ANTARCTIC

A NEWS BULLETIN

published quarterly by the

NEW ZEALAND ANTARCTIC SOCIETY

WELCOME ABOARD GIRLS

First New Zealand and United States women scientists at South Pole (see p. 333).

Official U.S. Navy Photo.

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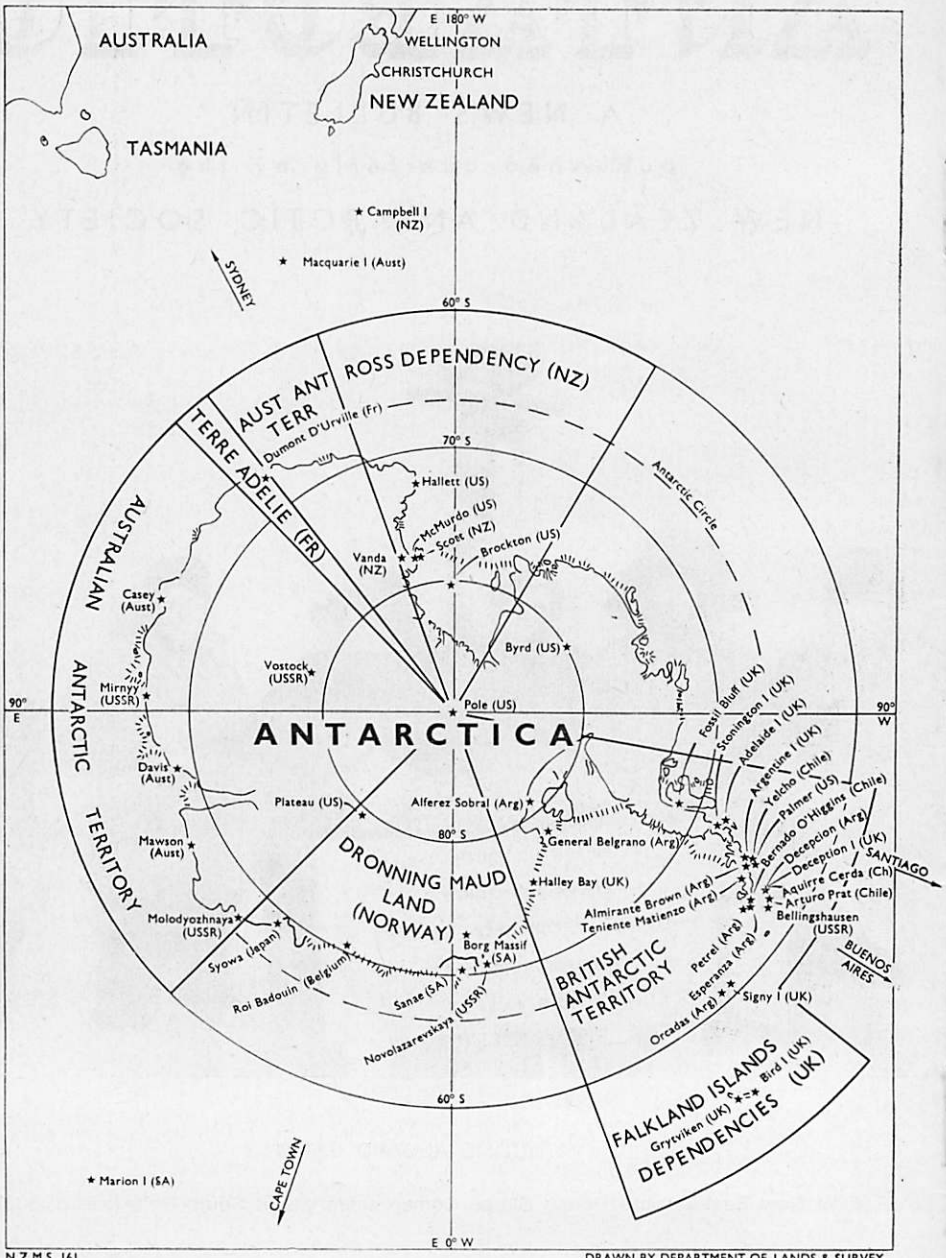

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"ANTARCTIC"

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CONTENTS

GREAT FOSSIL FIND

Though there is an uninformed (and more human) majority to whom the advent of women is the great news of the 1969-70 Antarctic season, to the connoisseurs (and that means you and me, of course) undoubtedly one of the great Antarctic events since the first decade of this century was the discovery, on December 4 1969, in the Queen Alexandra Range, of fossil remains of the reptile **LYSTROSAURUS.** It created an immediate ripple of interest in scientific circles which will travel far and wide for a long time. A National Science Foundation release tells the story and gives us the reasons for all the excitement.

McMURDO STATION, ANTARCTICA —Discovery of a bed of fossil bones has been reported to the National Science Foundation in Washington, D.C. by a team of scientists in Antarctica.

Dr. Laurence M. Gould, internationally-known geologist and chief scientist of the 1928 Byrd Expedition, telephoned the following:

"On December 4 the Ohio State University Team working in the Queen Alexandra Range discovered part of a reptilean skull identified by Dr. Colbert as lystrosaurus. This is the key index fossil of lower Triassic in the major southern land masses and establishes beyond further question the former existence of the great southern continent of Gondwanaland."

Geologists Dr. G. Murray and Gould happened to visit the site shortly after the discovery and they considered this latest find "not only the most important fossil ever found in Antarctica but one of the truly great fossil finds of all time."

The initial report from the group indicated that they have found fossil bones of several types of vertebrates, including amphibians and reptiles. All appear to be remnants of now-extinct creatures that lived during the Triassic period, more than 200 million years ago.

According to Dr. Colbert's book, "The Age of Reptiles," lystrosaurus "had a peculiarly shaped skull, with the nostrils high on the skull, between the elevated eyes. This almost surely indicates aquatic habits." Fossil remains of these 2 to 4 foot long reptiles have been found in Asia and South Africa.

Comparison of these fossil remains with those found in other parts of the world will provide further evidence about theories that Antarctica was once joined to other continents.

"This promises to be a most significant finding," said Dr. William D. McElroy, Director of the National Science Foundation, in commenting on the discovery. "It shows once again the importance of good science everywhere in the world. Work such as this contributes greatly to our better understanding of the earth that we inhabit."

Among the fossils discovered were bones of an extinct reptile, the thecodont. Thecodonts were ancestors of the dinosaurs, and fossil remains have been found in North America and Europe. The only evolutionary descendants of these creatures livineg on earth today are crocodiles and alligators and, through a more complex evolution, birds.

Another fossil remnant found by the Antarctic team was of an extinct amphibian called labryinthodont. The only previous find of fossil vertebrate remains in Antarctica was of a labryinthodont jaw bone, a discovery made two years ago.*

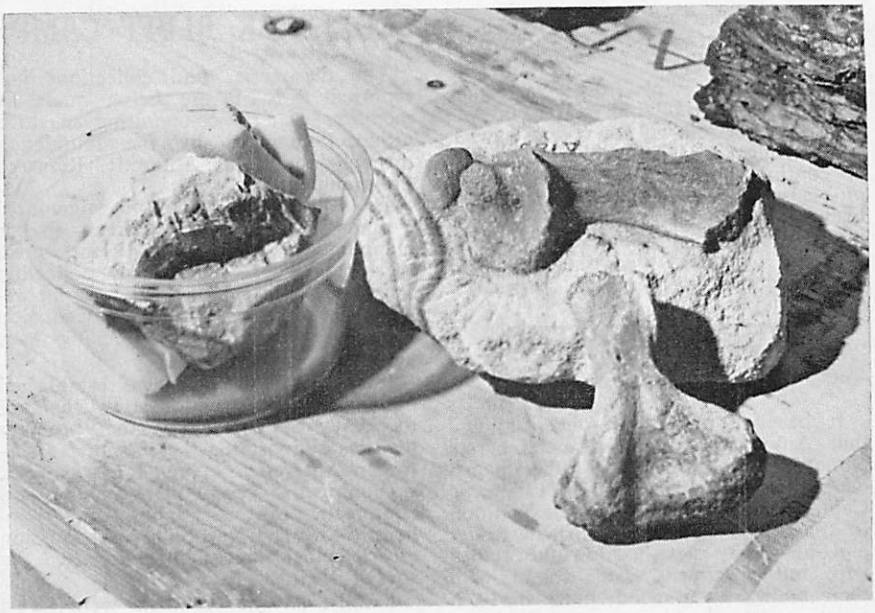
ACCOUNT OF WORK

The following is the text of the report sent by the scientists in Antarctica to the National Science Foundation :

"On November 23, 1969, the first day of work in the field, Dr. David H. Elliot of the Institute of Polar Studies and Department of Geology, Ohio State University, discovered fossil bones in a sandstone bed at Coalsack Bluff, Central Transantarctic Mountains, about 400 miles from the South Pole."

"Since the initial discovery by Dr. Elliot, the exposure has been systematically explored by a group of vertebrate

* See New Zealander Peter Barrett's article in "Antarctic," June 1968, describing his party's discovery of the labryinthodont bone.



The jawbone of a LYSTROSAURUS (in plastic cup on left), discovered in Antarctica on December 4, 1969.

palaeontologists, including Dr. Edwin H. Colbert of the American Museum of Natural History, New York, and the Museum of Northern Arizona, Flagstaff, Arizona;; James Jensen of Brigham Young University, Provo, Utah; William J. Breed of the Museum of Northern Arizona; and Jon S. Powell of the University of Arizona, Tucson."

"As a result of this work, now in the initial stages of an intensive collecting programme, various types of vertebrate fossils have been discovered. Included among them are the fossil bones of labryinthodont amphibians; and various reptiles, among which the remains of thecodonts, characteristic of the Triassic period of earth history, would seem to be present."

"The current geological investigations in the Central Transantarctic Mountains by the Institute of Polar Studies and vertebrate palaentologists are an outgrowth of continuing geological study by the Institute of Polar Studies and, in particular, of the discovery by Dr. Peter J. Barrett in December 1967 of the first fossil bone of a land-living vertebrate in the Transantarctic Mountains, which was subsequently identified by Dr. Colbert as a labryinthodont amphibian."

"This discovery is of great significance to students of earth history. During recent years the so-called theory of continental drift has received increasingly favourable attention from geologists and other students of the history of the earth. This theory, developed in detail more than 50 years ago, supposes that the present continents are remnants of a once supercontinent, perhaps two such continents, that fragmented, the separate pieces then slowly drifting across the face of the globe to their present positions. If this theory

is valid, Antarctica was once part of a great southern land mass known as Gondwanaland."

"The presence of fresh water amphibians and land-living reptiles in Antartica, some 200 million years ago, is very strong evidence of the probability of continental drift, because these amphibians and reptiles, closely related to back-boned animals of the same age on other continents, could not have migrated between continental areas across oceanic barriers."

OTHER ANTARCTIC FOSSILS

It has for many years been known that Antarctica once had a temperate climate. Fossil ferns and other plants were found as early as 1911, during Captain Robert Falcon Scott's expedition to the South Pole. The British leader and his party perished on the return trip, but specimens were found with their bodies by a search party in 1912. Scott's party had discovered beds of coal, containing fossil leaves, in the mountain wall bordering the Beardmore Glacier not far from the site of the present scientific camp at Coalsack Bluff.

Coalsack Bluff, named by the 1961-62 New Zealand Geological and Survey Antarctic Expedition, takes its name from the coal seams in the bluff.

The labyrinthodont fossil discovery two years ago lay in an ancient sediment-filled stream bed, among plant fossils. It was also in the general area of the Beardmore Glacier, about 325 miles from the South Pole and within 100 miles of the newly reported find. Until its discovery, there had been no evidence of the existence of a vertebrate animal that lived on land or in fresh water and was common both to Antarctica and to other continents.

Last year, insect fossils were discovered for the first time in Antarctica. This find was made at the Carapace Nunatak, about 100 miles from McMurdo Station and roughly 300 miles from the site of the current palaeontology work. Extinct dragonflies were found that appear to have been similar to the insect fossils contained in the florissant beds near Colorado Springs, Colorado.

COALSACK BLUFF CAMP

The discoveries and collections just reported to NSF are being made by members of two co-operating scientific groups supported by the foundation through the U.S. Antarctic Research Programme.

Dr. Elliot is principal investigator of a nine-man geological field party that is mapping the geology of the area, measuring rock strata, and collecting rock and fossil samples for later laboratory analysis. Dr. Colbert is leading a four-man scientific team seeking land vertebrate fossils.

Coalsack Bluff camp was established by a Navy construction crew, part of the Navy Support Force that provides logistics support for the scientific activities in Antarctica. Navy C-130 aircraft, ski-equipped, flew in supplies and equipment during the month of November, following a reconnaissance mission during which the scientists selected the site of their camp.

Finally, all the scientists were flown to the camp on November 22, and they began their field investigations the next day. It was then that the first fossil discoveries were made.

