea ice in McMurdo Sound was done with the use of a motor toboggan and a Gnat. Census of the McMurdo Sound population was done at about 10-day intervals from U.S. Navy helicopters. This was to determine the change of numbers and seasonal movements of the populations of seal populations in particular and vertebrate populations in general."

Welcome visitors this summer to Bird include Colin Clark (who disappointed us by failing to come for a week at the end of summer); Reg Blezard who came to survey the middle and southern rookeries and who arrived with some magnificent steak instead of the ubiquitous beer carton; Rod East and Craig Kensler who came to look at seals and the sea respectively, and a host of Antarctic dignitaries who came to help in celebrating a double birthday on January 17.

The party was pulled out by "Glacier" on January 29 and spent 10 days to a lifetime at Scott Base



Chicks in an enclosure. The parents are standing on nest sites.

waiting for the bus home. This period was made bearable by the very friendly hospitality we received there and was enlivened by the planning necessary for the running of the "International Ice Shelf, 4×100 Down Trow Relay" (not held because of blizzard obscurity although 11 teams found the entry fee of a carton not too impossible) and the "Naturalists versus Trade Unionists Chess Match" (not held as the former went home).

It should be noted that the Unit could not exist without the support it received from many groups. Antarctic Division provided the laboratory, clothing and equipment, Scott Base gave close tactical support to the Cape Bird party and provided very good living and help to the two working on seals. The American support groups provided all transport to and fro to Bird and gave vast amounts of time and trouble to the seal party. It is not everyone these days who is offered a ship the size of the "Glacier" as personal transport.

END OF SEASON

A flutter of excitement on February 27 following indications of activity on Mount Terror (10,700 ft) after both Erebus and Terror had been cloud-covered for more than two weeks, enlivened the last days of the summer season. Scott Base leader Colin Clark organised an investigation by Orchiston and Kidd. Using a motor toboggan and sledge, the trip at this late period may take five days in very cold conditions.

[The investigation was later cancelled. Ed.]

On the same day the last two United States Hercules aircraft left for New Zealand.

R.N.Z.A.F.

ANTARCTIC FLIGHTS

The Royal New Zealand Air Force made its first flight of the season to the Antarctic on January 8 when a Hercules from Christchurch landed at Williams Field, near McMurdo Station.

The aircraft left Christchurch Airport at 6.8 a.m., and arrived back at 1.30 a.m. after a two-hour stop.

On the flight south 25,000 lb of cargo was carried. Passengers included the superintendent of the Antarctic Division of the Department of Scientific and Industrial Research (Mr. R. B. Thomson) and a New Zealand Broadcasting Corporation television team.

On the return flight the Hercules carried three Queen's Scouts and Mr. John Whalan, a D.S.I.R. photographer of Wellington, who had broken a leg near Scott Base three days earlier.

Two further flights were made with approximately the same weight of cargo, the third flight leaving Williams Field at 4 p.m. on January 12. The average time for the 2,200 mile flight was seven and a quarter hours. The R.N.Z.A.F. flights were pooled with United States Navy Hercules flights and cargo carried was for both McMurdo Station and Scott Base.

Three similar flights were made last year.

TWO THANK YOU'S

R.N.Z.A.F. Sergeant L. P. Boyd, of Wigram, flew to the Antarctic aboard the Air Force Hercules which made three supply flights from Christchurch in January.

His visit was at the invitation of men of the N.Z. Antarctic expedition in appreciation of the assistance he had given them with transport, dining and accommodation at Wigram while they were en route to Scott Base.

"The boys at Scott Base gave me a wonderful time. It was thoroughly enjoyable and I couldn't have got better treatment if I had been the Governor-General," he said.

On his return Sergeant Boyd picked 12 lb of fresh strawberries for the men at Scott Base. They were flown south the same evening.

AUSTER FOR MUSEUM

The Auster plane which was used extensively for scouting and the transport of men and material by the New Zealand team which established and first occupied Scott Base in 1956–57, has been donated by the R.N.Z.A.F. to the Museum of Transport and Technology in Auckland. In August last year it crashed into Kaipara Harbour. It was re-built and refitted with its Antarctic ski-wheel landing combination before being handed over to the museum.

BIG BLACKOUT

The longest communications break between the Ross Dependency area of Antarctica and the outside world in recent years began on January 28, when sunspot storms blacked out communications and delayed aircraft flights between New Zealand and the Antarctic.

For two and a half days Scott Base operator Norman White hopefully tapped out his call-sign to no avail. There was silence across the full board which normally brings in the major broadcasting stations of the world. Only McMurdo could be heard, also calling other Antarctic stations and the world, unanswered.

It was 108 hours before the first sound from the world outside was heard. Even then only intermittent contact could be made with New Zealand.

Because radio contact could not be made, scheduled aircraft were not flown between New Zealand and Antarctica.

The effect of this sudden and prolonged isolation was uncanny for the first few days. The last news heard from the outside world was that a moon probe rocket had exploded.

WHO DID IT?

Scientists at Scott Base and the nearby United States McMurdo station are debating whether this blackout in communications was caused

by a solar flare or by cosmic disturb ance further away in outer space.

Normally the ionosphere reflects radio communications and propagates them around the earth. The solar flares disrupt the regular layers of the ionosphere.

Scott Base ionospheric observer, Mr. Robert Murdoch, said that no layers of the ionosphere had been recorded above Scott Base during four days.

"T'he ionosphere is spread in one dense layer close to the earth and instead of reflecting radio signals this layer was just absorbing them, as happens at times of major solar flare disturbance," said Mr. Murdoch.

Lieutenant Commander H. Ferrere, assistant chief of staff for communications to the United States Navy Antarctic Support Force, said such blackouts normally lasted 36 hours.

Commander Ferrere said atmospheric disruption of communications could be expected again now the 11-year cycle of maximum sunspot activity was near. The number of communications blackouts could be expected to increase next year and in 1969 despite new developments in communications systems.

Commander Ferrere said there was no way of beating the phenomenon.

OUR MEN MUST BE PHOTOGENIC

Again this summer Scott Base is being featured in many films. No fewer than four filming groups have been working about the Base. Day to day life and the departure of the Ice Shelf field party were filmed by a German television team. This film was in colour and is to be among the first screened when colour television starts in Germany about the middle of next year.

Location scenes of Scott Base have been filmed in colour by the Australian National Film Board and will be part of a cinema film on Antarctica for world release early next year.

In January the N.Z.B.C. team arried at Scott Base on board the first R.N.Z.A.F. flight of the season and filmed around the Base for about two weeks.

SCOTT DOCUMENTARY

A three-man American camera-crew spent about seven weeks in the Antarctic, shooting 60,000 ft of 16 mm colour film which is to be edited to produce a 2,000 ft one-hour television documentary on Captain Scott. Camera-man W. Hartigan, who made films in the Antarctic for three summer seasons from 1955, and his assistant, with director J. F. Hughes, went south on "Glacier" on November 15 and arrived back in Christchurch on January 3.

Filming was done at several locations, including the South Pole and Scott Base. "The New Zealanders at Scott Base gave us a fantastic amount of help," said Mr. Hartigan, "and often worked into the night to assist us. They're a great bunch of fellows." Men from Scott Base, including the three Queen's Scouts David Goulden, Dennis Hunt and Anthony Mort, acted as members of Scott's party. Others making their film debut were Warwick Orchiston, Peter Whiteford, Robert Murdoch, John Williams, Lloyd Beech, David Brown and John Caswell.

The film is one of an American Broadcasting Company series "The Saga of Western Man", and is to be shown on American television on March 21.

"No facial shots of people appear in the films and close-ups are done in silhouette," Mr. Hughes said.

"Early parts of the film were made in England and to get authenticity, research was done at the Scott Polar Institute, Cambridge.

"Reindeer hide had to be bought in Finland for some garments, and to conclude the project some filming has to be done in Christchurch," Mr. Hughes said.

U.S. SPACE MEN VISIT SCOTT BASE

Visitors to Scott Base on January 7 were four Directors of the United States National Aeronautics and Space Administration (N.A.S.A.).

Dr. Werner von Braun (Director, George C. Marshall Space Flight Center).

Dr. Maxine Fagot (Assistant Director, Engineering and Development, Manned Spacecraft Center, Houston).

Dr. Robert R. Gilruth (Director, Manned Spaceflight Center).

Dr. Ernst Stuhlinger (Director, Research Projects Division, Marshall Space Flight Center).

The four scientists were at McMurdo Station with a view to utilising American research in the Antartic to further their own space studies.

After being shown the Scott Base scientific programme and about the base, the party was entertained to morning tea and met members of the base.

The four Americans, who are engaged in sending capsules and men into space, later went for a ride on dog-drawn sledges driven by Bob Murdoch and Warwick Orchiston. Such transport is a long count-down from the type of transport dealt with by N.A.S.A. directors, yet, Dr. von Braun said as he patted the dogs, "It was a marvellous experience."

In the afternoon the Scott Base leader, Colin Clark, escorted the N.A.S.A. party on a visit to the historic huts of Ross Island. These huts of the Shackleton and Scott expeditions were cleared of ice and are preserved as historic shrines by members of the New Zealand Antarctic Society, working under the auspices and with the help of the Antarctic Division of the New Zealand D.S.I.R.

SIMILAR CONDITIONS

Speaking at Scott Base, Dr. von Braun discounted any suggestions that it was planned to use Antarctica as a major rocket-launching base, or to make it a recovery zone for astronauts. "Our purpose," he said, "was mainly to familiarise ourselves with the vast area that is devoted and internationally dedicated to research, and yet, at the same time, is dependent on a very long and complex logistics chain." The interplay between research in the field in an unusual environment and the very intense support chain in the Antarctic was, he said, very similar to what they would meet in the space projects, including a landing on the moon.

"We want to take advantage of everything that has been learned here." he said, "so that we do not have to re-plough ground already covered."

In the Dry Valley area they thought they had learned a great deal which would help them in determining the best method of detecting life-forms on Mars.

Dr. Gilruth said that their visit to Scott Base had been one of the highlights of their trip.

GNAT FOR THE MOON?

While at Scott Base, Dr. von Braun showed considerable interest in the design and performance of the Gnat, a three-wheeled, two-stroke "engine and seat" vehicle designed and manufactured in Christchurch primarily for use on New Zealand high-country farms.

Scott Base zoologists from Canterbury University use one for moving about seal colonies.

The Gnat is often taken on journeys of up to 50 miles and can pull about 500 pounds at 5 miles an hour over even snow surfaces.

Dr. von Braun and Dr. Fagot both "test drove" the vehicle and discussed its points with other members of the party.

Noticing the sign **"Hurry, I am late for my appointment at the crater Copernicus"** painted on its side, Dr. von Braun joked as the pull-cord failed to start the engine the first time.

Dr. von Braun asked for all the information he could have on the Gnat.

CHANGES AFOOT

The anticipated emphasis in future years on semi-mobile and static field parties as opposed to the long distance dog-team or tractor journeys of earlier years has led to considerable modifications in the planning and equipment of field parties.

For example, the home-made wanigan used by the ice-drilling party last summer proved so successful that another one was built at Scott Base during the winter on top of a spare Maudheim sledge. This year the Canterbury University party at Cape Bird is occupying a 16 by 12 plywood hut (¾ in. thick plywood on the outside) prefabricated at Scott Base, transported to the site in five helicopter lifts, and erected at Cape Bird in four days by Greeks and Bartlett. Painted a bright orange, it "sleeps" six men and has ample heating and cooking facilities.

The station is named the Harrison Laboratory, after John Harrison, pictured below in a characteristic mood.

On his return to Scott Base from the third ascent of Erebus, (See Antarctic, Sep. 1966, p. 360.) He was killed during a mountain rescue attempt on June 23 last.

Consideration is now being given to the construction of similar huts for use in areas of special significance for geological, glaciological, biological and meteorological research.

EREBUS CLIMB

Although the planned geological investigation around the crater zone of Erebus this summer was unavoidably cancelled, Erebus did not remain unvisited. The seventh ascent, by New Zealanders Bartlett and Vickers, was recorded in our December issue.

The eighth climb was undertaken late in the summer. The climbers planned to study nuclear fall-out, snow accumulation, geology and entomology, and to test the performance of a new snow-vehicle. The climb took the place of the expedition forecast in our September issue (p. 324) which could not be implemented owing to the departure from New Zealand of the geologist, Dr. Ewart.

The party comprised Dave Lowe, leader, Bruce Willis, Bill Lucy, Warwick Orchiston, Peter Whiteford and Bryan George.

As a first move, early in January Orchiston and Bob Murdoch began to reconnoitre a suitable route. Using dog-teams they got to between 2,500 and 3,000 feet, but found snow conditions too soft for climbing. The party finally left Scott Base on January 26. Using a sledge with an out-size team of 13 dogs and two motor toboggans (a Fox and a Polaris), the party set out to establish a base camp at about 7,000 ft. Soft snow slowed the party down and they camped for the first night at about 3,000 feet. Winds gusting up to 20 knots limited visibility, and it was hard going for the six-man team and the dogs. The party was held here for two days. On the 29th they climbed a further 3,000 feet. Soft snow then held them up again for a day. The base was later established and was manned by Bryan George and Peter Whiteford.

The summit team comprised Lowe, Lucy, Willis and Orchiston, who moved forward throughout the late evening of the 30th and the early morning of the 31st. At about 10,000 feet Lowe returned to camp, while Lucy, Willis and Orchiston reached the summit at 7 a.m.

Lucy placed on the crater rim of

Erebus a piece of New Zealand greenstone which was given to Ray Tatham of this year's summer support party by a Maori woman who has been a life-long friend of his family and who requested that he leave it "somewhere in Antarctica".

After camping for the night at the 7,000 ft base camp, the party made a rapid return to Scott Base in four and a quarter hours.

[We hope to publish a fuller account in our next issue.—Ed.]

MEN ASLEEP

The sleep patterns of New Zealanders wintering at Scott Base are being studied as part of a United States Antarctic project. Similar research has been done at stations in the Arctic.

In explaining their project at Scott Base, Doctors Jay T. Shirley and Chester M. Pierce said sleep information obtained from Scott Base could be different from that of American bases. "For a start the temperature of the huts in which New Zealanders sleep is a lot cooler, as well as the routine work and way of life being different," said Dr. Shirley.