The Coalsack Bluff camp consists of Jamesway huts, which have prefabricated wooden floors and frames covered with insulated canvas. From the base camp, the scientists shuttle to field work areas by Navy turbine helicopters.

The camp is in a mountainous, heavily glaciated area about midway between McMurdo Station and the South Pole, in the area of the Queen Alexandra Range. The scientists plan to work in various areas within about 100 miles of the Coalsack Bluff camp.

Following the initial discovery on November 23, word was quickly spread to other interested scientists in Antartica. On November 26 a group of senior scientists visited the site. They included Dr. Laurence Gould, professor of geology at the University of Arizona, who was chief scientist of the 1928 Byrd Antarctic Expedition, and Dr. Grover Murray, President of Texas Tech, Lubbock, Texas, a member of the National Science Board. Drs. Gould and Murray were in Antarctica to observe and report on the operation of the United States Antarctic Research Programme, and to observe the Fortieth

Anniversary of the first flight over the South Pole by Richard E. Byrd in 1929.

They were accompanied on their flight by Dr. Alton Wade, professor of geology at Texas Tech, who has done research in Antarctica for many years, and Mr. Kendall Moulton, National Science Foundation representative at McMurdo Station.

AND WE SAY

Two things we must comment on here. With some pride we draw attention to the prominent part played by a New Zealander, Peter Barrett, in the sequence of discoveries of vertebrate fossils in Antarctica; further we note that the chairman of the Geology Department at Ohio State University is Colin Bull, who had his first Antarctic experience with New Zealand (Victoria University of Wellington) expeditions. The second comment we wish to make is to commend the support personnel of Task Force 43. Unfailingly, year after year, they support United States (and much New Zealand) research in Antarctica, subject to much carping complaint from the scientists. Though the present excitement is scientific, we hope that some of this excitement will rub off on to Task Force 43 personnel and make them feel that they have contributed to an unusually rewarding season in Antarctica.

40th ANNIVERSARY OF BYRD POLAR FLIGHT

The annual service at the Byrd Memorial, Wellington on November 30 1969 was more than ordinarily significant for two reasons. Firstly it celebrated the 40th anniversary of Byrd's flight over the South Pole (on Nov. 29 1929) and also the 10th anniversary of the signing of the Antarctic Treaty. Secondly, addressing an audience of 100 people at the gathering, which included the Mayor of Wellington (Sir Francis Kitts) and a Minister (the Postmaster-General, Mr. Scott), the American Embassy Public Relations Officer, Mr. John N. Hutchinson had some pertinent observations to make on the "cost-benefit analysis" of exploration which will interest all (and this means most) Antarcticists who have been asked the question: "Is it worth it, what good will it do" . . .

Antarctic explorers have changed man's concept of the earth. Apollo has changed man's concept of the moon. Both explorations had altered man's concept of mankind, Mr. Hutchinson said.

"We are placed by pioneers at points where we are confronted with the new secrets that accompany new knowledge. Discovery reveals to us new mysteries and man knows he must go on unveiling them.

"For every James Cook, Columbus or Richard Byrd, there are those who openly complain that the cost is too much and the expedition is pointless. There has been this sort of talk about the moon. Apollo has cost each man, woman and child in the United States $12 per year for the last 10 years.

"This figure is sometimes cited to suggest extravagance. But is it—when in the United States, as in New Zealand, per capita expenditure on alcoholic beverages is much more than that?"

ECONOMIES NOT USED FOR NOBLE PURPOSES

Mr. Hutchinson said that there was little evidence that nations which economised on one thing really devoted the savings to some noble purpose. It could not be demonstrated that a nation which decided to give up tobacco or horse racing or Apollo projects would then wisely use the funds to clear away slums or provide better medical care.

Byrd had the vision, the drive and the organising ability to be a successful Antarctic pioneer. It would have been inconceivable to him to abandon his polar explorations because there were other worthy but vaguely defined uses in his world for the funds he needed.

FRONTESPIECE—The women are, from left to right: Mrs. Pam Young of Christchurch, N.Z.; Mrs. Jean Pearson, a science writer for the Detroit News; Miss Terry Tickhill, Dr. Lois Jones, Mrs. Eileen McSaveney and Mrs. Kay Lindsay.

FATALITY MARS N.Z. ANTARCTIC SEASON

On 19th November 1969 a U.S. Navy Seahorse helicopter crashed near Mount McLennan, about 65 miles west of McMurdo Station and Scott Base, and to the north of Taylor Dry Valley. Two civilians, one an Englishman, Mr. Jeremy SYKES, living in Wellington, the other Dr. Thomas BERG of Edmonton, Canada were killed. Six other persons were injured including Mr. Samuel Grau of Wellington.

The L.H. 34 helicopter with three crew members and five civilians left Scott Base at about 8.0 a.m., piloted by Lt. Cdr. Brandon, to film in the Wright Valley, particularly the Labyrinth and petrified forest areas, about 80 miles from Scott Base. They were scheduled to have three hours on the ground and return to Scott Base by midday.

No great concern was felt at Scott Base when they had not returned at the stated time in view of the fact that they were having time on the ground. Early in the afternoon, the USARP representative, Mr. K. Moulton, telephoned to report that they were overdue and that an SAR helicopter was searching the operation area. Later, a full search with five helicopters and one fixed wing aircraft was initiated.

SEQUENCE OF EVENTS

During level flight at an altitude of 2,300 ft. the engine of the helicopter had failed and the pilot landed the aircraft by autorotation. The helicopter landed on a slope near Mt. McLennan, slid down the slope and caught fire.

The weather in the area was clear, visibility 15 miles with a temperature of + 20deg. F. The helocopter had not reached the intended operation area at the time of the crash, in which all survival equipment was destroyed.

The co-pilot, Lt. J. Mabry, walked 12 miles to Meserve Glacier hut and sent a Mayday message which brought in a rescue helicopter. The crash occurred about 9.45 a.m. but the report of finding the crashed helicopter did not come through until about 5.45 p.m.

EXPERIENCED FILM DIRECTOR

Mr. Sykes was in charge of a National Film Unit team of four men whose assignment was the production of a colour film showing the work of New Zealand scientists in Antarctica. The National Film Unit had produced a previous film (in 1963-64) entitled "140 Days Under The World" which had popular success and critical acclaim.

Mr. Sykes was born at Bexhill-on-Sea, England and was 34 years of age. He was educated at Culford Public School, Suffolk and was awarded a county scholarship.

At the Essex Institute of Agriculture he gained a certificate of Agriculture with additional sciences. He also held a diploma from the London School of Journalism and was a Fellow of the Royal Geographical Society.

He travelled extensively in Europe, U.S.A., Canada and Brazil, specialising in radio and film work. In 1962 he returned to England, joining the BBC film department handling material for current affairs, drama, light entertainment and documentaries. He earned a high reputation as a film editor and handled over 30 BBC documentaries in this capacity.

He left the BBC in 1968 to take up a film director's position with the National Film Unit in May of that year, coming to New Zealand on his own initiative.

Among other film productions for the unit, he scripted and directed a colour film on the dairy industry of New Zealand and the 40-minute colour film "Your Most Humble and Obedient Servant, James Cook."

NEW POLAR MEDALLISTS

New Zealand Expedition Members honoured by Queen

In November, the Governor-General announced that the Queen had approved the award of the Polar Medal to the following 29 members of New Zealand Antarctic Expeditions.

A. L. (Buzz) BURROWS. Wintered-over Scott Base 1958, 1965. Member of U.S. Party which located latest position of South Magnetic Pole, 1962.

Colin M. CLARK. Leader, Scott Base, 1967.

Malcolm R. J. FORD. Wintered-over Scott Base 1965. Member Southern Field Party 1962-3. Deputy Leader and surveyor Oates Land Party 1963-4. Northern Field Party 1964-5. Member Balleny Islands Expedition 1965.

J. F. (Frank) GRAVESON. Driller with 1962-3 summer party. Wintered-over Scott Base 1963-4. Member Northern Dog Sledge Expedition, Northern Victoria Land, 1963-4, one of the longest dog-sledge journeys ever made.

H. J. (Larry) HARRINGTON. Leader 8-man Geological Survey Expedition Hallett area, 1957-8. Leader 12-man Geological Survey and mapping team Northern Victoria Land 1958-9. Scientific Leader Hallett Expedition 1967-8.

Adrian G. HAYTER. Leader, Scott Base 1965.

Arnold J. HEINE. Member, Geological Survey expeditions 1957-8, 1958-9. Wintered-over Scott Base 1959. N.Z. Member USARP North Victoria Land Traverse Party 1959-60. Leader of group working on McMurdo Ice Shelf Project since 1960.

W. W. (Wally) HERBERT. Member Southern Field Party 1960-1. Wintered-over Scott Base 1961. Leader Southern Field Party 1961-2, which retraced part of Amundsen's polar trail.

R. W. (Ron) HEWSON. Member Field Party 1961-2. Wintered-over, Scott Base 1962. Leader, Southern Field Party Victoria Land Coast, November 1962.

Peter J. HUNT. Member, Southern Dog Team Party, 1959-60. Wintered-over Scott Base 1960. Leader, Southern Party surveying coastal area of Barne and Shackleton Inlets, 1960-1.

Brian M. JUDD. Base Engineer, Scott Base. Wintered-over 1964, 1965.

G. A. M. (Geoff) KING. Wintered-over, Hallett Station 1958. Member search party after Globemaster crash October 1958.

A. George LEWIS. Senior Technical Officer. Wintered-over Scott Base, 1963, 1964.

W. R. (Ray) LOGIE. Maintenance Electrical Officer. Wintered-over Scott Base 1961. N.Z. Member of USARP party, Roosevelt Island 1962. Deputy Leader, Scott Base summer 1962-3. Leader, Toboggan Support Party, Victoria Land Coast 1962-3.

W. R. (Bill) LUCY. Surveyor, McMurdo Ice Shelf Party 1963-4. Wintered-over Scott Base 1964. Surveyor, Geologists Range Expedition 1964, Surveyor, McMurdo Ice Shelf Projects, summers 1965-1966-1967. Leader Vanda Station 1969.

D. R. C. (Dave) LOWE. Field assistant McMurdo Ice Shelf Project 1964-5. Wintered-over, Scott Base, 1965. Leader, Northern Field Paryt to Campbell Glacier region 1965-6. Deputy Leader, Scott Base, 1966-7.

D. G. (Dave) MASSAM. Member, Ice Shelf Project, 1963-4. Wintered-over Scott Base 1964. Member, Southern Field Party, 1964-5. Leader, Southern Field Party, 1967-8.

Garth J. MATTERSON. Member, Southern Dog Team Party, Victoria Land Coast 1959-60. Assisted in rescue of survivors of Sno-Cat disaster, November 1969. Wintered-over Scott Base 1960. Leader, Northern Field Party, 1960-1.

Dr. Berg, who was a geologist, had worked with University of Wisconsin teams in Antarctica since 1960. His research included a study of the patterned ground on Ross Island and the dry valleys. The 1969-70 season was to have been the final year of about ten years of periodic data recording in the field.

Peter M. OTWAY. Member, Northern Survey Party, 1960-1. Wintered-over Scott Base 1961. Member, Southern Sledging Party in Terra Nova-Wood Bay region 1962.

M. M. (Mike) PREBBLE. Member Historic Huts Restoration Party 1960-61. Dog handler summer party 1961-62. Deputy Leader, Scott Base 1964-5. Leader, Scott Base 1966.

Kevin P. PAIN. Field Assistant, Southern Dog Sledge Party, Beardmore Glacier 1961-2. Wintered-over, Scott Base 1962. Member, Northern Survey Party, Victoria Land 1962.

R. Murray ROBB. Maintenance Officer, wintered-over Scott Base 1958. Leader, Sno-Cat team, Victoria Land Coast 1959.

Athol R. ROBERTS. Leader Scott Base 1961.

K. J. (Ken) SALMON. Scientific Leader, Hallett Station 1958. Leader, search and rescue party to Globemaster crash, October 1958.

Brian P. SANDFORD. Senior Scientist, Scott Base 1959.

Maurice J. SHEEHAN. Member, Northern Field Party to Terra Nova Bay, 1962-3. Wintered-over at Scott Base 1963. Field Assistant with Northern Field Party 1963-4.

R. B. (Bob) THOMSON. Scientific Leader, Hallett Station 1960. Officer-in-charge, Wilkes Station 1962. Leader Wilkes-Vostok traverse 1962-3. Deputy Leader, Scott Base 1963-4.

Keith C. WISE. Wintered-over Scott Base, 1959. Member, Southern Field Party 1959-60. Assisted in rescue of survivors, Sno-Cat disaster November, 1959.

Peter A. YATES. Radio Officer. Wintered-over Scott Base 1958, 1960.