At set times of the year computer cards will be filled in by each of the twelve New Zealanders wintering at the base. These cards are broken down into half hour periods over the full twenty-four hours and the amount of time spent on working, relaxing, and sleeping is noted.

HELP

When two climbers were killed in the Mt. Aspiring area in November the team recovering their bodies received valuable assistance from the U.S. picket ship "Thomas J. Gary", in Dunedin at the time. As the team had difficulty in obtaining supplies late on Sunday, the "Gary" volunteered to help and supplied the teams' complete rations, two stretchers, and monitored the frequency the rescue workers were using in case any further help should be required.

FAR SOUTH — FAR NORTH

Two young New Zealanders, recently back from the Antarctic, are heading for the Arctic, at the invitation of a Canadian scientist.

Teaching survival and rescue techniques is their passport. Both are members of the Tararua Tramping Club. J. Hayton (26) is a bachelor of commerce and qualified accountant. A. Bibby is a little younger; his main interest is photography.

CHANCE MEETING

Both recently spent three weeks at McMurdo Sound with a party from the Federated Mountain Clubs to instruct American staff in survival and rescue. While there, they met Dr. E. F. Rootes, head of the Canadian Continental Shelf Project. "He was looking for someone who wanted to work in the Arctic," Mr. Hayton said. "He asked us to put in a formal application, but we're confident there will be a field job up there for us. We are arranging to leave in mid-February, and the first job lasts till July.

ARCTIC ASSIGNMENT

"We expect our task will be much the same as in the Antarctic—looking after the safety aspect of the field parties of scientists on the project."

Mr. Hayton said the scientists would be working on geophysical and oceanographical research in the remotest north of Canada. Albert Base, the main base on the field parties' operations, is at the tip of Ellesmere Island, across a channel from Greenland and only about 400 miles from the North Pole.

AND THEN?

After their time in this region, the two expect to move across Canada to attend a series of camps in the Yukon for the country's alpine clubs, in tough mountain country near the border with Alaska.

After that they have nebulous plans, but it seems likely they will be away from New Zealand for a year or so before settling down.

NEW ZEALAND PLANS SUB-STATION IN DRY VALLEYS

A sub-committee of New Zealand's R.D.R.C. (Ross Dependency Research Committee) has been investigating the possibilities of establishing a small scientific station in the Wright Valley near Lake Vanda. Once investigations into sites, logistic problems and the scale of scientific programmes are completed, the R.D.R.C. will decide whether to recommend to Government the proposal to set up New Zealand's second wintering station in Antarctica —in fact, the first actually on the continent.

A year ago New Zealand, the United States and Japan were going to share a year-round station in the dry valleys. However, this did not eventuate and now New Zealand plans to build its own station.

After aerial and helicopter reconnaissances early this year, the site for this proposed station was selected by R. B. Thomson, Superintendent, Antarctic Division, and J. Holmes Miller, the Wellington surveyor who was deputy-leader to Sir Edmund Hillary's party and selected the site of Scott Base.

Bad weather prevented a planned ground reconnaissance of the Wright Valley by three men to be put in by helicopter, and the state of the sea-ice at this time of year forbade an "overland" approach.

"It is intended to shift two huts that are no longer being used into the Wright Valley, near Lake Vanda," Mr. Thomson said.

"One of these huts is at Cape Royds 25 miles north of Scott Base and was used as a summer station for biologists.

"Two seasons ago the biologists shifted their studies to Cape Bird where a small summer base has been opened.

"The other hut is near to Scott Base and was used for an auroral programme that has been completed."

Should the Ross Dependency Research Committee decide to open this year-round station in the dry valley region both prefabricated huts will be transported to the selected site and the first party of four to six men will live near Lake Vanda next winter.

In the proposed scientific programme continuous upper atmosphere sciences will be studied during the winter as well as full meteorological and glaciological programmes.

"In summer," said Mr. Thomson, "more extensive outdoor sciences will be carried out with the station as a base for field parties.

"The base and its environment will be a strict science area and to minimise interference to scientific recording equipment generators will not be installed. All equipment will be operated by batteries, recharged by wind-powered generators with small motor generators as a stand-by."

The dry valley region is about 60 miles west of Scott Base. Only the summer appearance of the valleys is known — there is no covering of ice or snow, glaciers hang part way down the near sheer 6,000 feet sides, there are sand dunes 100 feet high, rivers flow, and there are lakes with thickly frozen surfaces.

No one knows exactly what happens in the valleys during the winter and over the short summer months scientists of many nationalities examine the geology and physics of the area. The only life in the valleys is microscopic, collecting around the shores of the lakes and in streams

TWO FLAG RAISINGS AT SCOTT BASE

1957

From left: A. B. Ramon Tito, ————, Capt. Kirkwood, Sir Edmund Hillary, Admiral Dufek.

from the snouts of the glaciers.

"This area has puzzled explorers and scientists," said Mr. Thomson.

"Since New Zealand's Antarctic research started 10 years ago parties from Victoria University of Wellington have worked in the valleys each summer.

"There is a full range of work for geologists, and physicists are interested in the excessive salt content of the lakes and their abnormally warm waters beneath the ice covering, where a maximum temperature of 77 degrees Fahrenheit has been recorded."

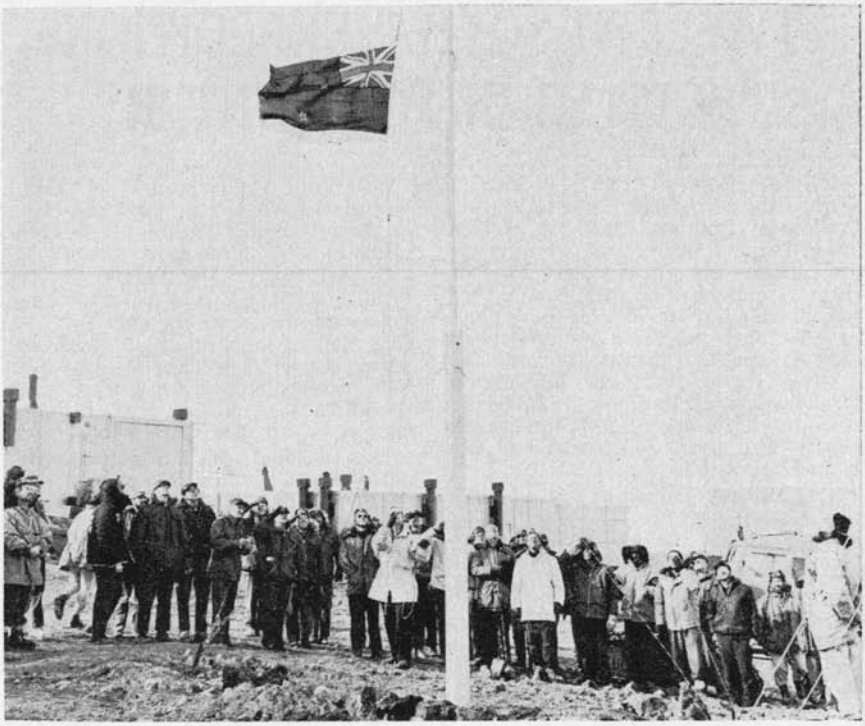
The continent that is most hostile to man is the one which will do most for the cause of peace.

(Bauer and Lorius)

N.Z. GIRL ON "ELTANIN"

On the 22-day Tasman cruise of the U.S. Research Ship "Eltanin" was Miss Helen Clark, M.Sc., of Napier. Since her graduation at the Victoria University of Wellington, Miss Clark has been lecturing in biology at the Universities of Malta and Ghana, and before her return to New Zealand was at the Smithsonian Institute in Washington, U.S.A. On "Eltanin" she concentrated on starfish research. Her aim was to study "fresh" specimens direct from the sea for colour notes. With her in the ship's company of 85 was one other woman, Dr. Helen McCammon of Pittsburg University.

Miss Clark expects to spend a year working up her results before again setting off on her travels.



1967

Bob Thomson (left) and 'Bob' Miller in white. Eddie Goodale, USARP representative, on Miller's right.

Photo: John Murphy.

HE BEING DEAD

When Charles Wilkes, the determined American explorer of Antarctic waters, had occasion to refer to John Balleny, the Enderby Brothers' whaler-captain-explorer, or to the islands which Balleny discovered in 1839, he always misspelt **Balleny** as **Bellamy.**

In an article in our last issue Peter Harper referred to the "Eltanin's" cruise in the vicinity of the Balleny Islands. But the long dead Wilkes laid his hand on type-setter and proof-reader alike and "Balleny" was once again transmogrified into "Bellamy".

Please don't blame Mr. Harper.

TOUGH SURGERY

In an article on Antarctic medical problems in the Australian Health Education Advisory Digest, for August, 1966, Dr. Phillip Law mentions the emergency operation at an Australian Antarctic station to aspirate clotted blood and cerebrospinal fluid from the skull of a man who had suffered a ruptured intracranial aneurism.

The needle used was manufactured in the base workshop, and the needle and techniques to be used were first tested on a Weddell seal. After being repatriated on Russian and American aircraft the patient recovered: and the doctor got the M.B.E.

TWELFTH SOVIET EXPEDITION SETTLES IN FOR WINTER

138 members of the 12th Soviet Antarctic Expedition sailed from Leningrad bound for Antarctica aboard the "Ob" on November 5, 1966. There were about 2,000 tons of cargo. In the middle of January 1967 another group of 75 members flew to Australia on "IL-18", a passenger turbo-propeller aircraft. From the Australian port Fremantle this group reached Antarctica on board the "Ob", which came at that time from Mirny with about 70 members of the 11th Expedition.

The following stations will operate this season:

Mirny (66° 33′ S., 93° 01′ E.; 35 m. above sea level).

Novolazarevskaya (70° 46′ S., 11° 50′ E.; 102 m. above sea level).

Vostok (78° 28′ S., 106° 48′ E.; 3,488 m. above sea level).

Molodezhnaya (67° 40′ S., 45° 51′ E.; 40 m. above sea level).

The seasonal personnel of the Expedition is 64 men, comprising 28 scientists, 31 pilots, 4 engineers and 1 photo-reporter.

Dr. P. K. Senko from Leningrad is the Deputy Chief of the XII SAE for seasonal operations. M. G. Ravich from the Research Institute of Arctic Geology, Leningrad, is the chief geologist.

The wintering personnel of **Mirny** is 63 men, including 23 scientists, 10 radio specialists, 4 pilots, and 12 mechanics.

V. I. Gerbovich from Leningrad is the Director of the Observatory Mirny and Deputy Chief of the XII SAE.

The wintering personnel of **Novolazarevskaya** is 14 men, including 9 scientists, 1 radio operator, 3 mechanics, 1 cook. O. K. Sedov is the Chief of the station.

Station **Vostok** has 16 men, comprising 11 scientists, 1 radio operator, 3 mechanics, 1 cook. B. M. Beliaev will be in charge.

The wintering personnel of station **Molodezhnaya** is 55 men, comprising 20 scientists, 27 builders, 3 radio specialists, 2 cooks, 3 mechanics. I. M. Titovsky is the station leader.

There will be two foreign scientists working with the XII SAE: E. Everett MacNamara, geologist, from the U.S.A. Expedition, and Josef Sekyra, geologist, from Czechoslovakia. A scientist from Bulgaria may also join the expedition.

It is planned that a Soviet scientist will conduct scientific research at the American Antarctic base MacMurdo in 1967.

"OB's" FIRST VOYAGE

"Ob", on her first southern voyage from Fremantle for the 1966–67 season, arrived off Molodezhnaya Station, Alasheev Bay, on or about December 13 and disembarked the new team for the station as well as those who were to make the 3,000 km. surface journey Molodezhnaya–Pole of Inaccessibility–Novolazarevskaya (Schirmacher Oasis).

The assemblage of the plane AN-6 now began; with the help of this plane men and cargo will be taken deep into the continent. Besides the team for Molodezhnaya station, the tractor-train men were also put ashore for the journey Molodezhnaya–Pole of Inaccessibility–Novolazarevskaya. The length of this trip exceeds 3,000 km.

After leaving Molodezhnaya "Ob" sailed for Mirny, where the new station personnel were disembarked and stores and equipment unloaded. She then sailed for Fremantle.

SECOND VOYAGE

The last members of the 12th Soviet Antarctic Expedition left Leningrad on January 19 on an IL-18 plane on the route Tashkent–Karachi – Colombo–Jakarta–Darwin–Perth. From Australia they were taken to the Antarctic by the diesel-ship "Ob".

The commander of the plane was A. S. Poljakov, one of the two pilots who pioneered the route Moscow-Antarctica in 1961. In the group of 74 people there are hydrologists, geologists, aerologists, doctors and builders.

"Ob" left Mirny about the same time heading towards Australia with 81 members of the 11th Expedition returning home.

OB RETURNS

The Soviet research ship "Ob" arrived at Fremantle, Western Australia, from the Antarctic on January 26, bringing the men who wintered last year at the Russian bases. A replacement group of 75 men had arrived at Perth Airport in a Russian turbo-jet on January 24. This group included two American exchange scientists, John Taylor, who wintered at Vostok and Dr. Victor Hessler of the Geophysical Institute of the University of Alaska. Taylor has been invited to visit Leningrad and will make the trip with his Russian friends on the IL-18 aircraft.

AMERICAN AT VOSTOK

Included in the replacement team is Dr. E. MacNamara of New Jersey, who is to winter at Molodezhnaya, the first American to do so. As one of a team of 17 working on high atmosphere physics, oceanography and satellite observation, he will himself be studying mainly environmental conditions and the fresh water lakes near Molodeszhnaya. The lakes, 30 ft deep, do not freeze solid, and some marine life exists in them. Dr. MacNamara is taking $40,000 worth of equipment to the base, including a complete chemistry laboratory. He will also study the chemical weathering process on the rocks and soil and will be looking for new mineral deposits.

"Ob" left again for Mirny at the end of January. En route, oceanographic research was planned, including depth sounding and the investigation of the hydro-chemical properties of the sea water. After a call at Mirny "Ob" was expected to carry out research in the Davis, Commonwealth and Kosmonauts Seas before returning via Fremantle to the Soviet Union.