These awards are the first to be made since 1958 when wintering-over members of the first expeditions at Scott Base and Hallett Station in 1957 were so honoured. The new awards "for distinguished services in scientific research and exploration" cover a wide spectrum of services to New Zealand's Antarctic work. Among the recipients are leaders, those who have wintered-over twice, engineers, surveyors, a radio officer and field assistants with professional scientists being few and far between. One of the awards, that to Murray Robb, is posthumous. Murray was killed in a car accident in March 1961. The New Zealand Antarctic Society offers its congratulations to all the above, members of the Society almost to a man, on a well deserved recognition of their services to New Zealand's Antarctic endeavours.

CHRISTMAS WITH NEW ZEALAND EXPEDITION

Twenty-seven New Zealand personnel spent their Christmas away from Scott Base, at Vanda Station or in tent encampments in the field.

Christmas mail and fare were dropped successfully to a four-man party at Terra Nova Bay on the Saturday before Christmas, but supplies dropped to a six-man party on the Robert Scott Glacier the same day were a total loss when the parachute failed to open.

Women Celebrate at Vanda

As well as the four-man station staff, four men from a party on the Asgard Range, two from a Victoria University of Wellington expedition and four American women scientists gathered at Vanda Station for some Christmas cheer. Six men from Waikato and Victoria University parties were in the Taylor Valley.

The first New Zealand woman to work in Antarctica, Mrs. Pam Young, spent Christmas at Cape Bird with her husband Dr. E. C. Young and three other members of a zoology team from the University of Canterbury.

White Christmas at Scott Base

At Scott Base, the staff of 17 men, together with two visiting technicians and an American who was in his fourth year in Antarctica but who had never previously visited Scott Base, enjoyed a traditional dinner of roast turkey *and* Christmas pudding.

Christmas decorations and a tree brought to Antarctica from Christchurch created a festive spirit in the base, while falling snow provided for many at the base their first experience of a "White Christmas."

NEWS FROM CAMPBELL ISLAND

Peter Julius reports:—

October 16th 1969 saw M.V. Holmdale drop her hook in Perseverance Harbour after a rough and hectic nine-day marathon from Wellington via the Chatham Islands.

Under the care of Brian Smith, outgoing OIC, the servicing ran smoothly despite the extremes of typical Campbell weather which ranged from snow and sleet to heavy rain, strong wind and then bright sunshine, all within two hours.

From the minute that Holmdale departed amid the blaring of sirens, much waving and dipping of ensigns, not to mention a down-harbour escort by the pride of the Campbell Fleet H.M.C.I.M. Aurora, everybody settled into his job with a will. Already much has been achieved and a grand team is being welded together.

First social event of the year celebrated Mark (Longfellow) Crampton's 21st, along with the 30th birthday of our famed mechanic, amidst much hilarity and good spirits.

The works programme is well under way. New culverts have been laid with concrete pipes, and the foundation for our luxury type chook pen prepared and concrete poured. There is, however, absolutely no truth in the rumour that we intend to shift in on completion and let the fowls have the hostel.

Much island exploration has taken place and Dave Paull, our third-time Campbellite, is already well established with his bird-banding programme. Could this be in retaliation for those many Southland birds who have tried to band him?

Finally, with regard to the plotted position of our Shangri-La (see Page 49, March, 1968 issue of "'Antarctic") I am assured by the technical experts that the anticipated collision between Campbell Island and Guatemala can be averted by towing a sea-anchor of 12,347 empty beer cans. Two volunteers have already come forward in a spirit of self-sacrifice to help empty the cans. No doubt the authorities will provide the necessary supplies to help prevent the predicted calamity occurring.

Campbell Party

In the Campbell Island team for the 1970 year with Peter Julius (leader) are: David Paull (senior meteorological observer), Mark Crompton, Mike O'Donahue, Jim Carr (all met. observers), Phil Owens (ionosphere observer), Harlan Dazeley (mechanic), Bryan George (cook) and Clive Brunton (telecommunications technician) will join the team as the electronics man, in January.

Big Sheep Shoot

In January also will start an ambitious project to shoot more than 1000 sheep as part of a study of the effect of introduced animals on the plant and birdlife of Campbell Island. Twelve men from the Departments of Lands and Survey, Internal Affairs and Scientific and Industrial Research will spend a month on the island.

Since 1954 most of the 28,000 acre island has been a reserve for the preservation of flora and fauna, with entry by permit only. The island is the main nesting ground of the magnificent southern royal albatross. The only human inhabitants are the members of the Campbell Island meteorological and scientific station.

Are Sheep Threatening Island Flora and Fauna?

From 3000 to 4000 sheep were abandoned by Crown leaseholders in 1931 after nearly 40 years of struggling to graze the tussock grassland in the cold climate (average sunshine hours are only 710 per year, only half that of Scott Base). Sheep numbers declined for about 30 years but, since 1961 the population has risen from 900 to about 3000.

Now, on the recommendation of an inter-departmental committee set up to advise the Minister of Lands on the administration and protection of the various sub-Antarctic island reserves, members of the expedition are to reduce the sheep population and to assess claims that the animals are threatening the natural vegetation and bird habitats.

Island Divided by Fence

A fence will be put across the middle of the island and all sheep destroyed on the northern half, so that the sheep free and sheep infested areas can be compared. Expedition members will also begin research on the remaining sheep which are themselves scientifically interesting because of their long inbreeding.

The combined research programmes are expected to take some years, at the end of which the remaining sheep will probably be destroyed to leave the island as much in the natural state as possible.

BRITISH ANTARCTIC SURVEY NEWS

NEW BRITISH BASE OPENED

R.R.S. "John Biscoe" sailed from Southampton at the beginning of October and arrived at South Georgia on November 11. Shackleton House at King Edward Point was taken over from the existing Falkland Islands Dependencies administration and occupied as a B.A.S. station. Eleven men will winter there in 1970. During the summer botanists will continue work on the island as part of the Bipolar Project, sponsored by the International Biological Programme. Corresponding field work was carried out in West Greenland in 1967 and on South Georgia in 1967-68.

B.A.S. AIR PARTY

The two B.A.S. aircraft, a twin-Otter and a turbo-Beaver, left Toronto for the Antarctic at the end of November. They will fly to Anvers Island direct from Punta Arenas, and refuel before flying on to Adelaide Island where they will be based during the summer. In addition to supply work, they will be used in the resumption of the programme of ice depth measurements by radio echo sounding.

FIELD WORK

Spring field journeys commenced in early September when fifteen men with six dog sledges left Stonington Island and travelled southwards to George VI Sound. By early October survey, geological and geophysical work was in progress in several areas. Two glaciologists later travelled about 75 miles south of Fossil Bluff in a Foxtrac motor toboggan and carried out observations at the south-eastern corner of the Sound.

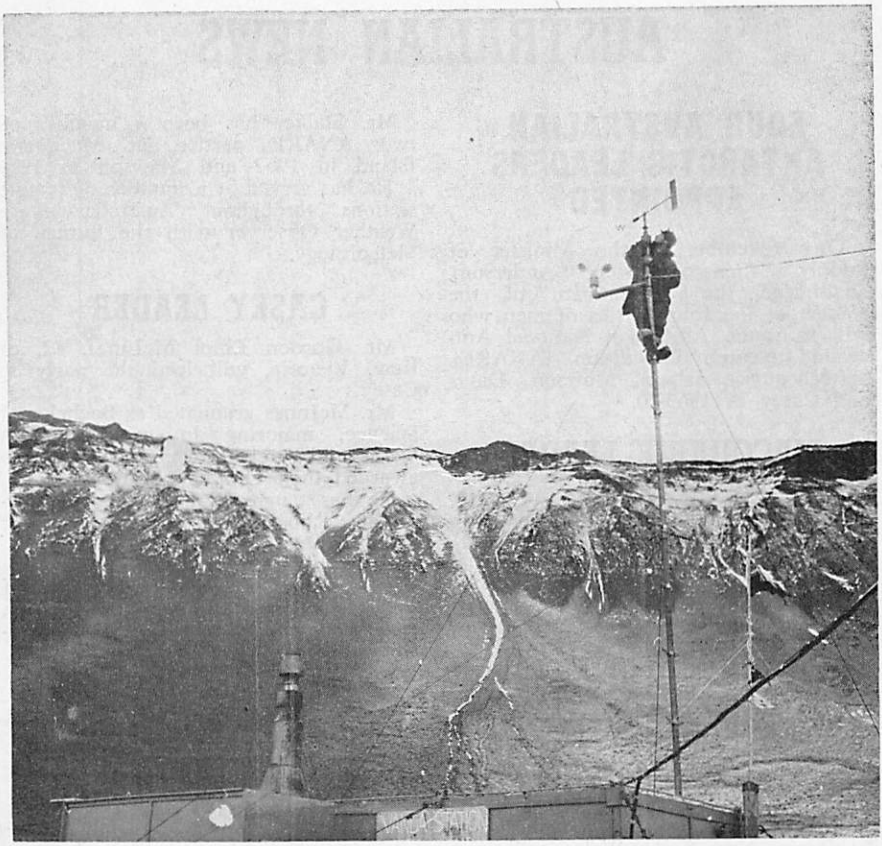
The main spring field party from Halley Bay set out on November 3 with two Muskegs, two International tractors and ten sledges. They crossed the ice shelf safely, but one of the Internationals broke through a snow ridge in the hinge zone and fell some 10 ft. down a crevasse. Fortunately, no one was hurt but it was not possible to recover the vehicle and the party returned to base to re-plan the journey.

JOINT BRITISH-AMERICAN PROJECT

A U.S. Navy C130 aircraft landed at Halley Bay on November 19 to embark six men and three dog teams for the Shackleton Range. This project, which was started last summer, should be completed this season and will provide ground control for existing American air photography. The party comprising two surveyors, a geologist and three field assistants will spend approximately two months in the mountains before being returned to base by another C130.

NEW HUSKIES

Six huskies, purchased in Greenland by the Surveyor's veterinary officer, will be taken south in M.V. "Perla Dan" which is due to sail from Southampton on December 5. It is hoped that the introduction of this new stock will eradicate signs of inbreeding which have begun to appear. Osteoarthritis which has developed in some B.A.S. dogs is now known to be work-induced and not hereditary.



Tony Bromley erecting the meteorological mast at Vanda Station. Low average wind speeds were an unexpected feature of the first winter's occupation.

ICE RESERVOIR AT VANDA

A recent innovation at Vanda Station is a piped water supply from the mented lake to the station buildings. A small pump is delivering four gallons a minute through the 200 yard pipeline.

A reservoir has been built adjacent to the mess building for water storage to overcome having to bring ice up from the lake during the winter. Comprising 44 gallon drums filled with water and placed in a rectangle about 25 ft. by 12 ft. and with bottom and sides of polythene, the reservoir contains about 1700 gallons of water. This is expected to be sufficient to last the winter.

"All we'll have to do is remove a couple of drums from one end when the water freezes and chip off blocks of ice as we need it," said a member of the station personnel, Mr. G. H. Lewis.

AUSTRALIAN NEWS

FOUR AUSTRALIAN ANTARCTIC LEADERS APPOINTED

On November 7 the Minister of Supply (Senator Ken Anderson) announced the appointment of the leaders of the four parties of men who will form the Australian National Antarctic Research Expedition (ANARE) at Macquarie Island, Mawson, Davis and Casey in 1969-70.

MACQUARIE LEADER

The Officer-in-Charge at Macquarie Island Station will be Mr. John Bennett, 30, of Cottesloe, Western Australia.

Mr. Bennett, formerly of the Education Department of Western Australia, graduated as a Bachelor of Arts, majoring in economics, at the University of Western Australia.

In addition to holding a private pilot's licence, he has many general outdoor interests and has fostered a wide range of youth activities.

MAWSON LEADER

Mr. William Bruce Roy Smith, of Artarmon, New South Wales, will lead the party at Mawson.

Born in Artarmon in 1922, Mr. Smith served with the RAAF as a navigator with Bomber Command in Britain. His aircraft was shot down and he became a prisoner of war in Germany in November, 1944.

After his discharge he graduated as Bachelor of Civil Engineering from the Sydney University and qualified as a surveyor.

He has worked with the Public Works Department in Konedobu, Papua, and is currently a Supervising Engineer with the New South Wales Department of Main Roads.

DAVIS LEADER

Mr. John Francis Stalker, 36, of Woomera, South Australia, will lead the party to Davis.

Mr. Stalker has been a member of two ANARE parties, at Macquarie Island in 1962 and Mawson in 1964

He has served at a number of remote stations throughout Australia as a Weather Observer with the Bureau of Meteorology.

CASEY LEADER

Mr. Gordon Elliot McInnes, 42, of Kew, Victoria, will lead the party to Casey.

Mr. McInnes graduated as Bachelor of Science, majoring in geology, from Sydney University, and was also awarded their Diploma of Education.