FIRST SPRING TRIP

Soviet scientists were reported on November 17 to have completed the first "spring" expedition of the season. The snow-train, under the guidance of Leonid Dubrovin (geographer), reached 106 km. south of Mirny in preparations for the 3,000 km. journey Mirny–Vostok–Mirny, which it was planned to complete in the New Year.

L. Dubrovin reported that the scientists had completed the measurements of the thickness of snow and meteorological investigations.

1,400 KM. TREK

It was reported on January 29 that the snow-caterpillar train from Mirny had reached the inland station Vostok. The difficult journey, under the guidance of E. Zimny, was achieved without any great complications.

VOSTOK RELIEF

Over 1,800 miles will be covered by a tractor and sledge train which has left Mirny on a return trip to Vostok station.

Leonid Dubrovin, Director of the Mirny Observatory, said that the train consists of nine caterpillar tractors pulling sleds with equipment and food for the new wintering party at Vostok near the Pole of Cold.

The expedition will take three months.

LONG TREK

On the 1,700-mile trek from Molodezhnaya to the Pole of Inaccessibility, and on to Novolavarevskaya in the Schirmacher Oasis scientists will concentrate on glaciology, seismic and gravity surveys and the measurement of ice sheet thickness along the trek routes.

The overland team of 17 left Molodezhnaya on New Year's Eve. Led by V. Petrov, they have two Kharkovchanka over-snow vehicles and a heavy tractor drawing a sledge. Most of the 3,000 km. journey will be at an altitude of up to 3,500 m. above sea level, in unknown territory.

GEOLOGICAL TEAM

A party of geologists under M. Ravich was flown from Molodezhnaya west to the Queen Maud Land mountains by a flying-team led by L. Kluev. The geological party included scientists from Czecho-Slovakia and Japan. Two field camps were set up to carry out geographical, geological and geophysical studies. One of these camps was near the Japanese Syowa Station and the other near the Belgian-Dutch base Roi Baudouin. Work began in the Yamato Mountains and continued in the Belgian and Sor-Rondane Mountains.

HOME

Antarctica left behind them, 63 men landed at the Leningrad airport in an IL-18 plane. They were Soviet scientists, members of the 11th Expedition, with the head of Mirny Observatory, L. I. Dubrovin. The scientists had successfully completed their stay in the Antarctic. They were received by scientist colleagues, families and friends.

"A small hut on legs" on two metre-high piles was constructed in Leningrad to be used by Soviet Antarctic scientists. The new hut "fears neither cold, snow nor ice", and is quite comfortable. The first sample of it has already been sent to the Antarctic and a model was sent to Canada for the World Exhibition.

ICE-RIVERS

New and interesting information about the Antarctic glaciers has been found by Soviet scientists: the result of investigations during the last seven years has enabled them to determine the speed with which the enormous "shelf-glacier" in the Novolazarevskaya sector is flowing down into the ocean.

A peculiar feature, standing in the way of this glacier, is the Schirmacher Oasis. It was found that a strong ice-current, passing by the oasis on the east, is moving towards the ocean with a speed of 300 metres per year. The speed of the western current does not exceed 85 metres.

THIRD KIWI VISITS VOSTOK

by **Colin Clark**
(Leader, Scott Base, 1967)

And enjoys the experience! It was on December 12, 1966, a crisp calm clear day. The sudden introduction to an altitude of 11,500 feet from the pressurised cabin of a Hercules aircraft left me gasping a little. After spending a year at such a height the chaps must feel pretty frisky when they reach sea-level again!

I had previously had friendly contact with Russians on Campbell Island in 1965 when a Soviet Antarctic research ship, Gnevny, spent a couple of days in Perseverance Harbour repairing oceanographic gear. They were delightful company. Our visit to Vostok was really too short (only a couple of hours on the ground) to allow one to make any close acquaintance with individual expedition members, but it was long enough for all present to realise that the artificial barriers the politicians erect between peoples do not exist in the Antarctic. The esprit de corps which unites all who work on this harsh continent shone brightly through despite our inability to communicate with each other except by mime and vigorous gesticulation.

The purpose of the flight was to take Dr. Victor Hessler, United States Antarctic Research Programme, to Vostok, where he is to spend the summer on VLF propagation. Among the passengers were a number of USN and USARP personnel, plus an Englishman, John Grierson, an Australian, Bruce Stinear (this season's exchange representatives) and myself, a New Zealander. Thus, five of the Treaty countries were represented at the "Pole of Cold" that day. The Russians had waiting for us a table laden with good things, including caviar, vodka, wine, etc. Toasts were drunk to our continued co-operation and friendship, and there was much exchange of gifts and souvenirs. The Americans, always wonderfully generous,

took fresh fruit, vegetables, and eggs for the Russians — the first fresh food they had seen since the previous summer.

Vostok is a far tougher place to winter than Scott Base. It is so much colder, so much more isolated, so very featureless. I was not tempted to "defect"! Nonetheless, vital scientific work is done there, the Base is comfortable and efficient, and the atmosphere was genuinely cordial.

WYROX°

A Perth "News" columnist was puzzled because when the "Koolama" docked at Fremantle early in January from Hong Kong she had on board 19 pieces of rock, weighing 2,000 lb. to be loaded on the Russian ship "Ob" for onward transport to Antarctica.

He writes: "I think I've hit it. Those boys have probably been trying to build a barbecue down there out of ice blocks, but as soon as they get some red embers glowing and a few blubber steaks grilling nicely the ruddy barbecue melts, so they've sent home for some good Soviet rocks."

"FROM THE RUSSIAN"

Several Russian publications of Antarctic interest have recently been translated into English and published by the Israel Program for Scientific Translations. To date they comprise **Soviet Antarctic Expeditions 1955–1959** (138 pages) and **1959–1961** (156 pages), both by A. V. Nudel'man; and **Antarctica 1960** (103 pages) and **1961** (169 pages). These latter are Reports of the U.S.S.R. Academy of Sciences Interdepartmental Commission on Antarctic Research and comprise papers on various topics, chiefly of a scientific nature.

These publications may be obtained from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia, at $3.00 a copy.

JARE NEWS

JAPAN'S EIGHTH TEAM

The ice-breaker "Fuji" started her second Antarctic voyage on December 1. From the 16th to the 22nd, she anchored in Fremantle, Western Australia, and was received with open arms. On the 24th, she entered into the stormy belt of the Antarctic Convergence; and on the 29th, when she passed from this belt, her echo-sounder reported the discovery of a new sea-mount (54°–55° S., 99° E.), the summit of which is only 1,000 ft. below sea-level. "Fuji" reached the edge of the pack-ice (65° S., 50° E.) on January 4, 1967, and her invasion of the pack was carried out very smoothly.

On the 7th, from the edge of the fast-ice, 85 kilometres N.N.W. of Showa Station, her helicopter made the first flight to the station, where Dr. Torii (leader of JARE VIII) and Captain Matsuura met a cheerful wintering party of 18 men led by Dr. Muto.

UNLOADING

Transportation of goods by air was now begun. On the one hand, the "Fuji" herself carried out some very troublesome ice-breaking and on the 14th she anchored within one kilometre east of the station. Over-ice transportation was now also made possible. Over 450 tons of goods, including construction materials for five new buildings, were all brought to the station by January 26.

Unloading was finished so unexpectedly fast that some scientific field surveys, being carried out simultaneously with the construction and replenishment of huts, could not be finished. Because of dangerous ice conditions, the "Fuji" removed her position on February 6 to the edge of the fast-ice, some 80 kilometres from the station. And on the 10th, the new wintering team of 24 men — 14 are scientists including Dr. Torii as the leader, and 16 of the 24 are Antarctic freshmen — started their work.

Having finished her supporting tasks, the "Fuji" began carrying out oceanographical observations in the

pack-ice zone. She will visit the South African SANAE station (70° 16′ S., 2° 21′ W.) on the 22nd, and will leave for her mother country on the 26th.

ARGENTINA

Following a year, 1965, in which Argentine Antarctic activities included two major exploits, a land journey from General Belgrano base to the South Pole and a trans-Antarctic flight, 1966 has been a relatively quiet year.

These two achievements have been recorded in an earlier issue of "Antarctic" (December 1965, p. 194; March 1966, 251). The six sno-cats left Belgrano on October 26 and reached the Pole on December 10. On December 15 they left for "home" via Sobral base, and reached Belgrano on the 31st. A support group of four men, with two dog-sledges, took part in the expedition up to the Diamante Range (Pensacola). The C-47 and two Beaver aircraft left Belgrano on November 4 and landed at the Pole. On November 12 the C-47 flew on from the Pole to McMurdo Station, and flew back to Belgrano on the 25th. The two Beavers joined the C-47 as it flew back over the Pole. They landed at Sobral.

FOR 1967

The scientific programme for 1967 is to be essentially the same as in 1965 and 1966. The stations to be operative in 1967 are Decepcion, Orcadas, General Belgrano, Teniente Matienzo Esperanza, Sobral and Almirante Brown. The same ships, aircraft and organisations are expected to operate in 1966–67 and 1967–68 as in this previous summer.

FOR MEMBERS ONLY

Members of the New Zealand Antarctic Society are reminded that copies of "Antarctic" edited by Dr. Trevor Hatherton are still available at special reduced cost from Society secretaries.

SOUTH AFRICAN RELIEF OPERATIONS

The "RSA", South Africa's Antarctic research vessel, with SANAE VIII, the Antarctic relief team, aboard, left Cape Town on December 31.

The team for the coming year numbers 16. The Leader, A. F. G. Rossouiw, M.Sc., has under him three meteorologists, two geologists, a radio operator, a radio technician, two geophysicists (ionosphere and cosmic rays), a geomagnetist, two technicians, a physiologist, a medical officer and a surveyor.

The scientists in the team have been well prepared to undertake the various scientific research programmes.

The team has been entered for the National Fitness Competition organised by the South African Federation for Youth and Sport and it is hoped to gain at least 16 gold medals.

En route to SANAE the "RSA" paid an official visit to the Belgian Antarctic base, Roi-Baudouin. The South Africans were very well received by the Belgian-Netherlands expedition and old friendships were pleasantly renewed. Most of the Belgian-Netherlands expedition were old acquaintances of SANAE VIII as they had the opportunity of meeting them in Cape Town before their departure.

On leaving Roi-Baudouin, the "RSA" made for SANAE but was delayed by exceptionally thick "ice-pack", which it was unable to penetrate immediately, delaying it about two weeks. The "RSA" finally arrived at SANAE on January 28.

The relief of SANAE 7 was quickly and expertly carried out and the "RSA" was ready to depart for Cape Town on February 6. The handing-over ceremony at the base was formal for the first time in its history. The South African flag was flown, the National Anthem played and messages transmitted to South Africa and all other Antarctic bases that SANAE 8 had now officially taken over SANAE. The "RSA" left

SANAE the same day, and after a record run of ten days arrived in Cape Town on the evening of February 16.

The Japanese Antarctic Expedition, en route from their base, SYOWA, to Cape Town accepted an invitation to visit SANAE. Unfortunately, due to very adverse weather conditions, the "Fuji" could not get near the base and also could not make use of their helicopter to fly to SANAE. The South Africans are extremely sorry that the Japanese did not manage to get to SANAE and we sincerely hope that a future visit will be arranged. Meanwhile in Cape Town a reception is being prepared in honour of the Japanese Antarctic Expedition. On February 25 a group of five American observers visited SANAE. They spent approximately 11 hours inspecting the base.

South Africa was also host to the returning Belgian-Netherlands Antarctic Expedition. We in South Africa trust that the base will be re-opened in the near future and we look forward to meeting them again.

SAD STORY

A two-man South African geological survey party dog-sledging in October 1965, from S.A.N.A.E. base south to the Ahlmannrygen area (approx. 72° S., 2° W.), ascended an isolated nunatak believing that they were the first human beings ever to set foot on it. On its summit they found a broken beer bottle. Their high spirits were further subdued by having to sit out a nine-day blizzard.

At Pyramiden, a nunatak which had marked the advance base of the Norwegian-British-Swedish expedition of 1949–52, the N.B.S. depot was found in good condition.

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the Antarctic and the submarine topography of the surrounding oceans. These were enlargements of originals of illustrations in the new Russian Atlas of Antarctica.

On August 26, an informal meeting on Antarctic logistics was held when delegates were urged to air "their views and frustrations".

INTERNATIONAL CONFERENCES

POLAR METEOROLOGY

At the Symposium on Polar Meteorology sponsored by the World Meteorological Organization and held at Geneva, Switzerland, on September 5–9, 1966, most of the papers presented concerned the Antarctic, says Bernhard Lettan in the latest issue of the Antarctic Journal of the United States. Individual sessions were held on trace constituents of the atmosphere, the boundary layer, heat balance and radiation processes, circulation of the free atmosphere and special problems of the polar environment. The final session was devoted to a general discussion of the papers and to the current state of research in the Antarctic.

MEETING IN JAPAN

A CONFERENCE ON LOW TEMPERATURE SCIENCE was held in Sapporo, where the Hokkaido University Institute of Low Temperature Science is located, from August 14 to 19. The largest delegations in an attendance of 160 came from Japan, the United States, Canada and the Soviet Union, in that order. The two major sections dealt with low-temperature biology and ice (covering sea-ice, avalanches and frost heaving). Several papers dealt specifically with the Antarctic.

The Pacific Science Congress held in Tokyo drew no fewer than 6,500 scientists from 60 countries. Antarctic subjects discussed during the three-week conference which began on August 22 included atmospheric physics, the earth sciences, and fauna and flora. Summaries of glaciological work and future plans were presented by the United States (Colin Bull), the U.S.S.R. and Japan. A notable event was the presentation by the Soviet Union of maps of the sub-ice topography of

(Continued on previous column)

FOUR DRAGON ROCKETS FIRED IN TERRE ADELIE

Interest in the 60-man team comprising the 17th French Antarctic expedition and its summer support and ancillary group centred on the plans for the first space probe from the Antarctic continent. The programme was financed by the National Centre of Space Studies and logistics were in the experienced hands of Expéditions Polaires Françaises.

FRANCE

France and Australia joined forces to make full use of the chartered Danish polar ship "Thala Dan", which was scheduled to make four voyages south from Australia:

(1) December 6 from Hobart to Terre Adélie.
(2) January 3, Melbourne to Terre Adélie and Australian stations.
(3) February 4, Melbourne to Terre Adélie.
(4) February 24, Hobart to Terre Adélie.

Details of the ice conditions which caused considerable delays at one stage of this programme are given in the account of Australian operations on page ??

"THALA DAN" AT HOBART

The greater part of the scientific personnel of the 17th (1967) expedition left France by air on November 30 under M. P.-E. Victor, and were given a civic welcome at Hobart on December 1. They transferred to "Thala Dan" which left Hobart on December 6. Various oil companies and the Seamen's Church donated films for the winter party of 27. The Hobart Marine Board gave the expedition a fork-lift truck.

"Thala Dan" reached Dumont d'Urville on the 13th and was unloaded by December 26 despite almost continuous bad weather. The summer party was disembarked, and 570 tons of cargo unloaded. The ship was back in Melbourne on January 2.

Misfortune befell the ship on her next voyage, leaving Melbourne on January 6. She arrived safely at l'Ile des Pétrels on the 15th and disembarked cargo and personnel, leaving the same day for the Australian Wilkes Station. Caught and held by ice as described elsewhere, the delay was so considerable that the ship's further itinerary had to be drastically curtailed. Instead of returning to Melbourne and then making a special voyage to Dumont d'Urville, "Thala Dan" went via Wilkes to Dumont d'Urville. Nineteen men and most of the intended cargo were taken on board on February 14–16 and returned to Australia only a few days behind the scheduled date.

ROCKET TEAM

A 27-man team from the National Centre of Space Studies planned to spend three months at Dumont d'Urville and to launch four 23 ft-long French scientific rockets which were loaded on "Thala Dan" on December 5. The leader of the team, M. Morius le Fevre (35), said that the two-stage rocekts had a range of 250 miles and would carry nose-cone equipment for measuring upper-atmosphere electrons and protons and recording magnetic phenomena. Upper atmosphere probes in the Antarctic were very difficult, he said, because of the proximity of the Magnetic Pole. None had yet been successful. Added to the difficulties was the need to build and operate a mobile launching pad in subzero temperatures. The rocket firings had high priority on the French scientific research programme this summer.

Weather rockets have been fired in the Antarctic before. The rockets used have been of the Arcas type, which reach a height of only 50 miles, although Arcas rockets with boosters have attained 90 to 100 miles.

ROCKETS FIRED

Four firings in a single day were planned to enable an ionospheric research group to estimate changes of ionospheric conditions in a single day. Before the firings could take place meteorological and magnetic conditions had to be favourable.

The first rocket was fired on January 26, the second on January 28, and the third and fourth on January 29. This period coincided with the total blackout which is referred to on page 444, and which also completely disrupted radio communication between Terre Adélie and Kerguelen. The blackout was caused by an exceptional absorption of radio-electric waves in the auroral zone, itself ascribed to geomagnetic and ionospheric disturbances. It was also a period marked by a noticeable increase in the rate of solar cosmic radiation in high latitudes.

The ground installations are now to be dismantled, repacked and loaded aboard the "Thala Dan" by mid-February. The technicians will also return to France aboard the ship.

LOOKING AHEAD

It is reported that in 1969 France plans to establish a station 500 miles inland from Dumont D'Urville.

The installation of this base, to be occupied by five or six men, will necessitate the employment of 10 HB 40 vehicles, and 16 tons of equipment, including two tons of scientific material. In order to keep the base operative, 19 tons of supplies will be needed each year including five tons of motor spirit and five tons of food. The earliest period during which the installation could be carried out would be December 1969–February 1970.

Next summer the French plan to fly in for the first time to their base. A four-engined, ski-equipped Breguet 941S is expected to make the flight from Melbourne by way of Macquarie Island. A second Breguet would be used for search and rescue.

A French Air Force officer has been in Melbourne making arrangements for the flights. The planes should be able to land not far from the base on the Astrolabe Glacier. A wheeled runway could be made on Governor's Island not far from Petrel Island.

The terrain around the French base is so rough that all cargo unloaded from the supply ships has to be transported by an Alouette helicopter.

WINTER PROJECTS

The 1967 winter programme centres round the task of interior arrangement and has been reduced to a minimum, having regard to the available personnel and their responsibility in the way of scientific research. The main plans are:

(a) Completion of the interior layout of the new living-quarters (construction of a darkroom for the developing of photographs and scientific records, and the furnishing of the dormitory, library, discothèque, etc.).

(b) Construction of a metal covered-way connecting the balloon-launching shelter with No. 1 laboratory, which includes the meteorological laboratory. This is essential to permit safe movement between the two buildings during the winter.

(c) Replacement of the mechanical workshop in another building, in order to make possible the further development demanded by the extension of the base.

(d) General repair and alteration work (the built-up area at Dumont d'Urville has grown from 500 sq. metres to 2,400 sq. metres in the past three years).

TA 17

For the 17th expedition to Terre Adélie, 27 men will winter at Dumont d'Urville, with André Hougron as Leader. Hougron, Challon (cook), Chesnais (meteorologist), Coiffard (chief radio operator), Heuzey (meteorologist) and Le Pouriel (maintenance officer) have previously wintered over.

DRINKING WATER

Reference was made in our December issue to the projected installation of a new supply system for the drinking water required at Base Dumont d'Urville. The system has been devised by the Société Grenobloise d'Etudes et d'Applications Hydrauliques and the Technical Division of Expéditions Polaires Françaises. The energy required to distil enough fresh water from sea-water is provided by the utilisation if waste heat from the central power-house. Five cubic metres of sea-water per hour must be pumped to produce the three tons of fresh water required each day.

Although simple in principle, the installation has been complicated by the climatic conditions and the necessity for built-in automatic action throughout the whole complex of pumping, distillation and distribution to ensure complete safety. In particular there has to be provision for the automatic emptying of the whole system of pipes in the event of any malfunctioning so as to prevent the water from freezing. It should be noted that the water drawn from under the floating ice is just above the temperature of freezing.

The installation of the pumping station and the system of pipes for the supply of sea-water, distribution of fresh water, and disposal of used water, was carried out during the 1965–6 summer and the succeeding winter. During the present summer (1966–7) it was planned to instal the distillation plant in the generator house. The under-sea section of the pumping-system and its protection from the sea-ice were to be the responsibility of three expedition members equipped with under-water gear, and the whole system was expected to be completed and functioning normally by the end of the summer season.

Comparative measurements of the Ross Ice Shelf in 1962-3 and 1965-6 suggest that the shelf moves towards the Ross Sea at speeds up to 900 m. (2,950 ft.) per year.

THE WHALERS

Despite the very considerable lowering in recent years of the "allowed" catch of whales in Antarctic waters, there are widespread indications that all is far from well with the once flourishing Antarctic whaling industry. At the 17th meeting of the International Whaling Commission in 1965 the quota was reduced to 4,500 blue whale units. In June–July last year the permissible Antarctic pelagic catch was lowered still further, to 3,500 units — and still there was a lack of agreement on national quotas.

The 19th meeting begins on June 26, 1967, in London.

Some indication of the steady fall in catches is indicated in the reduction of "catch material" over the past few years, from 1959–60 to 1966–67:

Factory ships: 20, 21, 21, 17, 16, 15, 10, 9.

Catchers: 220, 252, 261, 201, 190, 172, 128, 121.

WHALE TALK

Strange sounds made by whales have been reported by numerous casual observers during the past hundred years, but only recently have systematic observations been undertaken, and the first actual taping of sperm whales was made by Paul J. Perkins in 1957. The Norwegian Whaling Gazette now publishes a paper by Mr. Perkins and two associates from the Norraganset Marine Laboratory, University of Rhode Island.

"In addition to investigating **clicks**," say the writers, "eight categories of sound have been differentiated: **Whistles** of various duration, frequency and inflection, **chirps** which involve considerable change in frequency in a very short period of time, **pings** which resemble ASW echo-ranging, **plinks** which resemble pings without reverberation, **squawks, rasps, yelps** and **wheezes.**

"We maintain," they conclude, "that these can serve as intelligence-bearing, communicative signals."

BRITISH ANTARCTIC SURVEY BUILDS NEW BASE AT HALLEY BAY

High on the priority list for British Antarctic operations this summer has been the construction of a new station to replace the old F.I.D.S. base in Coats Land, on the Weddell Sea, built in 1956 at the beginning of the International Geophysical Year.

The British Antarctic Survey is again using three ships for the annual relief of the bases, but this year the "Perla Dan" (2,675 tons) has replaced the "Kista Dan" (1,300 tons). A larger ship was necessary because of the large amounts of cargo required for the rebuilding of the base at Halley Bay. The "Perla Dan" has been chartered for four summer seasons.

The other two ships, R.R.S. "John Biscoe" and R.R.S. "Shackleton", left England in October, as usual, but the "Shackleton" had to be diverted from her scheduled programme to make an early call at Deception Island to collect a mechanic requiring specialist medical attention. (See "Antarctic", Dec. 1966.) The man was taken to hospital in Punta Arenas and was later flown home. We are very pleased to report that he has now fully recovered.

The two ships resupplied Signy Island at the beginning of December. The "Shackleton" then carried out a bathymetric survey off the South Orkneys and also resupplied the bases at Deception and the Argentine Islands, while the "Biscoe" proceeded to Halley Bay to assist the "Perla". The "Shackleton" is now continuing the magnetometer and seismic survey of the Scotia Sea.

AT HALLEY BAY

The main operation this summer has been the rebuilding of the Halley Bay observatory. This was established on the Brunt Ice Shelf in 1956 and was soon buried under an increasing thickness of snow and moving seaward. (The original hut is now about 50 ft. down and three and a half miles from its original position.) In the last 12 months the deterioration has been marked, even in the newest (1964) hut, and living conditions have become increasingly unpleasant. During the winter it was reported that ice was readily available at the bar in the living-room as it was, by then, showing through the ceiling!

It was decided to rebuild at a point some miles inland (roughly where the base started eleven years ago), and that the "Biscoe" should accompany the "Perla Dan" to help with the task of erecting the seven main huts. "Perla" had sailed from Southampton at the beginning of December, with a party of builders and other staff, and was joined at Montevideo, three weeks later, by Sir Vivian Fuchs (Director of B.A.S.), Maurice Sumner (Assistant Stores Officer, B.A.S.) and Colin Baldwin (Crown Agents' Civil Engineer).

PROBLEMS AHEAD

The two ships together provided a much larger work force than is usually available, and despite the fact that over 1,000 tons of stores had to be off-loaded and moved inland, the shells of three of the seven new buildings had been completed five days after arrival. It was fortunate that the unloading was carried out so speedily, since on February 6 it was reported that a large area of the ice shelf had calved, leaving 40-ft. ice cliffs where there had formerly been an easy gradient to the sea. First reports indicate that both Halley Bay and the neighbouring Emperor Bay (where for several years there had been an Emperor Penguin rookery) no longer exist. It is impossible at present to see how this will affect future operations, but as there appears to be no alternative landing place within 40 or 50 miles, further reports are awaited with considerable trepidation.

As work on the new buildings had progressed so well the "Biscoe" was able to leave Halley Bay on February 1. The return passage through the Weddell Sea was unusually easy, so she was able to follow a more direct route than usual to Signy Island. She then visited King George Island, Deception Island and the Argentine Islands, and is now (late February) at Marguerite Bay, resupplying the bases at Adelaide and Stonington Islands.

FIELD WORK

Field parties operating from Halley Bay are continuing to work in the Theron Mountains some 400 miles away. It is hoped that the topographical and geological surveys there will be completed at the end of the 1966–67 summer. Parties from Stonington Island are working on the Palmer Land Plateau and around Mobiloil Inlet.

A new Pilatus Porter aircraft was delivered to Deception Island early in January. It was assembled and tested and on the 26th was flown south to Adelaide Island, where it is now supporting field parties. The De Havilland Otter which had wintered at Deception is chiefly being used this year for Dr. Charles Swithinbank's programme of airborne radio-echo ice-sounding. Interesting results have already been obtained from flights over the Wordie and Larsen Ice Shelves and George VI Sound.

With the assistance of H.M.S. "Protector" gaps in the topographic survey in the vicinity of Cape Kater and Hope Bay have been successfully closed, and the triangulations east, north and west of the Trinity Peninsula (the northern tip of the Antarctic Peninsula) finally linked up.

The "Perla Dan" left Halley Bay on February 13 and is expected back in the U.K. towards the end of March; the "John Biscoe" and "Shackleton" are due home towards the end of May.

WHALE CATCH GOOD

An officer in the tanker Kyokuyo Maru No. 2 which called at Fremantle on February 6 to pick up fuel oil told a press-man there that the Japanese whaling fleet operating in the Antarctic is having a good season.

DEATH RATE

The mortality rate among members of Antarctic bases and summer expeditions is very low, according to a monograph published in 1965 by Juan Carlos M. Beltramino, Ministry of External Affairs and Worship, Argentina. The paper is entitled Mortality in Antarctica Since the End of the Nineteenth Century.

Compared with mortality rates for other continents and regions, Antarctica's is low. From 1904 to 1964, despite the primitive conditions of the pre-1945 era, the rate at the bases was only 5.36 per thousand and on the summer expeditions from 1951–52 to 1963–64 was only 0.73 per thousand. Wintering-over expeditions produced a higher rate, 26.7 per thousand.

Fatalities have risen with the increase in summer activities away from the bases, but apart from here, the mortality rate has declined in almost all cases. Causes of death have varied, recently being almost entirely accidental, with no reports of criminally-caused deaths anywhere. Neither the occupations nor the ages of those who died appear to have had any direct bearing on the deaths, although aviation and motor-vehicle operators have suffered more in recent years.

With no epidemics and few germs, Antarctica presents a danger through accident almost alone. Improved means of care in the event of accidents, and improved care in transportation and accident prevention should reduce the rate even further, but the Antarctic imposes its own safety and survival rules which must be strictly obeyed.