He has taught in a number of Australian schools, at Trinity Grammar (Melbourne) for the past 10 years.

His outdoor interests have taken him walking and skiing over many of Australia's mountains, and he was a crew member in the 1958 Sydney-Hobart yacht race.

CALENDAR FOR 1969-70 AUSTRALIAN ANTARCTIC EXPEDITIONS

Details of sailing dates for the 1969-70 Australian National Antarctic Research Expeditions (ANARE) were announced by the Minister for Supply, Senator Ken Anderson, in Sydney in November.

The polar ship Nella Dan was scheduled to sail from Melbourne on November 28th for Maquarie Island with a party to relieve the team of 19 men who have wintered at this southerly island outpost 800 miles from Australia. The station at Maquarie Island was established in March 1948 and for over 21 years has been continuously manned by ANARE. Scientific work at the station includes meteorology, geomagnetic and seismic measurements, various observations in connection with upper-atmosphere physics, measurement of the ozone content of the atmosphere, biological studies of wild life and physiology.

The only Tasmanian in the Macquarie Island party is Mr. Leslie Gould, a technical assistant (biology) with the Tasmanian Department of Agriculture. He will, with Mr. Keith Adams, a CSIRO virologist, continue the investigation into the control of rabbits on the island. The study was started by the Department of Agriculture in 1965. The vessel was due to reach Melbourne with the returning 1969 party on December 14th.

It was immediately to begin loading cargo for Mawson and equipment for the geological, mapping and glaciological survey party which will operate from an inland base near Moore Pyramid, a rocky outcrop 190 miles south of Mawson. Teams will radiate to selected spots in the Prince Charles Mountains by helicopters and fixed-wing aircraft to continue the detailed survey of the area which began last summer. This summer party will be led by Dr. Des. Lugg, Senior Medical Officer of the Antarctic Division, Department of Supply.

AMERY ICE SHELF BASE RE-OCCUPIED

The ship will also take a party of four men, with Mr. Max Corry of Melbourne as leader, to re-occupy the base on the Amery Ice Shelf where Mr. Corry and three men wintered in 1968. During the time they spend on the ice shelf they will use motor toboggans to visit selected areas to measure the ice accumulation and movement which have occurred since the base was evacuated early in 1969.

After the relief of the Mawson station, the Nella Dan will sail to Fremantle late in January to collect 11 men who will replace the party which has been at Davis for the past year. Davis was reopened last February after having been closed for four years. After unloading at Davis the ship will again visit Mawson to pick up the survey team and aircraft for return to Melbourne on March 19th.

Meanwhile the Thala Dan will leave Melbourne about January 14th to relieve Casey station. The ship should reach the station about January 26th. After unloading has been completed and the parties have been changed over, it will sail for Melbourne which should be reached on February 17th.

From Melbourne the Thala Dan will sail for Dumont D'Urville, the French Antarctic base on the Adelie Land coast, to pick up members of the French party. On its return voyage it will call at Macquarie Island to collect the scientists who have worked there through the summer. These will return to Hobart about March 12th.

NEW AIRCRAFT FOR ANARE

From Bob Dalton, via "Aurora," the official journal of the ANARE club comes news of the new (and old) planes of the Australian expeditions.

In 1970 two new types of aircraft enter the ANARE ranks. These are:

Pilatus Turbo-Porter—A single engined high-wing aircraft with outstanding short take-off and landing characteristics. Span 49 ft. 10½ ins., length 36 ft.; gross weight 4850 lbs.; cruise speed, 136 knots.

Hughes 500—An all metal, compact, single-engined helicopter powered by a gas turbine driving a four-bladed main rotor. Length 30 ft. 3¾ ins.; rotor diameter 36 ft. 4 ins.; passengers 4, gross weight 2500 lbs.

The Porter has an extensive background of type flying in the Swiss Alps and the Hughes helicopter has military experience in Vietnam.

Bob considers that these aircraft and their crews have a formidable task ahead of them to match or surpass the great record of achievements set by aircraft and crews before them. The Austers, Beavers, Bells and Hillers and a short-lived DAK provided over five and a-half thousand hours of accident-free flying for ANARE expeditioners over the past 12 years.

The all gas turbine fleet for 1970 is not entirely a "first" as last year's aircraft—a Turbo Beaver and three "Hiller 1100" helicopters—were all gas turbine powered and provided over 500 flying hours during the short 45 day summer operational period.

MEDALS FOR AUSSIES TOO

In the promulgation of the Polar Medal (see New Zealand item above) are awards to 58 Australians for service in the Antarctic between 1959 and 1967.

The 58 men include scientists, technicians, doctors and teachers and came from all parts of Australia. Many of them served in two or more expeditions.

DIRECTOR HONOURED

Among the men is Dr. Phillip Law of Melbourne, Director of the Antarctic Division of the Department of External Affairs from 1952 to 1966. His citation says that from 1948 to 1965 he spent 915 days in 14 voyages to Antarctica. He led the expeditions on the ships in 13 of these voyages and made many first landings along the Antarctic coast, set up bases at Mawson and Davis and installed automatic weather stations at Lewis and Chick Islands. He made many flights along the coast and up to 100 miles inland in light, single-engined aircraft.

As in the case of New Zealand one award was made posthumously, to Dr. Soucek, of Victoria, who as a medical officer in 1960-62 completed valuable studies in physiology and biology.

In 1962, as second-in-charge of Wilkes Base, he was in charge for five months in the absence of the leader on field duties.

His citation says his remarkable vigor and enthusiasm were a constant inspiration to others.

Dr. Soucek had previously served with distinction as medical officer at Macquarie Island in 1952 and in 1967 he again visited the island as second-in-charge of the annual relief operations.

It was on this voyage, and while at the station, that he died, of natural causes, on Christmas Eve, 1967.

CASEY BAPTISED

To mark the beginning of October, mother nature decided to test Casey, the new Australian base. Winds up to 150 knots were estimated, causing collapse of several radio masts and some damage to the streamlined passageway. The station as a whole came out unscathed except for some individual corrugated sheets which were ripped off due to the failure of the fastenings.

Credit must go to those who designed and constructed the station so faithfully.

SURVIVAL IN ANTARCTICA

In a full page interview with Dr. Phillip Law, Tom Prior has drawn out from Dr. Law the problems of survival in the Antarctic and the mental attitudes necessary for successful exploration (see Brisbane "Telegraph," Nov. 1, 1969). In recounting his association with Australian expeditions over 20 years, Dr. Law, formerly Director of the Antarctic Division of the Australian Department of External Affairs, said eight men died on Australian Antarctic expeditions between 1947 and 1966, four from natural couses (two from appendicitis, two from haemorrhages).

"One of the others was killed when he walked in front of his own snow-tractor," Dr. Law said. "That's the sort of accident which could happen anywhere.

"One man died when he was skiing across a frozen lake at Macquarie Island and the ice broke.

"A two-man team died, one by drowning and the other by freezing, after an accident at Heard Island.

"Your chances are good if you are careful.

"The closest I came to getting killed was pure foolishness. It was my own damn fault and I'd never have forgiven myself!"

HARRY AYRES SAVES LIVES

"Three of us, Harry Ayres, a famous New Zealand mountaineer, Bill Bewsher, a Victorian climber, and myself decided to climb an ice-face for practice.

"Bill was all right on rocks but not on ice and wanted to learn all he could from Harry.

"I didn't even have an ice axe and should have ruled myself out of the jaunt immediately. Instead I put myself in the middle of the rope.

"The motor boat that took us to the ice-face left, another bad thing.

"Anyway, we were about 50 ft. up the face, about 70 ft. above some nice clear, three or four-degree water, when Bill lost his footing and fell.

"I heard him go but, not having an ice-axe, couldn't do very much about it. I didn't even shout.

"I wasn't frightened. I was just so flaming annoyed.

"Bill's weight on the rope whipped me loose and all I could think was 'What a damn silly way to go . . .'

"But, fortunately for us all, Harry Ayres, the New Zealander, was the complete old pro.

"The second he heard the slither of the rope, he whacked his axe deep into the ice and hitched the rope around it.

"There was a nerve-racking 'whump' and a doubtful second or two, but the axe held and we were able to get our footing again.

"But for Harry Ayres there would have been three men dead through criminal carelessness . . . ."

Dr. Law, born in Tallangatta, a M.Sc. Honours from Melbourne University, is now the vice-president of the Victoria Institute of Colleges (a position with the combined technical colleges approximating that of a university vice-chancellor).

AUSTRALIAN SCIENTIST TO JOIN JAPANESE ANTARCTIC EXPEDITION

An Australian scientist will accompany a Japanese expedition to the Antarctic at the invitation of the Japanese Government.

Dr. Garth Morgan, 28, a Research Scientist with the Department of Supply's Weapons Research Establishment, left Fremantle on December 16 aboard the Japanese icebreaker Fuji for a three-month summer expedition to the Japanese Antarctic base at Syowa.

Syowa, on Lutzow-Holm Bay, is at longitude 39deg. 35'E and latitude 60deg. 0'S, about 600 miles west of Australia's base at Mawson.

At Syowa Dr. Morgan plans to make oceanographic measurements by placing an instrument capsule on the floor of the bay.

The equipment will be provided by the Horace Lamb Centre of Oceanography of Flinders University, and they will participate in the interpreation of the results.

The capsule will continuously record tidal variations in February and this information will later be analysed by computer to provide a more detailed knowledge of circulation currents in the Southern Ocean.

As well as performing oceanographic measurements between Australia and Antarctica, the Japanese expedition will replenish Syowa Base with a new wintering party of 30 men.

Their scientific programme will embrace many fields in which the Australian Department of Supply is interested, including the planned launching of two rockets to obtain measurements of solar radiation and auroral phenomena.

ALL WHITES IN ACTION

SOUTH WIN ANNUAL RUGBY MATCH AT SCOTT BASE

The South Island won the annual inter-island Rugby match on New Year's Day, 1970, by six points to nil. The points resulted from two tries. They were scored by two Rangiora men. Peter Hide, a senior Rugby player, scored between the posts in the first half, and Peter Oliver, who normally plays hockey, scrambled over the line to score in the second half.

Although at a substantial weight disadvantage, the South team had territorial superiority, although lightly falling snow and soft going added to white-out conditions and unpredictable hummocks led to erratic play.

North's disappointing display is attributed to the predominance of either Englishmen and/or soccer players in that team. Perhaps Rugby and soccer should be played alternately in these tournaments.

The small crowd of New Zealanders and amazed Americans who came to see the most southern Rugby match in the world had to wait until the field was marked out with a bright yellow dye from a fire extinguisher before being able to witness the spectacle.

Teams

South: Harold Lowe (Gore), Bob McKerrow (Dunedin), Peter Hide (Rangiora), Ron Garrick (Gore), Brian Dunn (Dunedin), Russell Powick (Westport), Roger Lusby (Roxburgh) and Peter Oliver (Rangiora).

North: Ian Walton (Feilding), Bob Hancock (Wellington), Peter Wigg (Auckland), Derek Nutt (Wellington), Chris Knott (Stratford), Eddie Deason (Wellington), Michael Ellis (New Plymouth) and Lindsay Burton (Hamilton).

MAWSON INSTITUTE FOR ANTARCTIC RESEARCH

In 1959, the University of Adelaide set up the Mawson Institute for Antarctic research as a memorial to Antarctic explorer and scientist, Sir Douglas Mawson. The aim of the Institute is to carry out research in fields related to Antarctica including work in the Antarctic when possible. Also the Institute is responsible for publishing and distributing the BANZARE Reports resulting from the expeditions of Sir Douglas. Even though these expeditions finished in 1931 work still continues on the enormous collection of marine speciments obtained.

In 1965 Dr. Fred Jacka resigned from his position of Assistant Director (Scientific) at ANARE to take up the position of Director of the Mawson Institute. Since then, numbers have increased to the present figure of twenty staff and post-graduate students. These make up two groups, the Physics group led by Dr. Jacka and the Biology group led by Dr. Robert Carrick.

PHYSICS GROUP

The Physics group is currently investigating upper atmosphere phenomena including airglow and the rare "stable auroral red areas", and fluctuations in auroral intensity and its relation to radio effects and changes in the earth's magnetic field. Most of the observation work is carried out from the field station at Mt. Torrens, 30 miles from Adelaide. During the summer 1967-68 two post-graduate students, Bob Schaeffer and Fred Yuan carried out observations on Macquarie Island. Most of the work at Mt. Torrens has been with scanning photometers operated by Bob Schaeffer who must nearly have set a record for the number of photometer channels to be operated from one site (4 scanning and two fixed). Shortly, an interferometer and a cooled image intensifier system are to be installed at the field station. These instruments will permit determination of temperature and wind in the atmosphere up to about 200 miles.

A new man (Dr. Pat Seymour) has recently been added to the staff to work on theoretical problems of plasmas and charged particle motion in the upper atmosphere and magnetosphere.