LESS TO REPORT

A significant notice in the December issue of the journal of the International Association of Whaling Companies:

"The Norwegian Whaling Gazette will from 1967 be published with six issues per year against twelve previously. The reason is the reduced Antarctic whaling and as a consequence hereof there is less need of monthly publications."

Chile To Maintain Antarctic Weather Centre

The Chilean Antarctic base **Presidente Aguirre Cerda,** an Air Force station, has assumed the status of an Antarctic Meteorological Centre.

This places Aguirre Cerda on a similar technical level to McMurdo and Mirny.

The Aguirre Cerda Base has recorded and distributed meteorological observations for the Antarctic Peninsula area since 1964. In cooperation with the University of Chile, also, seismological and volcanological research has been carried out. But on New Year's Day, 1967, the Base became the Meteorological Centre for all the British, Argentinian and Chilean stations in the Antarctic Peninsula region.

Weather charts have previously been produced and forecasts broadcast. On assuming this permanent form the Base is being manned by two meteorologists, a meteorological observer and five radio-telegraphist-observers. The base programme will now include hourly weather observations, the study of high altitude winds, ice, snow and ocean studies, and the observation of noctilucent clouds, sastruggi and other phenomena.

Owing to the difficulty of transmitting, it was proposed to McMurdo that Byrd and Palmer stations should act as relay stations. Reports will be received from surface and high level stations throughout the area between 53° W. and 90° W., and daily weather forecasts will be issued.

As expected, Chile retained during the 1966–67 summer the ships previously used in the annual relief operations. These were:

A.P. "Piloto Pardo", transport, 2,000 t. displacement. The vessel carries 2 helicopters (UH-13 and TH-13M).

P.P. "Lientur", patrol ship, 534 t. displacement.

The relief expedition left Valparaiso on December 7. carrying the personnel to replace the men who have wintered at the Chilean bases.

The operational period was due to extend from December 15, 1966, to February 28, 1967.

There has been no change in the number or location of bases, which remain as follows:

YEAR-ROUND BASES

General Bernardo O'Higgins (63° 19′ S., 57° 54′ W.), on the west coast of the Antarctic Peninsula, still called "O'Higgins Land" by the Chilean Government. Ten men; leader, Cap. Sr. Patricio l Armijo.

Capitan Arturo Prat (62° 29′ S., 59° 38° W.), on Greenwich Island in the South Shetland Islands. Nine men; commandant, Cap. de Corbete Sr. Herman Cornejo.

Presidente Aguirre Cerda (62° 56′ S., 60° 36′ W.), on Deception Island, South Shetlands. 15 men; commandant, Cap. de Bandada Sr. Jorge l Noreira.

SUMMER STATIONS

Yelcho Sub-base (67° 46′ S., 68° 54′ W.), on Bird Island (Isla Avian) in Marguerite Bay.

Presidente Gonzalez Videla (65° 49′ S., 62° 57′ W.), on Paradise Bay, Danco Coast, Antarctic Peninsula.

In charge of the relief operations was Cap. de Navio Arturo R. Schwerter.

The major scientific work apart from meteorology comprises geomagnetism, biology (with special reference to algae, marine biology, soil biology, and ornithology), oceanography, seismology and volcanology.

VIOLENT STORM

The Arturo Prat base recently suffered the severest battering it has had for many years. Fierce snow storms with hurricane force winds

struck the base. The ship "Piloto Pardo" was five miles out from Soberanio Bay when the storm struck and was unable to enter the harbour as the sea was covered with great masses of ice which made ship movement impossible. Meanwhile the Commodore of the Antarctic Fleet was detained at Arturo Prat.

FLIGHTS INLAND

Three Grumman amphibious planes from No. 2 Wing at Quintero made a series of reconnaisance flights over a period of 35 to 40 days from Aguirre Cerda base into the interior.

On another Grumman aircraft the Commandant of No. 2 Wing, Col. Jorge B. Valenzuela, flew to the Antarctic and spent a week inspecting Air Force personnel

RECONNAISSANCE FLIGHTS

Flights were made to reconnoitre the area where aerial photographs were desired of various locations considered suitable for an Air Base, with ice fields where heavily-laden aircraft could land. At the same time it was desired to secure confirmation of the forecasts sent out by the Aguirre Cerda Meteorological Centre, and to test the behaviour of aircraft equipment and materials at these latitudes.

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menced in January, 1960. Responsibility for the Belgian-Dutch expeditions is in the hands of an Antarctic Committee presided over by Commandant Gaston de Gerlache. They are organised entirely in Belgium. Leaders in 1964, 1965 and 1966 have been Luc Gabes, Winoc Bagaerts and Tony van Autenboer.

The wintering-over teams, principally concerned with a geophysical programme, are reinforced during the three months December to February by teams specialising in geodesy, photogrammetry, glaciology, zoology and oceanography. Teams are carried to their operational base by the Danish ship "Magga Dan".

ROI BAUDOUIN BASE TO CLOSE DOWN

It was reported to the S.C.A.R. meeting in October that the Belgium-Netherlands station Roi Baudouin will be closed in the 1966–7 season for a period of three years. L'Expédition Antarctique Belgo-Néerlandaise 1966, which has now wintered at Base Roi Baudouin, is the sixth Antarctic expedition organised by Belgium since 1957. The three first, from 1958 to 1960, were entirely Belgian. The following three from 1964–1966, were organised in collaboration with Holland, which participated on the basis of one third in subsidy and in personnel. It was Commandant Gaston de Gerlache (son of the Adrien de Gerlache who led the "Belgica" expedition in 1897–99) and his companions who discovered late in 1957 a disembarkation harbour in an unexplored part of the Antarctic (King Leopold III Bay) and constructed Base Roi Baudouin.

Over and above the scientific programme for the I.G.Y. carried out in 1958 at the Base itself (meteorology, ionosphere, geomagnetism, electricity and atmospheric radioactivity, aurora) they carried out daring traverses by tractor and dog-sledge, and by aircraft, which made possible the mapping of the coast and of mountain chains where geological specimens were collected.

The scientific programme at Base Roi Baudouin and the exploration of the environs were followed up and extended in 1959 and 1960 by Belgian expeditions under the command of Captain F. Bastin and Major G. Derom respectively.

In February, 1961, the base had to be closed down through lack of finance; but the break was only a short one and activities recom-

(Continued on previous column)

ICE CAUSES DELAYS IN AUSTRALIAN RELIEF OPERATIONS

The two Australian Antarctic service vessels, "Nella Dan" and "Thala Dan", carrying fresh teams to replace the men who have spent a year at Wilkes and Mawson Bases, were both trapped by ice during the late summer, about 70 miles apart and 70 miles off the coast.

The "Nella Dan" had on board the Wilkes construction party of about 16 as well as a relief party of about 25 for Mawson. She had sailed from Melbourne on December 28 and was to have worked in the Mawson-Wilkes area between January 16 and February 28.

The ship made no progress after January 6 and was stuck fast on January 18, when a severe storm packed up the ice.

"Thala Dan", which had left Melbourne on January 7, had dropped a French party further along the Antarctic coast, and did not reach the Wilkes area until January 27. Shifting winds then caught her in the ice. "Thala Dan" was carrying the relief party for Wilkes.

ICE-BREAKER TO RESCUE

In response to an Australian request the Americans diverted the "East Wind", which had been on its way from the Weddell Sea to McMurdo Sound.

"East Wind" headed for the trapped Australian ships on February 1. The captain flew by helicopter to Wilkes to locate the best route to the base. "East Wind" reached "Thala Dan" on February 5 and freed her the following day, after she had been trapped for 11 days. "East Wind" now led "Thala Dan" through the pack to Wilkes.

The ice-breaker now made for "Nella Dan", which by this time had been held by the ice for a month, and reached the Australian vessel late on February 6.

At 5 a.m. next day, meat, personal belongings and mail were transferred from the "Nella Dan" to the "East Wind's" landing barges while the two ships lay in the shelter of an iceberg.

"Nella Dan" then sailed for the Australian base at Mawson, where it arrived on the 13th to relieve Australian expedition members.

PROJECT HALTED

Men on the trapped ships were in no physical danger, but the closing of the ice pack has wrecked Australia's chances of building a model Antarctic station near Wilkes this year. The "Nella Dan" was carrying a construction team which was to have been landed to start work on new buildings.

The construction team was to have been dropped by "Nella Dan" on its way to Mawson, and would then have been picked up by "Thala Dan".

More than 80 Australians were involved in the delay to the two relief ships. If they had not been freed by winter about 80 men at Wilkes and Mawson would have had to stay there another year.

"Thala Dan" was due to leave Melbourne for Dumont d'Urville on February 6 to repatriate the French team which had wintered there and the summer party.

The Australians on board, trapped for nearly a month in an Antarctic ice pack, kept cheerful in sub-zero temperatures while they awaited rescue.

Alan Blyth, who is in charge of Wilkes Base, said: "It is very cold out there on the ice. But everyone is bearing up extremely well."

Mr. Blyth said that the men had

not been able to leave their ships to venture out on to the ice. But they had been keeping themselves occupied with reading and physical training on board.

There were doctors on board both ships and no emergencies had arisen.

WILKES LEADER

The Australian National Antarctic Research Expeditions maintain bases at Mawson and Wilkes in the Australian Antarctic Territory and on Macquarie Island (which is a dependency of Tasmania). The leader of the party at Wilkes will be Mr. J. R. Canham, of Manly, N.S.W. The appointment of Mr. J. C. Erskine as Officer-in-Charge at Mawson was reported in our December issue.

Mr. Canham was born in 1917 at Ipswich, England, where he received his education, mainly in the mechanical engineering field. He served with the Royal Air Force from 1938 to 1960, attaining the rank of Wing Commander. During the Second World War he was decorated with the Distinguished Flying Cross, and was twice mentioned in despatches. Since his discharge from the R.A.F. he has held various administrative positions in Australia. He has had considerable outdoor experience, including mountain climbing, sailing and jungle walking and camping.

The party at Mawson for 1967 will comprise 27 men and 25 men will be at Wilkes Station.

CONSERVATION AREAS

The 15 specially protected areas for the conservation of Antarctic fauna and flora referred to on page 416 of our last issue were agreed upon by the **Fourth Consultative Meeting of the Antarctic Treaty signatories** in November after the prior ninth S.C.A.R. meeting in September had recommended these as the areas most urgently requiring special protection.

AFTER 55 YEARS

In December 1911, Douglas Mawson brought his ship "Aurora" into Macquarie Island to land a small party which erected and maintained the first wireless connection between Antarctica and the world outside. One of those who kept the dit-dit-da-dit going for two years was wireless operator Charles Sandell. Among those on the "Aurora" which went on to explore the Antarctic and returned to pick up Sandell was a young fellow named Morton Moyes. That was all more than 50 years ago.

In a letter to the Editor, Captain Morton Moyes says: "In December I got a splendid surprise when a voice on the phone said 'Charlie Sandell here'. Now retired (he is 80) and living on the west coast of Western Australia, he came to Sydney to see relatives, and rang me. We had not met since December 1911, just 55 years ago."

GHOSTS

Helium-filled balloons, released at Christchurch, New Zealand, in March 1966 and circling the earth at that latitude in 12 days, are in use to determine wind direction in relation to the South Pole.

Known as GHOSTS (Global Horizontal Sounding Technique), these balloons, three of which are already aloft and, it is hoped, will so remain for six months, carry an electronic transmitting device powered by solar cells, and scientists at the tracking centre at McMurdo Sound record the balloons' location from the morse code signal transmitted. If the wind from the southern hemisphere does in fact converge on the Pole, eventually all six floating balloons, designed to travel horizontally not vertically, may finally gather at or near the South Pole.

In 1969 a satellite orbiting the earth is planned to store data received from the balloons, thus adding to existing weather observing networks around the world.

NEW BUILDINGS, NEW PROJECTS AT U.S. ANTARCTIC BASES

A summer season of intense activity and no major disasters has been noticeable for work on important additions at McMurdo and the start of a new lay-out for Palmer Station.

McMURDO: A number of installations and improvements have been effected at McMurdo this season. The biological laboratory has had the addition of a more permanent storage unit by the tearing down and rebuilding of the Jamesway unit, allowing for cargo now to be moved by forklift into the building for uncrating inside. A sub-ice observation chamber and two huts have been installed near Turtle Rock and have been in use since October. The new ten-bed dispensary was officially opened by the Chief of the Navy's Bureau of Medicine and Surgery, Vice-Admiral R. B. Brown, during his visit in November and the second stage of the three-year building project to put all wintering-over personnel and most of their facilities under one roof has been completed. The second-longest "on-line" run for a nuclear power plant operated by military personnel was achieved with the McMurdo plant's 3,390 continuous hours of operation.

PLATEAU: With seven men remaining to endure the winter at Plateau, the station is now isolated until next November. In October a severe subsidence or snowquake rocked the camp for some four or five seconds, settling the back door about half an inch but causing no other damage. The cause of the subsidence is not known.

BYRD: A huge deep core drill has been set up and tested for next season's ambitious 8,000 ft. cut from the top of the icecap down to bedrock. Information from the ice samples thus recovered should not only yield historical data for some 10,000 to 15,000 years, but also indicate whether ice melting balances ice accumulation. The drill has been set up in an unused underground tunnel.

PALMER: The second week of January brought 26 seabees and 12 scientists to Palmer, the seabees to prepare the site for a new permanent scientific station at Anvers Island. The site at least for the permanent buildings, a wharf, fuel tanks and a distribution system were scheduled for preparation this season.

CHANGE OF COMMAND

The first change of command ceremony to be staged at McMurdo was scheduled for February 25, when Rear Admiral James Lloyd Abbot was to relieve Rear Admiral Fred. E. Bakutis as commander of Operation Deep Freeze.

That date was also to mark the closing of summer support operations for this season.

Adm. Abbot came from Washington, D.C., where he had been Director of Naval Warfare Analysis in the Office of the Chief of Naval Operations. A graduate of the U.S. Naval Academy in 1939, he is a naval aviator with both staff and command experience. Adm. Bakutis will, on his relief from Deep Freeze, assume duties as Commander, Fleet Air Alameda, Naval Air Station, Alameda, California.

INTERRUPTIONS

Bad weather and loss of radio communication on February 2 prevented Navy aircraft from flying to the Antarctic from Christchurch for a further 24 hours.