BIOLOGY GROUP

Dr. Carrick's group is continuing its work on Macquarie Island as well as studies in South Australia. Currently a study on the Silver Gull is being carried out from Beachport. Recently, Dr. Ian Stirling, a Canadian from the New Zealand Antarctic Expeditions, joined the group to carry out work on the seals around the south coast under a Nuffield Foundation grant.

Some time in the future it is hoped to have an Antarctic museum within the Institute. Could Mawson's Antarctic hut from the central attraction of such a museum, asks Don Creighton, from whose article in "Aurora" these notes are taken.

CONCERN FOR MAWSON RELICS

Much of the material collected by Sir Douglas Mawson lies unsorted in a basement at Adelaide Museum and the University of Adelaide. This news has created concern in press and public circles in Adelaide. Sir Douglas was Professor of Geology at the University from 1921 to 1952 and ten years ago the Mawson Institute was formally established by the University Council, in honour of Sir Douglas, for post-graduate training in scientific research related to the Antarctic regions (see article above).

According to the calendar of the University of Adelaide "The Institute will maintain a library of Antarctic literature and a museum of geological and biological specimens collected in the Antarctic". The museum, the calendar says "Will also include objects associated with Antarctic expeditions, in particular those of Sir Douglas Mawson".

LADY MAWSON'S VIEWS

Lady Paquita Mawson, widow of Sir Douglas, has definite ideas on what should be in a Mawson Institute, according to the Adelaide "News". "I see a hall located possibly somewhere in the northern city parklands, with relics of Antarctic explorations around the walls", says Lady Mawson. "The main exhibit should be a large relief map of Antarctica showing landmarks and features, and lit up from underneath so that it looks like a miniature Antarctica reduced to scale.."

Lady Mawson's own home is almost completely devoid of Mawson relics from Sir Douglas' explorations. "About all I have is a sealskin rug by the hearth and some pictures and some books," she said. "My husband was not a sentimental man. Almost everything he brought back from his trips went to the universities or institutions interested in research. This is why I would like to see a permanent display made of some of these objects."

U.N. FILM ON ANTARCTIC

Travel by husky team and sledge, communications with the outside world, an 'ice party' and work in the science laboratory are among aspects of life and work at Scott Base which may be included in a film on Antarctica being prepared by a team from the United Nations Organisation.

Martin Bunnel of Sweden and Pierre Desbonnet of France are employed by the United Nations radio and visual information service in New York and are spending a month on the continent to gather material.

The 16 m.m. colour film which they are exposing will be used in a half hour feature on international co-operation in Antarctica, with emphasis on the research work being done there. "It is intended for world wide release," said Mr. Desbonnet when he and Mr. Bunnel visited Scott Base recently.

"We make this material available at a price which is intended just to cover our costs. There is a much lower rate if it is to be used for educational purposes." To date the team has been to several United States stations as well as Scott Base, and also travelled to Vostok on the annual flight from McMurdo to the Russian station with the Commander of Operation Deep Freeze (Rear-Admiral D. F. Welch).

TO THE ENDS OF THE EARTH

Had Chief Photographer's Mate B. M. "Andy" Aandersen asked last April to be as far away from the North Pole as he could get, his wish would have come true.

Only seven months, six days later, Chief Anderson was standing as far from the North Pole as anyone possibly could—at the South Pole!

In the space of less than eight months, Chief Andersen, head of the still photography division of the Atlantic Fleet's Combat Camera Group, has travelled to both poles on assignment for the Navy; the feat is a distinction few well-travelled adventurers can rival.

Last March he left Charleston, S.C. aboard the U.S.S. WHALE (SSN-638) to photograph events during the sub's under-ice capability tests. On April 6, WHALE surfaced at the North Pole.

Then, in October, Chief Andersen once again left the States, this time for a trip south. Only the summer sun of Antarctica wasn't exactly made for basking.

He reached McMurdo Station, the largest U.S. station on the continent, on October 20. Twenty-three days later, the chief was assigned to cover a major event at the South Pole.

He accompanied five female scientists and a woman news correspondent aboard a Navy ski-equipped LC-130 Hercules to the Pole to record woman's first visit there.

After pictures of the women and Rear Admiral D. F. Welch, U.S.N., the Commander of the Navy's Operation DEEP FREEZE, had been taken by the chief at the candy-cane striped pole, the chief was asked to let the tables be turned so that a picture of him could be taken.

The chief said that when he reported to the Combat Camera Group, he expected to be travelling to the ends of of the earth.

"I didn't know they meant the extreme north and south ends, though!" he grinned.

RUSSIAN NEWS

The Russian Antarctic programme for the coming period is now finalised. The base scientific work will continue at the main observatory Mirny, and at the four out-stations, Vostok, Molodezhnaya, Novolazarevskaya and Bellingshausen.

SOVIET PLANS FOR 1969-71

On all five Soviet Antarctic stations the following studies will be conducted: meteorological, aerological, actinometric, ozonometric, geomagnetic, glaciological, and medical; on Molodezhnaya—rocket soundings of the atmosphere and (as at Mirny) receipt of data from satellites; seismic observations—in Mirny and Novolazarevskaya, ionospheric — in Mirny, Molodezhnaya and Vostok; radar studies of meteors—in Molodezhnaya; cosmic rays—in Mirny and Vostok; aurora—on all stations except Molodezhnaya and Bellingshausen; photographic satellite observations—on all stations except Novolazarevskaya and Bellingshausen. At Vostok, by agreement with the U.S. Antarctic Research Programme which supplies corresponding equipment, observations of ionospheric dispersion are planned for this period. Oceanographic, hydrometeorological, hydrological and other studies will be conducted en route by the expedition ships.

WINTER PARTY NUMBERS

The wintering party in Mirny will be 66 men, Molodezhnaya—103, Vostok—27, Novolazarevskaya—16, Bellingshausen—13. Also the U.S.A., Argentina, Cuba and the German Democratic Republic will send one scientist each to work for the S.A.E. Two Soviet polar explorers will winter on foreign Antarctic stations. The summer season personnel of the XV S.A.E. will be 230 men.

SHIP MOVEMENTS

The transportation of the party and facilities will be carried out on the e/s "Ob" and the scientific research ship "Professor Wiese." The first of the ships started from Leningrad in the middle of October, stopped in Montevideo in the middle of November, arrived at the station Bellingshausen in the end of November, at Molodezhnaya in the beginning of December and at Mirny in the end of December. In January 1970 the ship will visit the French Antarctic station Dumont d'Urville in the region of the Oates Coast, and in February it will drop anchor in Fremantle (Australia). At the end of February the ship will return to Mirny, in March it will visit Molodezhnaya and Novolazarevskaya. The return of the "Ob" to Leningrad is planned for May 1970.

The "Professor Wiese" left Leningrad in the end of November, calling at Las Palmas (Canary Islands) in the beginning of December, and arrives in Mirny in the end of December. The ship will return to Leningrad via Le Havre (France) at the end of February 1970. En route the ship will carry out oceanographic measurements along longitude 20deg. E.

During January-February 1970 the Oates Coast will be studied from AN-2 airplanes, and in favourable conditions oceanographic studies will be conducted there.

Extensive construction works are planned in Molodezhnaya in which over 100 men are wintering.

THERMAL DRILLING

Among the field work planned is a Mirny-Vostok-Mirny traverse with magnetic, microbiological and snow observations. Deep drilling of plateau ice at Vostok station will be carried out by means of an electrothermobore. A reconnaissance survey of the Oates Coast region to select a site for a new station will be done concurrently with geological work.

"...AS OTHERS SEE US"

"New Zealand's researchers are contributing substantially to the study of the ice continent's geology," said Mikhail Ravich, a Leningrad scientist who had been in Antarctica four times in an interview recently with Liya Shevchenko of Novosti Press Agency. "Especially fruitful are their efforts on Victoria Land and the Great Antarctic Fault. The Soviet scientists who are devoting themselves to studies of the geology of Antarctica are gladly maintaining mutually beneficial contacts with their colleagues from New Zealand."

Professor Mikhail Ravich is at present deputy director of the Leningrad Research Institute of Arctic Geology. He has been devoting himself to the geology of Antarctica since 1956. Prior to that he worked for several years in the far north of Russia.

Professor Ravich dates the establishment of contacts between Soviet and New Zealand geologists back to 1961 when the meeting of the Committee on Antarctic Research was being held in Wellington. There he met Dr. R. W. Willett, Director of New Zealand's Geological Survey, who is also chairman of the above Committee's working group for geology. Soviet and New Zealand scientists have since steadily corresponded and exchanged literature.

APPRECIATE N.Z. GEOLOGY TOO

"The Leningrad Institute is receiving very interesting geological maps of New Zealand from that country," said Mikhail Ravich. "They provide a detailed picture of the geological structure of New Zealand, enabling us to draw most interesting parallels between New Zealand and Antarctica. This seems paradoxical, but the wonderful, warm and flowering country has much in common with the morose ice continent—a common geological history, to a certain extent. The splendid geological maps our colleagues in New Zealand produce help us make most interesting theoretical generalisations and conclusions.

"We are solving many geological problems in collaboration with New Zealand scientists. A portion of our correspondence passes through the hands of Dr. Adams, secretary of the working group on geophysics, a very taking man of exceptional energy.

"I recall he was rather surprised to learn that we were planning to conduct deep seismic sounding in Antarctica in 1969. I believe he was slightly sceptical about the idea.

"However, the geophysicists of our Institute did accomplish the task. They covered a profile of 400 kilometres and determined the thickness of the Earth's crust to a depth of 55 kilometres. All the findings are being processed. We shall soon send the results of these studies to our colleagues in Wellington. Dr. Adams who, by the way, highly assesses Soviet science's contribution in the field of Antarctic geological research, will thus receive graphic proof that we keep our promises."

AND DR ADAMS' REPLY

"I am delighted to learn of the success of Dr. Ravich and his colleagues in successfully carrying out their large-scale seismic experiment, and look forward to receiving the detailed results," said Dr. Adams on being shown the above. "Such direct measurements of crustal thickness will allow much more meaning to be attached to results from less direct methods such as interpretation of gravitational measurements. Up to now the only seismological method of crustal thickness determination in the Antarctic has been surface-wave dispersion. Results from this method were first published by Dr. F. F. Evison of Wellington in 1960, using earthquakes occurring in 1957-8, and suggesting an average crustal thickness of about 35 km. for Eastern Antarctica. This work was perhaps the first instance of geophysical collaboration between Soviet and New Zealand scientists, for Dr. Evison used records made at the Soviet station Mirny as well as the New Zealand stations of Scott Base and Hallett. More recently, in 1968, I have published suggestions of a crustal thickness of 40-50 km. for parts of Antarctica, obtained from a study of reflected waves from earthquakes occurring in Alaska, recorded in Scandinavia.

"Far from entertaining scepticism about the proposed Soviet deep seismic sounding experiments, the Solid Earth Geophysics Working Group of S.C.A.R. expressed in a formal resolution its hope that such work would be encouraged

as much as possible. Its only concern was that adequate notice of such experiments should be passed to other countries carrying out seismological recording in the Antarctic, so that they too could be prepared to monitor the explosions.

ANTARCTIC CONTROL NEEDED

Competitive aims for the slowly unfolding riches of the Antarctic meant that the Antarctic Treaty must be broadened to provide legal and administrative guidelines, according to a Canadian expert on the Polar regions.

Mr. A. L. Hunt was commenting on the new problems posed by an increasing number of tourists to the Antarctic, after a 10-day visit down south. The 12 members of the treaty, including New Zealand, would have to make decisions to preserve the continent and to administer their owns regions of it, he said.

TOURISM

Oil, minerals and, more certainly, tourist wealth meant that exploitation of the Antarctic was overtaking the treaty, said Mr. Hunt., who is an official of the Canadian Federal Department of North-west Territories.

"Time is closing in on us. There are going to be problems of jurisdiction. The treaty is very fine and very noble but it doesn't go far enough," he said.

"The treaty lacks detail. The clauses have no real teeth in them," he said.

NATURE BALANCE UPSET EVERYWHERE

"We're upsetting the natural environment. There should be ways of technology overcoming these problems."

"Unfortunately these efforts to obviate the ill-effects of man's impact on natural environment took time to work out, cost money, and were too often disregarded in the name of progress."

"The treaty Nations must consider the same problems in the Antarctic."

CONCERN IN NEW ZEALAND ALSO

In a leading article the "Dannevirke Evening News" (Nov. 26, 1969) asks, of the tourists:

"Is their journey really necessary? So far most of the hundreds of people who have visited the Antarctic must be said to be explorers of one kind or another, or else welcome guests because of their ability to assist work by some direct or indirect means. Most of these people have been attached to official parties and for the most part only a handful were on the ice at any one time. Unavoidably, the arrangements made by man to live in Antarctic conditions will have already affected the ecology of the continent to some subtle extent. If more and more humans call there, the process of contamination or pollution of the natural environment will inevitably be hastened!