This was the third day on which flights had been postponed. For the

previous two days radio communication between Christchurch and McMurdo Station was impossible because of magnetic storms and sunspots. On the 2nd, three planes —a Super Constellation and two Hercules—returned to Christchurch after getting half-way to McMurdo Station.

Snow, driven by winds of 40 to 50 miles an hour, swirled around McMurdo Station. Cloud was down to 500 ft., and visibility was less than half a mile.

It was planned to end flights to Antarctica on February 28, but 850 men and tons of equipment had to be brought back to Christchurch by that time. It was estimated that this would require 10 Super Constellation flights and eight to 10 Hercules flights. The Navy had two Super Constellations and four Hercules available.

END OF SEASON

Flights to Byrd Station ended on February 22.

On the 25th Rear-Admiral F. E. Bakutis handed over his command toe Rear-Admiral J. L. Abbot at McMurdo. The two admirals then flew back to Christchurch.

Left behind to winter on the continent are 201 Navy men and 38 scientists.

Antarctica will never be a launching ground for manned or unmanned space probes, in the opinion of Dr. Wernher von Braun on his return from a fact-finding visit to the Antarctic this season.

He and his fellow space scientists went to the Antarctic to study "the way things are done down there", and Dr. Braun said that the similarity between Antarctic conditions and those expected to face moon visitors gave valuable clues about management and operational techniques. Transport on the moon could be achieved by means of an adapted New Zealand-built Gnat; extreme temperatures could be combatted by planting housing under the moon's soil as barracks are buried under Antarctic snow; and the inter-play of research and supporting teams was vital to lunar, as to Antarctic, exploration.

BYRD COASTAL SURVEY

The stalling and consequent crash of one of the four helicopters participating in the Byrd Land coast survey, in November, fortunately without loss of life, caused considerable doubling-up on the programme. It was reported in December that the scientists had been plagued by bad weather and that the overall survey was behind schedule.

It was intended to establish three base camps on the 2,700-mile traverse routes along the coast. The first was in the vicinity of the Edsel Ford Range, the next between the Crary Mountains and the Executive Committee Range, and the third at the Hudson Mountains. According to schedule the Geological Survey mappers should have been at the second camp by the end of November, but at that time they still had not left the first camp. It was expected to spend about 25 days at each camp.

During the traverse, which was conducted in a region extending from the Edward VII Peninsula to the Jones Mountains in Ellsworth Land, the survey team of four planned to occupy about 125 stations, to be reached by helicopter. Brass survey markers were to be embedded in the snow-free rock when latitude and longitude had been established.

NEAR DISASTER

It could have been a tragic landing, but thanks to luck or prayer or the pilot's skill, the C-130 Hercules with the dangling port landing ski came in to Harewood Airport safely as the pilot's (Lieut. Jack Muckenthaler) fiancée watched rigidly from the Terminal Building. Aboard the aircraft were the commander of Antarctic support activities (Capt. H. M. Kosciusko) and his prospective relief as senior U.S. Navy officer on the ice, Capt. H. A. Kelly.

The Hercules, an hour late on its flight from Williams field, was carrying 13 men and some 8,000 lb. of fuel and circled the runway at Harewood for that extra hour as the crew worked feverishly on safety precautions.

During the final 1,000 ft. of the approach the aircraft juddered and slewed to one side and all passengers were moved away from the area above the port ski in case it should be forced through the fuselage on impact. As the 46-ton aircraft hit the tarmac the hanging ski slewed off to the left and flames and smoke rose from the buckling undercarriage. One tyre blew out.

Three weeks ago Lieut. Muckenthaler nearly had a similar experience when a ski dropped on another Hercules. That time, however, he was able to raise the ski before landing.

MULTI-NATION TEAM

Included in an international party taken south as guests of the U.S. Navy in December for a 15-day tour of American and New Zealand bases were Baron Xavier de Maere d'Aertrijcke, **Belgian** meteorologist and nuclear engineer, who was deputy-leader of the 1958 Belgian expedition, Mr. R. W. Sharp, head of the consular division of the **New Zealand** Department of External Affairs, Mr. A. J. Oxley, **South African** Consul-General in New Zealand, Lieut.-Col. R. H. Toledo, a member of the 1962 **Argentine** expedition, Col. Alejandro Forch, head of the **Chilean** Antarctic Institute, Mr. B. H. Stinear (a New Zealander by birth), a member of the **Australian** Antarctic expedition eleven years ago, Mr. J. Grierson, **British** pilot and author, and Mr. Otto Jensen, a member of the **Danish** commission for the scientific exploration of Greenland.

John Grierson (57) is well known as a pioneer long-distance fiyer, and as the author of six books on air-history, including the part played by airmen in Antarctic whaling, in which he was himself a pioneer. Among his other works is a life of Sir Hubert Wilkins and, published in 1964, "Challenge to the Poles". His recent visit to Antarctica was sponsored by the Scott Polar Research Institute. He is a member of the S.P.R.I. Committee.

U.S. SHIPS

1966–67 Summer

Weather ships:
- U.S.S. "Thomas J. Gary" (DER-326), L.-Cdr. J. J. Kingston, U.S.N.
- U.S.S. "Mills" (DER-383), L.-Cdr. H. C. Norris relieved by L.-Cdr. J. A. Felt.

Ice-breakers:
- U.S.C.G.C. "Glacier" (WAGB-4), Capt. O. L. Dawson, U.S.C.G.
- U.S.C.G.C. "Westwind" (WAGB-281), Capt. F. A. Goettel, U.S.C.G.
- U.S.C.G.C. "Eastwind" (WAGB-279), Capt. W. M. Benkert, U.S.C.G.
- U.S.C.G.C. "Stalen Island" (WAGB 278), Capt. R. T. Norris, U.S.C.G.

Research:
- U.S.N.S. "Eltanin" (T-AGOR-8), Kenneth A. McCann.

Supply vessels:
- U.S.N.S. "Wyandot" (T-AKA-92), J. Cullen.
- U.S.N.S. "Towle" (T-AK-240), Allen W. Webb.
- U.S.N.S. "Alatna" (T-AOG-81), W. F. Martin.

U.S. AIRCRAFT IN ANTARCTICA

Air Development Squadron SIX (VX-6), Cdr. D. Balish, U.S.N.
- 5 LH-34D Helicopter Transports.
- 1 LC-47H Douglas Transport.
- 3 LC-117 Transports.
- 4 LC-130F Lockheed Cargo Planes.
- 3 UH-1D (Army) Helicopters.

Operating to and from Antarctica:
- 2 C-121J Lockheed Transports.
- 2 C-130F Lockheed Hercules.
- 1 C-141 Lockheed Starlifter.
- 2 C-124 Douglas Globemasters.

WINTERING OVER

In command of the 189 men to winter at **McMurdo** this year is Cdr. Norman J. Mills, U.S.N.

At the other U.S. stations will be:
- **Pole:** 12. Lieut. Ronald S. Sullivan, M.C., U.S.N.R.
- **Byrd:** 19. Lieut. John K. Williams, C.E.C., U.S.N.R.
- **Palmer:** 4, under a petty officer.
- **Plateau:** 4. Lieut. A. B. Blackburn, M.C., U.S.N.R.

ANTARCTIC'S HIGHEST PEAK CLIMBED

Newsworthiest feat of this season's U.S. activities in the Antarctic seems to have been the challenge to and defeat of its highest mountain, the 16,860-ft. Vinson Massif in the Sentinel Range.

First challenge came from Professor Woodrow Wilson Sayre, but his name dropped out of the news when an eleven-man team was announced as another challenger, by the National Geographic Society and the National Science Foundation. And this team was successful, climbing not only the previously virgin Vinson Massif but also some five other nearby mountains.

Led by Nicholas B. Clinch, a Los Angeles lawyer, the 1966 American Antarctic Mountaineering Expedition, sponsored by the National Geographic Society and the American Alpine Club, co-ordinated by the National Science Foundation, was flown from Christchurch, N.Z., to McMurdo Station on December 6 last year, then on to the foot of the mountain they were to climb. Ahead of them lay their goal, 16,860 ft. of snow and ice, guarded by winds of up to 90 m.p.h. and thousands of feet of ice. They had no maps, no contact wtih the rest of the world except by radio, and no previous attempts to guide them.

Yet, ten days later the now ten-man team planted 12 flags on the peak of the Vinson Massif, representing the 12 nations of the Antarctic Treaty.

The peak is near the base of the Great Antarctic Peninsula, formerly called the Palmer Peninsula, which thrusts northward from the main body of Antarctica towards the southernmost tip of South America.

Only one permanently manned base lies near the straightline path from McMurdo Sound to the Vinson Massif. This is Byrd Station.

Before a month in the field was up, the American Antarctic Mountaineering Expedition had added Mount Shinn, Mount Gardner, Mount Tyree (Antarctica's second highest — 16,300 ft.—and without doubt hardest peak), Mount Ostenso and Long Gable.

Prof. Woodrow Wilson Sayre had to abandon his planned ascent of the Vinson Massif after his party's plane, "piloted by Max Conrad," reports AAP from Washington, "developed unspecified difficulties in Buenos Aires".

Mr. Clinch said afterwards that the climb of the Vinson Massif had not been particularly difficult. "We had our base camp at 9,000 ft., Camp One at 11,500 ft., Camp Two at 13,000 ft., and Camp Four at 14,800 ft., so as you can see we broke the climb down into fairly easy stages." The first party reached the summit on December 18, the two other parties following on the succeeding two days.

Temperatures ranged between 10° above zero and 35° below.

According to Mr. Clinch, Mt. Tyree (16,290 ft.) was the hardest to climb. Only Mr. B. Corbett, a member of the American Mount Everest expedition, and Mr. J. P. Evans, of the University of Minnesota, reached the summit, on January 6.

In support of the Vinson Massif challenge party, a C-130 Hercules of Air Development Squadron SIX in December made the first landing ever attempted west of Nimitz Glacier. Carrying 11 members of the Mountaineering Expedition, the aircraft, commanded by Commander A. F. Schneider, executive officer of VX-6, with a crew of nine, landed safely in this unknown area 1,300 miles from McMurdo and took off again after placing the mountaineers in the field. Another VX-6 Hercules was to call back again to collect the party in January.

NEWS FROM "ELTANIN"

The deepest hole ever made in the Tasman seabed is thought to have been "dug" by scientists aboard U.S.N.S. "Eltanin's" December cruise in mid-Tasman.

A 1,500 lb. lead "bomb", complete with fins, was used to guide and drive five 21-ft. pipes into the seabed, after a 15,701 ft. drop. The exact depth of the core was not immediately known, as the difference between the 70 ft. of mud on the outside and 87 ft. inside the pipes may have been due to suction. Long cores give a picture of the earth's magnetic history.

An unknown and hitherto unseen fish also accompanied "Eltanin" back to New Zealand. This creature was described as an 8-inch long "whale", with a large whale-like head, large mouth and teeth, a whale's posterior but no fins. It was described as completely new, never found anywhere else.

Also captured in the trawling programme were four or five "very rare" fish and some 300 species of lantern fish, a variety of which only about 12 had previously been caught.

RECOVERED

Mr. Armand L. Spitz, the American aurora physicist who was evacuated by an emergency flight from Byrd Station early in September suffering from appendicitis, was reported fit and well at Christchurch in late November. He has been working at the D.S.I.R. magnetic survey in Christchurch, and hoping that the Arctic Institute, his American employer, might withdraw its objection to his returning to the Antarctic.

Minor damage to the hull of U.S. Navy tanker "Alatna" necessitated her visit to dry-dock in Dunedin, New Zealand, last December. A 26-inch crack in a ballast tank and a hole in a cargo tank were received, it is thought, after "Alatna" had left the fuelling berth at Hut Point. More ice than usual has been seen this year in Antarctic waters.

MORE SEALS INLAND

One Antarctic mystery looks like being unsealed. Over a period of more than 60 years, the skeletons or mummified bodies of more than 100 seals have been found in the dry valleys of Southern Victoria Land, and how they ever got there seemed inexplicable.

In early November of 1966, Dr. Wakefield Dort, Jr., of the University of Kansas, found a number of dead seals while studying cirques in ice-free valleys with an associate, Edward Derbyshire, of Monash University, Victoria, Australia. One animal, a female crabeater pup which was probably born in September, was found on the ice of Lake Bonney. Dr. Dort had visited the same spot in February of last year and knew that the carcass was not there at that time.

The seal's blubber was almost entirely used up, and its stomach and intestines were empty. The belly and chin were badly scarred from the long journey over rocky terrain and glacier ice. With a companion, Dr. Dort backtracked the trail from the eastern end of Lake Bonney diagonally upslope to the base of the scarp of Nussbaum Riegel. They found 11 more carcasses halfway up and another one on the top.

Samples of liver, intestine, skin, and blubber are being brought back to the United States for analysis.

On December 12, while flying near Mt. Saunders in Byrd Land, the crew and passengers of a helicopter spotted a live seal on Crevasse Valley Glacier at an altitude of 3,000 to 4,000 feet, about seventy miles inland. The seal was still moving away from the coast. After landing on the glacier, the four men managed to capture the animal, but only in a fight that required all of their efforts. The seal, a crabeater pup weighing 57 lb., and believed to be about three months old, was airlifted to the Byrd Land survey base camp, near 77° S., 144° W., where it was fed fish. On December 14, the animal was flown to McMurdo, and turned loose on the ice off Hut Point. Hopes are not high for its recovery on account of the

loss of blubber it had suffered.

The discovery of these two live or only recently deceased seals strengthens the theory previously advanced that the mummified seals were beasts that had become disorientated and wandered aimlessly until they died of starvation or exhaustion.

AND IN THE SEA

"Fantastic" motion pictures of seals under the Antarctic ice have been taken by a U.S. zoologist, Dr. Carleton Ray, and his companion, Mr. Michael A. de Camp from Morristown, New Jersey, who have been diving beneath the 10 to 15 ft. thick ice shelf on the southern fringe of the Ross Sea. The Antarctic is the greatest biological laboratory in the world, according to Dr. Ray, who believes that man is only just beginning to learn the secrets of how air-breathing mammals such as seals exist beneath the ice.