"The sights which the tourists will inevitably be going thousands of miles to see, which the scientists are so diligently recording, could become another 'vanishing prairie.' We are not suggesting that the ice-cap is going to melt overnight or penguins adapt their diet to bubble gum, but the time to begin control arrangements and supervision for preservation and conservation, presumably on an international scale, should be now, before the first tangible problems are noticed."

SPECIAL CACHET AT SCOTT BASE POST OFFICE

Mail posted at Scott Base on Monday, 1st December, may have high philatelic value as the only mail to have a special cachet to mark the 10th anniversary of the signing of the Antarctic Treaty.

The special cachet received little publicity. Consequently there was less philatelic mail than normally received at Scott Base for special occasions such as this.

Scott Base postmaster, Mr. R. J. Hancock, said about 200 items of mail were stamped with the special cachet and postmarked December 1. Such a small number would probably become collectors' items.

ANTARCTIC TREATY

TENTH ANNIVERSARY CELEBRATED AT SCOTT BASE

Representatives of several nations gathered at Scott Base on December 1st for the tenth anniversary of the signing of the Antarctic Treaty.

The President of the Special Committee for Antarctic Research, Dr. Laurence M. Gould, said the treaty was indispensible to the world of science, and a "document unique in history which may take its place alongside the Magna Carta and other great symbols of man's quest for enlightenment and order." Dr. Gould said that Antarctic research had laid a new foundation for unifying the world and had ushered in a new era of co-operation.

Other speakers at the ceremony in front of the base were Mr. I. Omishchenko, first secretary of the Soviet Legation in Wellington, Dr. W. M. Hamilton, director-general of the New Zealand Department of Scientific and Industrial Research, Captain E. B. Rubey, commanding officer of the McMurdo Sound naval air facility, and Mr. R. B. Willis, leader of the New Zealand 1969-70 teams in Antarctica.

After the formal ceremony a large number of United States Naval and Antarctic research programme staff joined the men at Scott Base and their visitors for lunch.

NEW ZEALAND PAPERS COMMENT

Leader writers in several New Zealand papers were drawn to comment on both the Byrd polar flight anniversary and that of the Antarctic Treaty.

The "Christchurch Press," morning daily of the most Antarctic of all cities (in association, not in climate) was moved to quote Admiral Byrd's hope that Antarctica "in its symbolic robe of white will shine forth as a continent of peace as nations working together there in the cause of science set an example of international co-operation."

The fruition of this hope came in 1957, the year of his death, when scientists from a dozen nations worked together on the International Geophysical Year programme. In an endeavour to perpetuate the international co-operation of that period, the 12 participating nations drew up the Antarctic Treaty, signed in Washington on December 1st, 1959.

Antarctica shall be used "for peaceful purposes only" says the first article; and the remainder of the treaty provides for the exchange of scientific information gathered in Antarctica, the conservation of natural resources and kindred matters. Signatories to the agreement guarantee that all their activities in Antarctica will be open to inspection at all times by other signatories.

JURISDICTION SHELVED

The Christchurch Press goes on to point out that "The agreement shelves the difficult question of jurisdiction in Antarctica. Six countries, including the United Kingdom, Australia and New Zealand, have previously staked territorial claims in the continent, and some of these claims have been disputed. The United States and Soviet Russia, whose nationals have probably done as much exploration and research as all the other claimants, have to this day made no territorial claims in the continent. Despite its obvious defect, the treaty has been faithfully observed, at least in spirit. If there have been minor "incidents" they have evidently been dealt with, quietly and finally, on the spot. On ther other hand, there have been several notable instances of international co-operation and good will—as when a seriously ill Australian scientist was flown in a Russian aircraft to the American base at McMurdo Station in New Zealand's "dependency" and from there to Christchurch in an American aircraft."

BENEFITS OF TREATY

"The Antarctic Treaty served as a model for the agreement in 1965 on the peaceful use of outer space. More

prosaically, it has formed the framework for such investigations as long range weather forecasting and the pooling of information on whales and seals. Mariners, air travellers, fishermen and others from many walks of life all over the world have benefited from the knowledge gained in Antarctica. At a time when the news from so many parts of the globe concerns war and strife, Antarctica truly does shine forth as a continent of peace."

AMERICANS HONOUR BYRD'S POLAR FLIGHT

At about 1 a.m., November 29, 1929, Rear Admiral (then Commander) Richard E. Byrd announced by radio: "My calculations indicate we have reached the vicinity of the South Pole." With those words Admiral Byrd and three other Americans aboard the aircraft "Floyd Bennett" became the first men to reach the earth's southernmost point by air.

In observance of the 40th anniversary of Byrd's historic flight, the U.S. Navy's operation DEEP FREEZE re-enacted the flight. The following day there was a series of events to commemorate not only the flight but also the 10th anniversary of the signing of the Antarctic Treaty on December 1, 1959.

It is significant that Byrd's second in command during the 1929 expedition, Dr. Laurence M. Gould, was a passenger on the plane that flew to the Pole forty years later.

Dr. Gould had remained at Little America in 1929 to supervise operations there while Byrd and his three flying companions made the flight. Dr. Gould, still actively engaged in Antarctic work, is currently president of the international Scientific Committee for Antarctic Research.

The memorial flight followed the same path flown by the Floyd Bennett, but there the similarity between the two flights ended. Admiral Byrd made his flight in a 14,500-pound Ford aircraft, its three engines producing 975 horsepower. The modern day flight was flown in a 135,000-pound LC-130 ski-equipped Hercules aircraft powered by four engines with a total capacity of nearly 20,000 horsepower.

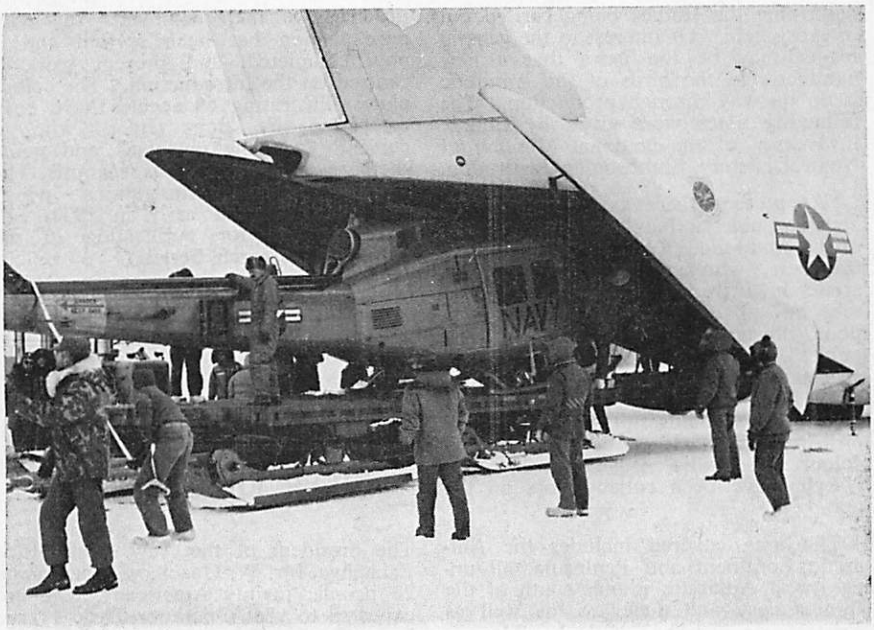
On the original flight, Admiral Byrd was accompanied by Bernt Balchen (pilot), Harold June (navigator), and Ashley McKinley (photographer). On board the Hercules on 29th November 1969 were 19 passengers and the flight crew and cargo for the station. The "Herc" was piloted by Lcdr. Roger H. Hageman of Antarctic Development Squadron Six.

The weather at the Pole was similar to that experienced by Byrd's party—clear and crisp. The ground temperature was 30deg. F. with a wind of 20 m.p.h. The Herc. crossed the Pole twice as did the Floyd Bennett, before landing.

CEREMONIES AT POLE

Ceremonies there were highlighted by a wreath-laying at the Pole by Dr. Gould, Mr. Ken Moulton, senior United States Antarctic Research Programme representative in Antarctica, and Navy personnel. Flags of the 12 original signatories of the Antarctic Treaty were raised at the geographic pole . . . about one mile from the station.

In playing tribute to the man who led the way, Dr. Gould called Byrd's flight a milestone in the history of Antarctic exploration. He said it was "the first step toward the highly productive partnership between the Navy and the National Science Foundation, which is turning Admiral Byrd's icy wilderness into the world's greatest laboratory."



Official U.S. Navy Photo.

"AND SO AD INFINITUM"

Offloading a helicopter from a Hercules aircraft at McMurdo Sound.

AT McMURDO ALSO

At McMurdo Station, activities included a ceremony at the Byrd Monument on November 30. The ceremony featured speakers from five nations: Belgium, Chile, New Zealand, the United States and the U.S.S.R.. The ceremony captured the theme of Byrd's heroism and of the international co-operation surrounding Antarctic exploration.

A special memorial service was held in the Chapel of the Snows at McMurdo and an international menu, featuring Brussels sprouts, Fiji rice, Marseilles cheese and other dishes, was served in the station's dining hall. Later, a motion picture, "Flight to the Pole," depicting Byrd's first flight, there, was shown at the three station theatres.

ANTARCTIC JOURNAL OF THE UNITED STATES

Valuable Source of Antarctic Information

For anyone wanting to see a summary of U.S. Antarctic research, there is no better source than the Antarctic Journal of the United States. Published bimonthly the Journal is prepared jointly by the Office of Antarctic Programmes of the National Science Foundation and the U.S. Naval Support Force, Antarctica. The subscription is only $US2.50 per year in the U.S. and Canada and $US3.25 elsewhere.

The September-October issue contains some eighty short articles briefly

describing the studies being carried out in every field. Of interest to the general reader may be the news that a new handbook to the birds of the Antarctic is on its way through production. The following notes were given by George E. Watson of the National Museum of Natural History, Smithsonian Institution.

"At present there exists no comprehensive guide or handbook to the birds of the Antarctic. Research scientists and travellers, who are invading the Antarctic in increasing numbers, have to rely on an outdated field guide with poor illustrations, or several regional guides of which no one covers all species. To meet this need, the Smithsonian Institution has undertaken production of a manuscript for a handbook on Antarctic birds to be illustrated in colour. J. Phillip Angle and Peter C. Harper have been collaborators on the text.

The area covered includes the Antarctic Continent and Peninsula, all unequivocal Antarctic islands south of the Convergence and 60deg. S, as well as Tristan da Cunha, Gough, Marion, Crozet, Amsterdam, St. Paul, Kerguelen, and Macquarie Islands. Species regularly occurring in the area are covered as well as vagrants, but the land birds of Tristan and Gough are omitted.

Information on each regular species consists of identification, flight and habits, voice and display, food, reproduction, moult, parasites, predation and mortality, habitat, and distribution. Only identification characters and distribution documented by literature citations are given for vagrant records. References are included for each Antarctic bird family represented.

Bird Maps Also

Research and distribution of the birds has resulted in preparation of maps for 51 species to be published in the **Antarctic Map Folio Series.** Roberto Schlatter, John Boyd, and W. L. N. Tickell have collaborated on various maps.

A preliminary draft of the species accounts section of the handbook was sent last year to 30 specialists. On the basis of their comments, this 250-page section has been revised and is now completed, and present work is centred on the introduction. The colour plates illustrating 69 species have been completed by Bob Hines, who is currently working on black and white sketches of the numerous vagrants. The manuscript and illustrations which should be finished early in 1970, will be submitted for publication in the **Antarctic Research Series.**

PARTY OF 22 ON DEEP FREEZE TOUR

The president of the New York Stock Exchange, Mr. W. Haack, will be among 22 people, mainly Americans, who are expected to visit Operation Deep Freeze bases in Antarctica in January.

Another prospective visitor will be Mr. J. Richard Dilworth, chief executive officer of the Rockefeller family and associates, as well as Mr. Salvatore V. Gianola, director Environmental Sciences Division, Navy Clothing and Textile Research Unit, who will make a study of clothing now used in Antarctica.

Dr. William H. Sebrell, jnr., director, Institute of Nutritional Sciences, Columbia University of Public Health, is also expected.

He and Mr. Richard M. Stalvey of the publication, "Nutrition Today," will evaluate the preliminary study of nutrition in the Antarctic. They will also plan for the final organisation of the nutritional survey requested by the Surgeon-General of the United States Navy.

Other visitors named by Operation Deep Freeze include Mr. Otis Booth, vice-president of the Los Angeles Times Mirror Company, Mr. Stephane Groueff, New York correspondent of "Paris Match," Mr. Raymond Cartier, French author and publisher of "Paris Match," and Mr. Hans Rehnvall, science editor of a Stockholm publication.

ANTARCTIC TOURISM

N.Z. TEAM INVESTIGATES

An investigational team from the Civil Aviation division of the Ministry of Transport recently found that commercial flights by Air New Zealand DC8s would face no real operational problems in flying to McMurdo Sound and landing on ice runways.

The team consisted of Mr. G. H. Willetts, deputy engineering manager for Air New Zealand, Captain E. H. Tredrea, DC fleet captain of Air New Zealand, Captain P. M. Grundy, trainer captain gf Air New Zealand, Captain J. Spence, airline inspector for DC8 operation, civil aviation division, and was led by Captain E. T. Kippenberger, controller of flight operations, civil aviation division.

While at Scott Base the team had talks with meteorologists and air traffic controllers at McMurdo and inspected the ice runway at outer Williams Field.

Commercial flights would probably be made between the last week in December and the first week in February, according to Captain Kippenberger, and the outer Williams Field on the permanent ice shelf would be used. However, ground facilities would be a problem because the field is 14 miles from where the passengers would be billeted in a ship during their week's stay in Antarctica.

POSTPONED UNTIL 1971-72

The most recent indications are that Air New Zealand has postponed its plans to fly to Antarctica during the 1970-71 summer because of the accommodation problem.

In the meantime, the Antarctic will be open to tourists with cruises in the current southern summer from South America and in the 1970-71 summer from Hobart and from Bluff. The cruises will be made by Lindblad Travel Inc. of New York.

"Any problems implicit in the Antarctic operation have been overcome," said Mr. C. J. Keppel, the general manager of the airline, recently. "Inspection has shown that the outer Williams Field could take jet operations during summer, but necessary passenger facilities cannot be provided there in time for next summer's operations.

"We will now plan towards the 1971-72 summer, when I hope Air New Zealand will inaugurate the first commercial air service to the Antarctic," he said.

BACK-UP FACILITIES STRESSED

Returning Antarctic Society members who have been acting as curators of the Shackleton hut at Cape Royds, Mr. J. P. Skellerup and Mr. M. Orchiston of Christchurch, do not see much future for Antarctic tourism until adequate back-up facilities are available. While the historic huts, restored by members of the New Zealand Antarctic Society in recent years, and the magnificent scenery are splendid attractions for tourists, Mr. Skellerup does not think large scale tourism is likely immediately, because of lack of commercial transport and accommodation facilities.

AIRLINE/SHIPPING CO-OPERATION

In an endeavour to provide transport facilities for tourist visits to the Antarctic, Holm Shipping Company and Air New Zealand have been in close touch and co-operation over the past two years, and the two companies are still working in co-operation on the question of flights to McMurdo Sound.

Captain J. F. Holm, of Holm Shipping Company, said this recently when commenting on recent press articles about proposed cruises to the Antarctic. "It is, therefore, still quite likely that the suggested flying of passengers to and from the Antarctic will be done with the Holm Shipping Company, and that this firm will operate the maritime side of the cruises," he said.

Captain Holm said it would be recalled that the Holm Company had pioneered cruises to the Antarctic with the Danish ship "Magga Dan," manned by New Zealanders, in the summer of 1967-68. These cruises had proved

highly successful but extremely expensive and since then the company had concentrated on the idea of flying passengers to and from the Antarctic as being a much more economical proposition.

SAS TO DEVELOP SOUTH POLAR ROUTE

Meanwhile, John Stackhouse, writing in the Aviation section of the Australian "Financial Review" stated that the Scandinavian Airlines System (S.A.S.) had announced that it would like to extend its African service, now terminating in Johannesburg, to Australia via New Zealand. S.A.S. has already sent its chief navigator E. S. Peterson, to South Africa to look into the problems of Antarctic navigation. As a private venture, Peterson, who is an entrant in the England-Australia air race planned to fly a light twin-engined aircraft home via the Antarctic route. Stackhouse's professional summing up of the Air New Zealand and S.A.S. proposals and the difficulties involved are quoted here:

"The Scandinavians, with their polar know-how, have not been slow to apply this to aviation. They inaugurated the first polar routes about 15 years ago and added a new dimension to air services.

But the South Polar region is altogether a different proposition from the Arctic.

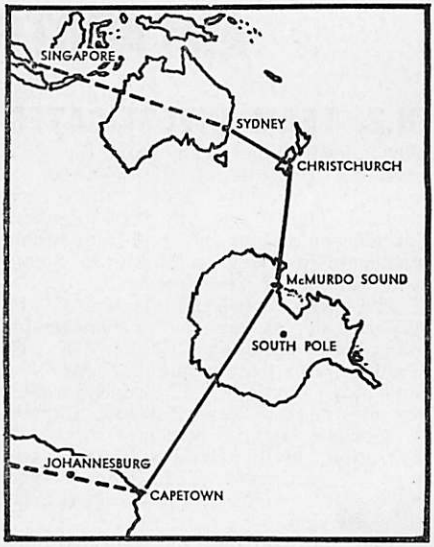
The first big difference is distance. By Northern Hemisphere standards, main centres in the Southern Hemisphere are almost tropical.

Sydney's latitude, for instance, is 34 degrees south and Christchurch, New Zealand, the southernmost international airport in this part of the world is 43 degrees.

By comparison, London is 51 degrees north and Copenhagen is 55 degrees.

With these lower latitudes, distances are obviously much greater. And, apart from McMurdo Sound, there is no alternate landing field suitable for commecial use in the region.

Distances via McMurdo are, however, quite acceptable. Cape Town to McMurdo would be somewhere around 4,500 miles with less than 3,000 miles on to Christchurch.



The problem here is the word "alternate." Standard civil aviation practice is to have a range of alternate airports to divert to should weather close down any of the route points.

There are few, if any, options available on any trans-South Polar route.

An aircraft flying from Cape Town to McMurdo would carry enough fuel for the trip, but would encounter a "point-of-no-return" situation about three-quarters of the distance to destination. It could not carry enough fuel—and economic load—to skip McMurdo and contnue on to New Zealand.

Antarctic weather is, of course, notorious. McMurdo is inoperable for much of the year and also is liable to extreme and almost instantaneous weather changes.

An aircraft could, for instance, reach its point of no return with a good forecast, only to find that hazardous weather had blown up in the remaining three to four hours of flight.

For this reason, the Antarctic will require extensive investment before it can be used by civil aviation: alternate landing areas, equipped with all-weather aids, will be an essential before commercial operation are possible.

However, while the S.A.S. venture might be in the manner of an experimental foray, there is a different set entirely of economics governing the projected Air New Zealand operation.

Firstly, this is projected purely as a "summer" seasonal tour venture.

Secondly, the Antarctic flight is the last segment of a long—and lucrative—flight from Los Angeles, via Auckland to Christchurch, and the scuth.

There is not the need to operate a week-in, week-out service to the standard that the North Polar flights have reached (and which the S.A.S. operation eventually would have to achieve).

The Air New Zealand flights would have basically an adventure appeal. If weather closed in and prevented a flight, this would be part and parcel of the adventure.

Distances are also shorter so that the long-range DC-8 aircraft could have the capability of reaching McMurdo, circling for a given period, then returning to Christchurch if the weather closed in.

While this might not be either convenient—or economic—it is certainly in accord with today's operational standards."

CONRAD UNLUCKY—SO FAR

Veteran American flier Max Conrad was still trying to fly from Invercargill to the Antarctic at the time this issue was going to press.

The 66-year-old American grandfather flying his twin-engined Piper Aztec failed in his first attempt on Friday, January 2 1970. He had flown nearly halfway to McMurdo Sound from Invercargill when icing on the wings of his aircraft and erratic behaviour of a polar compass forced him to turn back.

Mr. Conrad decided to fly back to Christchurch. He took off from Invercargill at 8.11 a.m. on the Antarctic section of his world flight over the North and South Poles.

He carried fuel for 20 hours. His 2100-mile flight was planned to take him over the Auckland Islands and the Balleny Islands, and he expected to reach McMurdo Station shortly before midnight.

A United States Navy Super Constellation which left Christchurch at 8.45 a.m. with the commander of the United States Navy Support Force (Rear-Admiral D. F. Welch) and a party of visiting American Congressmen, was available to provide communications and navigational facilities for Mr. Conrad if necessary.

Support at Christchurch were in regular communication with Mr. Conrad. At 3.10 p.m. Mr. Conrad advised Christchurch that he was turning back because ice was beginning to form on the wings of his aircraft and his polar compass was functioning erratically.

He had then flown nearly 1000 miles from Invercargill. His height was 500 ft. and his position was just inside the Antarctic circle on a course towards the Balleny Islands.

A few days later Mr. Conrad was forced to cancel his second attempt at the outset, because of a faulty engine. At that stage Mr. Conrad had about a month to reach South America before conditions ruled the flight out.

Meanwhile, the Norwegian crew of the second plane to cross the finishing line in the London-Sydney air race plan to return to Norway via the South and North Poles. They said they would fly first to New Zealand, then to McMurdo Sound in Antarctica, across to South America and home via the North Polar route.

STOP PRESS

Conrad Makes South Pole

After trying for five years Max Conrad finally arrived at the South Pole on 19th January, 1970. Unfortunately his triumph was short-lived for he later crashed his Piper Aztec airplane just after he took off for Punta Arenas in South America.

The 67-year-old pilot returned to McMurdo and thence to Christchurch. At the time of going to press his plane was still at the South Pole and plans for its salvage not yet determined.

ICE THICKNESS IN COMFORT

THE END OF THE TRAVERSE ERA

From 1957 to 1966 a feature of the Antarctic research programmes of all countries but particularly the U.S.A., was the "traverse," along which one of the main objects was to sound the thickness of the ice. Using the seismic echo sounding method a picture of the "land beneath the ice" was laboriously built up by many successive teams, starting early in the season in extremely cold temperatures and slowly drilling their 10 and 20 metre shot holes by hand. These traverses, one of the great proving grounds of modern day Antarctic endeavour, have been brought to a close by a technological development which allows ice thicknesses to be measured continuously from an aircraft flying at 400 m.p.h.

The man-in-charge of these experiments this summer is Gordon de Q. Robin, Director of the Scott Polar Research Institute, Secretary of S.C.A.R. and the man who made the first successful ice sounding traverse in Dronning Maud Land during the Norwegian-British-Swedish expedition of 1949-52. With him is Dr. S. Evans, also of the Scott Polar Research Institute, who started his Antarctic research on the aurora.

Writing for the "New York Times" news service, Walter Sullivan said they will use an airborne radar, mounted on a Hercules aircraft of the U.S. Navy based at McMurdo Sound.

The equipment has already penetrated more than 14,800 feeet of ice, recording a profile of the mountains and valleys underneath.

It will be the first large-scale attempt at radar charting of the ice-buried continent surrounding the South Pole.

The technique has been developed in recent years at the expense of three lives, one Russian and two British, lost when vehicles broke through snow bridges and fell down crevasses.

The radar exploits the fact that radio waves of suitable frequency can penetrate ice (unless partially melted and hence electrically conducting).

RADICAL ADVANCE

Ice-sounding radars have been developed in the U.S., Russia and at the Scott Polar Research Institute in Cambridge, England.

In 1964, the Russians first tried their system, which was carried across the ice by a vehicle, but it plunged through a crevasse, killing the driver.

The next year the British, based in Queen Maud Land, atempted to chart the buried land using their own equipment.

Two men were lost, as well as all scientific records from that journey and some from an earlier expedition.

The airborne equipment to be used records the ice depth on film and, at the same time, displays the data so that the crew can make any needed adjustments.

In this respect the British believe the system is superior to the American one, which tape-records the data with no on-the-spot display.

Airbourne sounding represents a radical advance over past methods.

Standard technique has been to set off explosive charges every few miles, recording the interval before the first echo returned from the rock far below.

Only a few soundings per day could be made, what with the hazards of over-ice tractor travel.

MEMORIES OF "BUD" WAITE

Those of us in New Zealand remember the fervent advocacy of A. H. ("Bud") Waite who pioneered the technique. In fact, it was at the Antarctic Symposium in Wellington in February, 1958, as the first results of the I.G.Y. seismic traverses were being presented, confirming Robin's earlier results of the tremendous ice thicknesses, that "Bud" Waite spoke from the floor about the "new" method. Year after year subsequently as Bud came south he regularly called in our offices and harangued us about it. The early sceptics have been confounded and now 100,000 miles of

ice thicknesses can be plotted from one plane in one season—eclipsing the 60,000 miles of traverse data gathered by all countries over nearly ten seasons. Still, the "traverse" men form a special group, and those who travelled with the Sno-cats (or Russian or other equivalents) consider themselves the aristocrats of the modern Antarctic age.

HANDS ACROSS THE ICE

ANNUAL DEEP FREEZE FLIGHT TO VOSTOK

The annual flight from McMurdo to Vostok took place just before Christmas.