CHANGE-OVER

The annual exchange of U.S. and foreign scientists has continued this season, with four U.S. scientists working outside their own bases, and nine foreigners working within them.

E. E. MacNamara, from the Arctic Institute of North America, will spend the 1967 winter at the Soviet Molodezhnaya Station; Wakefield Dort, Jr., spent part of the summer at Japan's Showa, doing research in glacial geology; and John H. Taylor and Victor P. Hessler conducted upper atmosphere physics research at Vostok Station.

Belgium has been represented by Roland Souchez, Institute of Geography from Brussels, in the dry valleys west of McMurdo Sound; Norway by veteran Antarctican Olav Orheim of the Norwegian Polar Institute, who participated in the 1965–66 South Pole–Queen Maud Land Traverse II; from Australia are geologists Clifford T. McElroy and John H. Bryan from the University of New South Wales, and Geoffrey Rose from the N.S.W. Geological Survey, also working in the dry valley areas. A. McClared, from the Australian Antarctic Division of the Department of External Affairs, is a guest of the U.S. Antarctic Research Program at Byrd, observing the deep drilling work, while David Carter, another Australian geologist, spent several weeks at McMurdo calibrating two gravity meters for the Antarctic Division. An engineer from the Isuzu Motors Company of Japan, Masahiko Yamanaka, has visited McMurdo and Plateau Stations to aid in the rehabilitation of Sno-Cats for the U.S. South Pole–Queen Maud Land Traverse III. Also at McMurdo was L. M. Klimov, exchange scientist from Leningrad.

Dr. MacNamara, who is Director of Research for the State of New Jersey, has been seconded to the Arctic Institute of North America and has received a grant from the National Science Foundation to enable him to spend 14 months at Molodezhnaya.

In Christchurch on December 22 Dr. MacNamara said that the Russians were sending an icebreaker back from the Antarctic to collect him at Fremantle. He expects to study soil, rocks, drainage water, meteorology and climatology.

MORE TOURISTS

Lindblad Travel Inc., the New York travel agency responsible for the Antarctic Peninsula tour of the 1965–66 summer, described in our March issue, arranged three tours of roughly the same area for this summer. Two of the tours were scheduled to start from Argentina and one from Chile.

Argentine tours: A.R.A. "Lapatoia", the ship employed last year, from Ushuaia. Each tour of 14 days: 60 passengers each sailing; leaving on January 15 and 29. The majority of the tourists are United States citizens.

Chilean tour: M.S. "Navarino" leaving Puerto Montt on December 14, returning to Punta Arenas about January 6, after visiting the U.S. Palmer Station and the Chilean bases.

FROM THE SUB-ANTARCTIC ISLANDS

MACQUARIE ISLAND

In the second week of December a hurricane delayed the departure from Macquarie. The "Nella Dan" was preparing to pick up the 18 scientists and other expedition members when winds up to 90 m.p.h. forced her to put to sea.

"Nella Dan" arrived at the island on December 6 with a relief party and supplies for the next year.

At the weekend, dangerous seas also prevented amphibious trucks from putting supplies ashore at several outposts on the island.

THE WEATHER

A recent visitor to Macquarie writes in "The Australian":

"The handful of Australian scientists on Macquarie Island have a simple method of weather forecasting: 'Just take your pick: snow, rain, hail or hurricanes. You won't be disappointed', they say.

"It is surprising how accurate the method is. In the 12 months to last November 30 the average daily period of sunshine was 1.9 hours — a better record, I was told, than in other years.

"Other climatic statistics for this 'good year' were equally depressing: rain on 310 days, strong winds on 277 days, hail on 90 days, snow on 96 days, fog on 104 days, and gales on 83 days."

LEADER 1967

The leader of the Macquarie Island team this year will be Mr. R. M. G. Walker of Harbord, N.S.W. Mr. Walker was born at Bareilly, India, in 1935 and was educated in England. He was an officer in the British Army from 1953 to 1960, and had considerable experience in jungle warfare in Malaya. His work since 1960 has been mainly administrative, in India and Singapore. The Macquarie Island party will number 24. Macquarie is part of the state of Tasmania. Mr. Walker as leader becomes Coroner and J.P. for the Esperance Municipality, in which the island lies.

NEW BOAT

An air boat has been designed in Melbourne as a result of talks with members of the Australian National Antarctic Research Expedition with experience in conditions at Macquarie Island.

It was built by Norman Hamilton Pty. Ltd. of Melbourne.

The ANARE teams found the use of boats at Macquarie Island impossible because of floating kelp and seaweed in strands up to a mile long.

But the air boat, drawing only an inch of water and practically out of the water at full speed, would overcome this problem because it is driven by an air propeller the same as an aircraft's.

The double-skinned fibreglass hull is in split catamaran form. The boat weighs only 600 lb. but the filling of Estafoam in the hull gives it a floating factor of two tons.

The Porche aircraft engine pushes a four-bladed fan and the driver steers by a conventional wheel connected to rudders in the slipstream.

Last year, a rough model was built for a duck-shooting syndicate who went through mud and weeds in the N.S.W. ricefields where no other shooters had been before.

When final tests are made, the boat is expected to have a top speed of 60 m.p.h.

CROZET

(France)

Because of the death on December 2 of Dr. Le Gorrec, Officer in Charge of the Nouvelle Amsterdam area, following a jeep accident, the "Gallieni" made a return voyage Réunion–Amsterdam–Réunion between December 2 and 15, and then resumed the planned relief programme. Leaving l'Ile Maurice after refuelling on December 15, "Gallieni" reached l'Ile Crozet on the evening of December 21. In rainy weather the relief of personnel and unloading of 311 tons of cargo were carried out without incident.

KERGUELEN
(France)

On December 26, the "Gallieni" left for the Kerguelen Archipelago early in the afternoon, and arrived there during the morning of the 29th. Unloading began at Port aux Français at midday the same day and continued in moderate weather until January 4, 1967. 1,052 tons of cargo were unloaded, including three prefabricated buildings planned to house the new power-house (also unloaded), the equipment for future sounding-rocket firings, and a new radio transmitting centre.

After a voyage to Amsterdam Island extending from January 5–21, "Gallieni", back at Kerguelen, loaded cargo for the return voyage and personnel who had been relieved, and left for France on January 22, calling at Port-des-Galets on the 30th.

CAMPBELL ISLAND
(New Zealand)

The Festive Season has come and gone and brought with it a spell of excellent weather enabling most members to get out and about to visit some of the more interesting places on the island. On December 22 a party of six, Paull, Dreaver, Johns, Hodgson, Shone and Foubister, made the long trip to Penguin Bay by the southerly route and returned to the station via Complex Point and Northwest Bay. During this trip no fewer than 13 species of birdlife were observed, many of them being banded en route.

Of special interest was the locating of a Wanderer chick (Diomedea exulans) on the slopes of Mt. Dumas above Northwest bay, far from the more frequented nesting site at Mowbray Castle. Also of interest was Foubister's rescue on January 24 of another Wanderer chick from the surf in Northwest Bay and its inevitable rendezvous with the sea lions. The latter bird was carried some distance up Mt. Dumas and left in the vicinity of the nest of the former.

On January 8 the largest party to leave the station so far (Johns, Dreaver, Therkleson, Shone, Steuth, Hodgson and Foubister) tramped out to the end of the peninsula at Monument Harbour via the eastern slopes of Mt. Dumas, the southern coastal cliffs and over the top of Eboulé Peak. Before lunch Foubister and Dreaver had a short swim in the surf in beautiful sunshine with Peggy (our dog) and a friendly lion. The return was made via Six Foot Lake and Garden Cove. The party was picked up by Hip van Berkum in the station launch "Aurora" from Venus Cove. Undoubtedly this is one of the best walks on the island, not only because of the fine coastal scenery but because of the good conditions underfoot.

BIRD BANDING

Several members have been carrying on the good work of previous expeditions on the bird banding scheme mentioned in the December edition of "Antarctic" by C. J. R. Robertson. David Paull, senior meterological observer, has taken over the keeping of records of banding, recoveries and nesting habits of the birds from Gordon Surrey, who left the Island in November 1966 after two years there. Gordon has continued his interest in the study of birds by taking up a post with the Department of Wildlife.

Of interest on the recovery side of the scheme was the reported recovery of a Royal Albatross (R 9621) 350 miles east of Valparaiso, Chile, just after Christmas. This bird was banded by Surrey and Foubister on Campbell Island on October 23, 1966, a distance of 4,300 miles away.

The pegging of 100 Royal Albatross nests in the St. Col area was completed on January 17 and 78 pairs had been established by this date.

VISITORS

Unexpected but very welcome visitors to the island on the last day of 1966 were the six members of the Canterbury University's Expedition to Snares Island who were unsuccessful in their attempts to land on Snares from the U.S.S. "T. J. Gary" and were left at Campbell to await the arrival of the U.S.S. "Mills", which was successful in landing the party on January 2. Trips to Six Foot Lake, Courrejolles Peninsula and Rocky Bay were organised for the visitors, who also assisted us to bring in the New Year.

ANTARCTIC BOOKSHELF

SCOTT OF THE ANTARCTIC, by Reginald Pound, Cassell. 327 pp, maps and illustrations. N.Z. price 37/-.

The publishers of this fourth biography of Captain R. F. Scott, following books by Gwynn (1929), Seaver (1940) and Ludlam (1966), can fairly claim that Mr. Pound's book is "based on exhaustive original research". He has had access to a great deal of previously unpublished material in the form of letters, diaries and other documents, and is able to quote freely passages from Scott's own 1912 journal which have previously been published only in an expurgated form. All this has been supplemented by conversations and correspondence with many who served with Scott and knew him well, or who have themselves had access to further original material. Mr. Pound has also had the goodwill and active co-operation of members of the Scott family in writing a book which gives us a fuller and more intimate picture of Scott the man than we have had before.

On the whole the new portrait enhances the stature of a man whose wide interests, organising skill, devotion to duty, courage and endurance have for over 50 years placed him high among the world's great men. Weaknesses of course there were, and Mr. Pound does not shut his eyes to them. Those who knew him and students of Antarctic history have long been aware of them: hesitancies, "queer blank phases" (even if of no more real consequence than arriving at an evening in his shirt sleeves), resentment of criticism, "ready susceptibility to emotional indulgence", moods in which he seemed "unapproachable". But not many have known the extent of the disabilities, physical and temperamental, against which he had to wage a lifelong fight, and the courage and determination with which he fought and conquered them. "His conquest of the South Pole was also a triumph of self-conquest".

Some of the "new" passages quoted by Mr. Pound, especially from the letters of other people, are perhaps not strictly relevant to a biography of Scott, but they are permissible, even valuable, if they highlight qualities and circumstances with which Scott had to contend. That is not always the case. And it is unfortunate that some of the revelations cast a slur on other members of the expedition. Not every reader will know Scott's proneness to hasty and sometimes wrong judgements. Mr. Pound sometimes goes to considerable lengths to make it clear that there may be another side to the story: he is careful to give both Scott's and Shackleton's points of view in the "breach of faith" charge over the use of McMurdo Sound as a base. But was it necessary to quote Scott's private-letter reference to a man as "a snob of snobs" — and to give the man's name and office, in a footnote? Or to quote Kathleen Scott's opinion of another eminent explorer, "I'm afraid he's an ass"?

Incidentally, a pleasing feature of the book is the light it throws on the vital part in Scott's life played by his mother and his wife. And a New Zealander must express his thanks for the frequent acknowledgment of the help given by Joseph Kinsey.

There are a few historical inaccuracies, as where (p. 60) the author implies that the whole Crozier party was involved in the misadventure which led to the death of Vince.

This, however, is a well documented, perceptive, lucid and in the main well-balanced account of

Scott's life. Mr. Pound, an experienced biographer, has woven the well-known facts and the new material into a coherent and very readable whole which gives the reader a new insight into the character of the man whose adventurous life and heroic death did indeed "stir the heart of every Englishman" and many a man besides.

L.B.Q.

The November issue of **GEOTIMES,** the American Geological Institute's periodical giving "news of the earth sciences", is almost entirely devoted to Antarctic research, specifically the U.S.A.R.P. programme. The nature of the eleven articles and the calibre of their writers makes this 50-page, attractively produced journal of interest to a much wider circle of readers than those who are specialists in the earth sciences. Ex-New Zealander Colin Bull on **Antarctic Glaciology,** H. G. Goodell on **Marine Geology** (from "Challenger" to "Eltanin"), Philip M. Smith on **Geological Research,** Robert H. Rutford on **Field Party Transportation,** and other competent writers with the common touch make this a publication which no Antarctic enthusiast can afford to miss.

We are indebted for our co~~~ to John F. Splettstoesser who in his article on **Antarctic Geological Literature** gives full credit to the special Antarctic issues of the N.Z. Journal of Geology and Geophysics and to the N.Z. Antarctic Society's volumes "The Antarctic Today" and "Antarctica".

Among the most productive of the many United States organisations active in the Antarctic must be the **Sedimentological Research Laboratory** of the Department of Geology, Florida State University. The latest "contributions" we have received are numbers 15–17, October and November, 1966.

15. The Deep-Sea Sediments of the Drake Passage and Scotia Sea, by Thomas T. Mather.
16. A Comparative Study of Glaciconite and the Associated Clay Fraction in modern Marine Sediments by David L. Bell.
17. Recent Sediments and Sedimentary History across the Pacific Antarctic Ridge, by Samuel Koster.

All are theses submitted to the graduate school of the University by students doing research work for the M.Sc. degree.

ANTARCTIC SOILS AND SOIL FORMING PROCESSES, J. C. F. Tedrow, editor, 177 pages, illustrations, maps and diagrams. American Geophysical Union. $10.

This is the 8th Volume of the A.G.U. Antarctic Research Series. The editor, a professor of soils at Rutgers University, and an acknowledged expert on soils and soil classification in the Arctic regions, is well qualified to edit such a work.

This book is not intended as the complete and authoritative work on Antarctic soils, but as a reflection of current knowledge of the subject in order to place pedology in its realistic perspective and as a catalyst for future investigations. Within these limits the book serves its purpose admirably and will be of considerable interest to all soil scientists and especially to those in New Zealand who have pioneered soil investigations in Antarctica.

The first five chapters deal with the factors that govern soil formation in Antarctica and the final chapter, somewhat shorter, with the soils themselves. 'The geomorphology of Antarctica' by Robert L. Nichols is a very useful summary of the geological and geomorphological pattern of the Antarctic continent as a whole, which effectively means the mountains of the Ross Dependency and Graham Land, and a rather more detailed account of landforms in Graham Land and the McMurdo Sound region, where Dr. Nichols has worked extensively.

'Antarctic Climate' by William S. Weyant, contains much information on the climate of Antarctica generally, and then deals specifically with the additional climatic factors that may prevail in areas of exposed soil. Much of this, of course, is supposition, as very few climatic observations have been made in the larger ice free areas. Weyant recognises that the ice-free areas have a local climate which is very different from that of neighbouring snow-covered regions which, of course, is obvious to anyone who has worked in such areas; however there is no mention of the wide differences that have been observed between ice free areas at high altitudes and latitudes and those of the better known dry valleys. The

chapter does, however, provide a useful source of reference material on Antarctic climate which is otherwise difficult to obtain.

The lengthy chapter by Thomas E. Berg and Robert F. Black on the growth of non-sorted polygons in Victoria land is a very useful summary of the recent work of the authors on this very distinctive feature of the Antarctic landscape and provides the most detailed account of the morphology and occurrence of nearly all features that can be classified as polygons, tessellations or patterned ground. While not everything is yet known about these features Berg and Black's work goes a very long way towards elucidating their significance and concludes with a method for dating various geomorphic surfaces which has provided some rather startling evidence for the youthfulness of some surfaces. This is not the place to be critical of the ages derived by these methods, although they appear to be much younger than other workers also using soil evidence have thought. It will be difficult to refute the exhaustive field studies and experimental evidence presented by Berg and Black.

A chapter by Emanuel D. Rudolph on the Terrestrial vegetation of Antarctica discusses quite briefly the flora of Antarctica as a whole and then presents an account of some recent work on the microclimate, soil and vegetation of a small area near Hallett station which is one of the more favourable sites for plant life in the New Zealand sector of the Antarctic. The results provide a useful basis for comparison with the scattered short term observatiohs by pedologists and entomologists in other ice free areas of Antarctica.

The final chapter in this section is on the ecology of soil micro organisms in Antarctica by William L. Boyd, James T. Staley and Josephine W. Boyd. A short summary of previous work on the microbiology of the Antarctic is followed by an account of a detailed investigation of the microbial population of the McMurdo Sound region. As shown by other workers, there is a small but detectable microbial population in many Antarctic soils. Studies on the bacterial population and of the organic material on which it feeds are reported. It is interesting to note also that not only are there 'native' species of micro-organisms in Antarctic soils, but introduced species can also be observed, some of them surviving since their introduction by the early expeditions, but many others being introduced by the current inhabitants of Antarctica.

One slight error detected in this chapter is the writers' omission of Borchgrevink's expedition of 1899 and the Ross Sea Party of Shackleton's Trans Antarctic expedition from his account of early expeditions in the region.

In these five chapters the soil forming factors have been discussed and the soil environment has been placed in its proper perspective. Geology and topography, climate, time and biology are all discussed separately, but with general relation to soils. In the final chapter of the book, quite a short one, J. C. F. Tedrow and Fiorenzo C. Ugolini discuss Antarctic soils. The soil forming factors are again discussed and a review of much of the previous work on Antarctic soils is given. The authors then attempt to classify Antarctic soils and run into the same problems as other New Zealand workers have done in attempting to do the same thing. There is a gulf between the soils of Antarctica and any others in the Southern hemisphere — the Subantarctic islands are quite atypical, and it is difficult to find equivalents within the Arctic regions. Tedrow and Ugolini would describe the bulk of Antarctic soils as ahumic — a term which cannot be disputed, although it is rather broad. The characteristics of their ahumic soils however are based largely on soil characteristics in the McMurdo Sound region, and whilst it is no fault of the authors of this chapter, it should perhaps be pointed out here that further field work by New Zealanders has shown that the soils of other ice free areas in the Trans Antarctic mountains have somewhat different characteristics — they may be acid rather than alkaline, may contain much more salts and may be of markedly different colour. However Tedrow and Ugolini bring out the point, made by other pedologists in Antarctica, that the environment is an arid one, and that the nearest relatives as far as soils go, are to be found in the soils of desert regions.

Other minor groups in Tedrow and Ugolini's classification such as evaporite soils, protoranker soils and ornithogenic soils are discussed briefly. The groupings are valid, as these three classes of soil do differ from the bulk of Antarctic soils but the reviewer has his reservations about the use of terms such as protoranker for soils containing organic matter and ornithogenic for soils derived from penguin guano.

On the whole the value of this book lies in its bringing together the discussion of the soil forming factors that govern soil development in Antarctica, and especially the accounts of recent experimental work in microclimate, microbiology and patterned ground development. Although every pedologist visiting Antarctica does, and indeed must attempt to classify the soils he sees and to relate them to soils in other parts of the world, a valid classification must await wider knowledge of Antarctic soils, and not only those of the McMurdo Oasis area. Every classification put forward of Antarctic soils, including one put forward by the reviewer himself, can be criticised on the same grounds, but this need not deter future soil workers from building on previous work. The question asked by many — of what use are soil studies in Antarctica where no sheep graze as yet — is not answered in as many words in this volume but it is in fact answered by the presence of the volume itself, which shows how work from a number of scientific disciplines can be tied together to gain further knowledge of the environment of the earth.

G. C. C. Claridge

ANTARCTICA!

(We are glad to publish these verses forwarded to us as a sincere tribute to the 1966 wintering New Zealand team, by the mother of one of them. The poem is dedicated "to Mike Prebble, Leader of the 1965–66 Party, and to all those who served under him.")

Vast Continent, land of blizzards, ice and wind,
What secrets do you hold within your ice-bound heart?
Remote, mysterious and bleak; impart the knowledge that we seek to wrest
from you!
Antarctica!

Land of darkness, land of light,
Where Man pays dearly for his right to learn:
Implacable, belligerent and yet, at times benign
To those who yearn for truth, and spurn hypocrisy!
Antarctica!

Where Man has shown the world, that he
Can live and work in harmony, regardless of his race or creed,
And is judged by his deeds alone!
Antarctica!

Land of Sun, old before the world begun!
Azure skies, sparkling ice, in summer you're a paradise.
We're leaving you our mission done, be kind to those yet to come.
Reluctantly we have to part, we're leaving you — also our hearts!

Mary Greeks.

FLIGHT OFF

A plan by Max Conrad to fly a light aircraft across the Antarctic has apparently been abandoned because the United States Navy could not adequately help him if he encountered trouble. Conrad had planned to start his journey from Washington on February 27 in a twin-engine Piper Aztec.

Friends said Conrad had completed all details for the flight, which was to have marked the first time a light aircraft had girdled the world from Pole-to-Pole.

It is understood that severe weather and limited search and rescue facilities made it impossible for the Navy to support the flight.

During the summer season, representatives of 13 nations visited Scott Base. They included admirals, knights, and doctors or professors of science.

THE ICE COVER

In an article on "The Polar Ice Cap" in **Impact,** vol. VIX, no. 4, A. Bauer and C. Lorius give some interesting figures on the Antarctic ice cover. Admitting that "the present margin of error in the measurement of ice thickness is at least of the order of 10 per cent", the writers conclude that the surfaces under ice and the volumes of this ice are distributed as follows:

	Surface (million km²)	*Volume* (million km³)
Antarctic	12.8	29.5
Greenland	1.7	2.6
Other ice-caps and glaciers	0.5	0.2

Thus approximately 90 per cent of the ice in the world is contained in the Antarctic.

50 YEARS AGO

[*It was on February 9, 1917, that the "Aurora" arrived in Wellington, bringing back the seven survivors of the 10-man Ross Sea section of Shackleton's Imperial Trans-Antarctic Expedition who had been marooned without stores or spare clothing on Ross Island since the ship had been carried out to sea, icebound, on May 7, 1915.—Ed.*]

THE RETURN TO CIVILISATION

As Richards recalls it.*

"It was indeed a red-letter day for us when we arrived off the South Island of New Zealand and steamed along the coast on our way to Wellington. For the first time since 1914 we saw green trees and pasture, and savoured the wonderful scent of the eucalyptus — which was something I had deeply longer for at times in the 'Sterile South'.

"It was good to be back, and as we steamed into Wellington Harbour on 9 February, 1917, the Pilot Boat came out to meet us, and a party of prominent citizens came alongside on a tug. We were made to feel more than welcome. I shall never forget the kindness and warmth of the New Zealand people towards the seven survivors of our party. We had no shore clothing and no money, but we were told we would not have to worry about anything as we were to be the guests of the New Zealand Government. We were taken ashore to the Grand Hotel, tailors were put to our disposal, and we were outfitted completely in one day. Passes were given over all rail and tram services, and public and private hospitality was boundless, which was an eloquent tribute to the esteem in which Shackleton was held there, despite his failure to achieve the trans-continental crossing which was the object of his expedition."

Joyce adds some details.†

"The pilot boat had come out to meet us. Dusk had come down on the waters as we lay off Point Hallswell. From the moment we had a glimpse of those who ventured out to greet us, the enthusiasm and hospitality of the people of New Zealand never ceased towards us. A prominent party consisting of . . . the acting Minister of Marine, the Mayor, and other well-known citizens were on the tug 'Karaka'. As the two vessels drew alongside, three lusty cheers called for by the Mayor were given for our party. . . . Then followed general handshakes and congratulations. . . . We then made for the ferry wharf and berthed, where a huge crowd were gathered, and the air rang with cheers and shouts of welcome. Almost at once we were to recognise that New Zealand is a home from home.

. . . . .

"With everlasting memories I say 'Thank you!' "

* Richards: The Ross Sea Shore Party, 1914-17. S.P.R.I.

* Joyce: South Polar Trail. Duckworth 1929.

STILL GOING STRONG

The Royal Geographical Society has conferred on **Sir Charles Wright** the rare honour of Honorary Membership of the Society. A prominent member of Scott's Last Expedition, the veteran Canadian scientist has in recent years worked in the field of geomagnetic and ionospheric research, and when in his late 70's returned four times to the Antarctic with American Deep Freeze teams to cary out field observations in support of his research.

PLEASE !

IF you have a copy which you could spare of any of the issues listed inside the back cover as OUT OF PRINT or VERY FEW LEFT please forward to the Editor, as frequent enquiries are being made for out of print issues. Note that vol 1 nos. 2 and 9, vol. 2 nos. 3, 4, 7 and 9 are now also out of print.

SPACE FLIGHT LAB

Within 10 years the Antarctic could become the test laboratory for deep space missions, said an American atmospheric physicist, J. P. Katsufrakis, in Christchurch on February 27.

Mr. Katsufrakis, who is from Stanford University, had spent the previous six weeks with French scientists at the Dumont d'Urville Station as an exchange scientist. It is his fifth year on the continent.

He said the primary test would be the placing of a selected team of astronauts on the Polar Plateau for 18 months or so. This was the time that would be required for a journey to Mars and back.

"It would not have the artificiality of a research chamber in some laboratory in the United States. I believe Antarctica is the only place on earth where you can duplicate realistically the physical and psychological conditions of a space flight," he said.

"Down there in the middle of nowhere they would really feel the loneliness of space, particularly in the winter darkness, whereas in a test chamber they have the knowledge that there are plenty of people outside always ready to assist them if things get difficult," he said.

The use of the Antarctic for a deep space mission — "by that I mean after the moon has been conquered" —would probably be a joint N.A.S.A.-National Science Foundation project.

Mr. Katsufrakis said he believed it would be foolhardy to send four men on a mission to Mars without first seeing how they got along together in a similar, realistic environment, such as could be realised in the Antarctic.

SCOTT BASE ARCHITECT HONOURED

The rare honour of being made a life vice-president of the Incorporated Association of Architects and Surveyors has been conferred on Mr. W. F. (Frank) Ponder, of Lower Hutt. He has been invited to London to be presented with a special diploma in recognition of this honour, which has been granted on only two other occasions, and never to a person outside the United Kingdom.

The award is in recognition of Mr. Ponder's services to the association and to architecture over a period of over 21 years.

Mr. Ponder was recognised internationally when he was selected to be chairman of an international symposium on polar buildings, held in the U.S.A. in 1962. This followed the successful pioneering of a new era in polar building design when he designed New Zealand's Scott Base.

IN THE WIND

Adrian Hayter, author of the popular lone-voyager narrative "Sheila in the Wind" and two subsequent books, is now writing what promises to be a more-than-interesting account of "what it is like living in the Antarctic now," based upon his year as leader at Scott Base, 1964-65.

THANKS ARE DUE

The co-operative assistance given to Scott Base field parties by the United States is generous, as is clearly understood when these facts for the summer season are listed. Exclusively for New Zealand scientists, the United States flew 44 helicopter missions, three major Hercules missions, and on seven occasions Coast Guard ships were used.

On one of these missions, a helicopter crashed and was written off.

Speaking in Christchurch on March 1 after he had handed over the command of the US Navy Support Force, Antarctica, Admiral Bakutis paid tribute to the Hercules of the Royal New Zealand Air Force, which had been brought into Antarctic support operations during his command.

"We would welcome any further contribution New Zealand may make on a pool basis. We could in fact use up to six flights a season, but this, of course, will depend on whether or not the New Zealand Government sees this as being desirable," he said.

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Copies of our predecessor, the Antarctic News Bulletin, are available at 5/– per copy, except for numbers 9 and 10. The copies of numbers 1, 2, 3, 4, 7, 11, 17 and 18 are authorised reprints.

The New Zealand Antarctic Society

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

The Society has taken an active part in restoring and maintaining the historic huts in the Ross Dependency, and plans to co-operate in securing suitable locations as repositories of Polar material of unique interest.

There are currently two branches of the Society and functions are arranged throughout the year.

You are invited to become a member. **South Island** residents should contact the Canterbury secretary, **North Islanders** should contact the Wellington secretary, and **overseas** residents the secretary of the New Zealand Society. For addresses see below. The membership fee includes subscription to "Antarctic".

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