The flight has several purposes. One is social. Also, fresh produce is delivered to the Russians as well as American equipment which will be installed at the station to record data in the upper atmosphere. Michael Maish, a member of the U.S. Antarctic Research Programme, who just spent the winter at Vostok, will instal the new equipment and instruct the Russians on how to run and repair it.

Maish will soon take a Soviet aircraft to another Russian Antarctic Station, Mirny, on the coast of the continent. From there he will go to the Soviet Union by ship for a brief visit and eventually return to the United States.

During the austral winter, the Soviet scientists will run the American equipment and maintain the data. When next year the U.S. visitors again arrive at Vostok, the data will be given to U.S. scientists so that both countries can investigate it.

The flight, a distance of more than 850 miles, was made in a Navy ski-equipped Hercules (LC-130) flown by Antarctic Development Squadron Six. The inside of the plane was warm and comfortable but the outside temperature on the ground was minus 26 degrees Fahrenheit. Vostok holds the world record for low temperature . . . 126.9 degrees below zero Fahrenheit in 1960.

Aboard the flight was Rear-Admiral D. F. Welch, the commander of Operation DEEP FREEZE, who was the first to step from the plane and be welcomed by the leader of the Russian Station, Mr. Ivan Titovsky. Also on the plane was Mr. Hendrik Van Oss, Deputy Chief of Mission at the U.S. Embassy in New Zealand, and Mr. Phil Smith, United States Antarctic Programme representative in Antarctica. Alex Vasilev, the Soviet Exchange Scientist who had just wintered the previous season at McMurdo Station, also made the flight. He has been invited to visit the United States after he leaves Antarctica.

Altogether, there were 22 persons (including the flight crew) and 11,485 pounds of cargo aboard the "Herc."

After landing, all the U.S. personnel were invited into this station, some 12,500 ft. above sea level and resting on ice that is as many feet thick as the station is high.

The Americans were welcomed warmly and the Soviets proved themselves to be excellent hosts.

Prior to departure there was much hand shaking and back slapping among the Russians and Americans who had this day become friends.

After a three-hour visit, the plane once again soared into the thin air, passed over the station in wing-rocking farewell, and began the journey back to McMurdo carrying 22 people who had seen international co-operation at its best.

FLYING VIKINGS CROSS CONTINENT

Captain Thor Tjonvelt and his navigator, Einar Pedersen (see story p. 354) successfully completed the Antarctic section of their round the world journey in their twin-engined, turbo-prop airplane.

From Christchurch they flew to McMurdo Sound and thence directly to Punta Arenas, maintaining their last radio contacts in the Antarctic with Byrd Station. This last leg of their flight was 3050 miles long and head winds caused their flight time to be three hours longer than the expected time of 16 hours.

The plane is appropriately named "Roald Amundsen" and is actually on a delivery flight.

THE SUPERB EUPHAUSIA

OR, EAT KRILL NOT WOOL

For those non-zoological Antarcticists (like the Acting Editor) who couldn't really say that they had ever seen any krill despite several voyages to the south the following article by Michael Richardson in the Melbourne "Age" may be of interest.

TINY KRILL COULD PUT AN END TO STARVATION

A tiny crustacean called krill that abounds in the icy waters south of Australia could become an important source of animal protein for millions of people in underdeveloped countries who might otherwise face starvation or severe malnutrition.

Scientists at the C.S.I.R.O.'s division of food preservation in Sydney have produced a krill protein concentrate (K.P.C.) which may be the forerunner of an acceptable low-cost additive for commercial production.

K.P.C. in its final form is a light, greyish-white powder and can be mixed with a variety of food preparations without affecting smell or taste to any detectable extent.

Australians who have been to the Antarctic or sailed in the waters that surround it are well acquainted with krill, which symbolises life in that frozen region more aptly than the penguin or any other polar creature.

When euphausia superba (the proper name of the red, shrimp-like crustacean) shows up all hands can be certain the ship has entered the Antarctic Ocean.

Krill will grow up to two inches long and swarm by the millions on the surface layers of the sea during summer in the far south, turning the water into a mosaic of reddish-brown, orange and yellow.

Krill are the key organisms in the food chain sustaining life in what scientists believe is one of the richest biological provinces on Earth.

Feeding direct on the one-celled plants of the sea, the krill in turn support fish, penguins, vast numbers of sea birds, seals and whales, including the blue whale—the largest mammal on Earth.

SEVERAL TIMES TOTAL FISH CATCH

Dr. G. S. Sidhu, the leader of the Australian scientists studying the processing and nutritive value of krill, said yesterday that with suitable technology from 100 million to 500 million tons of krill could be harvested annually in the Antarctic, compared with the total world fish catch of 66 million tons.

He estimated that 70 million tons of krill a year would be sufficient to provide a daily animal protein content of 20 grammes—the desirable minimum level—for 1000 million people, or about a third of the world's population.

The work of the C.S.I.R.O. team has shown that K.P.C. has a protein content of between 70 per cent. and 77.5 per cent.

ECONOMIC ASPECTS

So far the economic aspects of harvesting and processing krill have not been considered officially in Australia. Special techniques for large-scale catching would have to be devised and this could pose major engineering problems. Generally adverse weather conditions in Antarctic waters could also raise difficulties.

It could turn out that other sources —including the synthesis of protein from mineral oils and the culture of yeast and other organisms for their protein content—might in the long run prove to be more economic food additives than K.P.C.

Yet the scientific communities of the U.S., Russia and Japan are now looking to the sea as a major food source for future generations. Aquaculture may well become a vital occupation for our descendants in the next millennium.

At least 40,000 million tons of organic material—much of it potentially nutritous—are produced annually iin the

sea and only a tiny fraction is reaped by man.

At present a large part of the total fish haul is not utilised direct by humans but is processed for industrial oil and fishmeal—a high-protein food for poultry and livestock.

The Bureau of Commercial Fisheries in the U.S. has developed a process for manufacturing fish protein concentrates (F.P.C.) for human consumption. It contains 85 per cent. protein and can be produced, but not distributed for about 25 cents a pound.

Apart from cost, there are many barriers to widespread use of marine animal protein concentrates like K.P.C. and F.P.C.. They would need, for example, to be made in a form acceptable to a diverse range of cultures and diets.

But the main obstacle appears to be lack of commercial incentive. Most of the countries that urgently need high protein food have neither the capability to get it themselves nor the spare cash to pay the developed countries to produce it for them.

RUSSIANS SHOW INTEREST

It is significant, however, that Russia has shown considerable interest in krill and intensified its experimental work in recent years.

At a meeting in 1968 of the 12 Antarctic Treaty nations a Soviet scientist estimated the potential krill harvest at 150 million tons a year.

It is reported that the Russians have already used processed krill for stock food and have almost certainly developed a protein concentrate for human consumption.

K.P.C., if used as part of a foreign-aid programme, could be a very effective diplomatic device fo winning friends and influencing people.

IS MACQUARIE ISLAND OCEANIC CRUST?

(From Hobart "Mercury," August 20, 1969)

A key to the geology of the world's ocean floors may have been discovered by three Tasmanian geologists.

They believe it is Macquarie Island, and their theory will be circulated in a world-wide science publication.

Dr. R. Varne and Dr. P. Quilty, lecturers in geology at the University of Tasmania, and Dr. D. Gee, of the Mines Department, have completed their findings after a trip to Macquarie Island last December.

They believe that Sir Douglas Mawson "introduced a misconception" when he wrote the findings of topographer John Blake who mapped the island during Mawson's 1911-14 expedition to Antarctica.

Blake, who was not a trained geologist, was killed before compiling his notes.

"Breakthrough"

"This island could be the poor man's Mohole," said Dr. Varne.

"I hope to explore Macquarie Island more and if our findings are further substantiated, then it would be a world breakthrough in studying the ocean floor."

He said the island had all the characteristics of the sea floor—pillow lava, deep sea assembly of rocks and a magnetic belt.

Also there was a four kilometre split through which basalt rock, which came from 30 to 100 miles inside the earth, had been injected, he said.

Spreading

Dr. Varne said recent work by geophysicists suggested that the sea floors of the world were spreading away on either side from mid-oceanic ridges which circled the earth.

The spreading—1 centimetre for the North Atlantic and 4.4 centimetres for the East Pacific—was being caused by injection of new oceanic crust through these ridges which resulted in earthquake activity, he said.

"One of the main supports of this hypothesis of sea floor spreading is the observation that, going away from the ridge areas in either direction, there is a pattern of elongated magnetic anomalies which run parallel," he said.

"They are supposed to be the result of molten rocks becoming magnetised as they cool down according to the prevailing direction of the earth's magnetic field."

For Study

Dr. Varne said some aspects of the sea floor spreading could only be tested by direct geological observations.

"We need a piece of the sea floor to look at," he said.

"Unfortunately the islands rising from the deep ocean floor are almost all the tips of volcanoes—like Hawaii—and are useless.

"But Macquirie Island seems to be the only exception.

Dr. Varne said it was proving extremely difficult to get back to Macquarie Island for a brief study tour because of shipping difficulties and the lack of accommodation.

He would like to see a complete study made of the island.

"We expect that Tasmania's south Island can tell geologists a lot more about rocks which are deep under water," he said.

ANTARCTIC BOOKSHELF

THE WORLD AT THEIR FEET. Philip Temple. 250 pages: 58 illustrations (4 full-page colour), maps. Whitcombe and Tombs Ltd. N.Z. price $5.50.

Philip Temple will be remembered by readers of ANTARCTIC as the author of "THE SEA AND THE SNOW," the story of the adventurous South Indian Ocean Expedition to Heard Island, reviewed in the December, 1966, issue of this journal. He was a member of the expedition. In this new book he has given us the story of New Zealand mountaineers in the great ranges of the world—including the mountains of Antarctica.

Many of these fine alpinists will already be known even to our non-mountaineering readers: men like Hillary, Lowe, the late John Harrison, Larry Harrington, Athol Roberts, Wally Romanes, and Jim Wilson. But here is our chance to become acquainted with other notable climbers who have not been futher south than New Zealand. It is good to learn of Dan Bryant, the first New Zealand mountaineer to make his mark overseas—in 1935, Earle Riddiford, the great organiser, and Rae Culbert, the only New Zealander to lose his life while mountaineering overseas, 20,000 feet high on Haramosh in the Himalayas. And it is good too to learn more about the outstanding climbers whom most of us have known only as Antarctic men.

Mr. Temple tackles his formidable task with gusto and determination. He writes well, and he successfully overcomes the danger of monotony and of stressing the technical difficulties interesting only to other mountaineers, by emphasising the personal element. His climbers come alive to us as we learn of their background, and of their human qualities as well as their qualities as mountaineers. The story is not clogged (for the non-alpinist) with technical jargon. But the spirit which inspires mountain climbers to face up to the challenge of the mighty peaks inbues the whole book.

Some 20 pages are devoted to the Antarctic climbs during the Trans-Antarctic Expedition, the Geology and Survey expeditions of 1957-8 and 1958-9, the N.Z. Alpine Club expedition of 1959-60, and Hillary's Antarctic Expedition of 1967-8. Other climbs, by members of the parties led by Grindley and Herbert in 1961-2 and of the Federated Mountain Clubs expedition of 1962-3, for example, are given relatively little attention. Mr. Temple protests rather petulantly, one feels, at the reluctance of the Government to include purely mountaineering expeditions in the New Zealand Antarctic programme. Or is it the reviewer who is being petulant?

THE COLDEST PLACE ON EARTH:

Robert Thomson. 192 pages, illustrations, maps and charts. A. H. and A. W. Reed. N.Z. price $3.50

Here is a book you must not miss. It is, essentially, the story of one of the great Antarctic journeys, the long 'vehicle' trek in 1962-3 from the Australian Wilkes Station on the Antarctic coast south of Perth to the Russian inland station Vostok, on the high polar plateau, 800 miles further south still, and back again to Wilkes. It is told by the man who planned and led the trek, the Wilkes Officer-in-Charge. Bob Thomson had spent a year on Campbell Island, wintered as scientific leader at Hallett Station in 1960, and served at Scott Base in the 1960-61 summer, before being appointed leader of the Australian Station. He is now back in New Zealand as Superintendent of the Antarctic Division, D.S.I.R.

The book opens with a preliminary flash of the autumn fuel-laying journey two months after the 1962 team reached Wilkes in **"Thala Dan.'** The four men are blizzard-bound 100 miles from Wilkes with the caterpillars belly-deep in soft snow. A sudden break in the murk ahead of them reveals "an immense snow valley . . . . studded with crevasses."

Then we hark back to Melbourne on sailing day, the voyage south and the setting out on the "Totten traverse" of the opening flash. The writer gives us just enough of this to let us know the sort of problems they would have to face on the journey on which he had set his heart. Back at base, the plan for the big summer survey is drawn up, modified by the promise of an American air-drop of fuel to a 3½ months trek, and the men chosen: four Australians, an American and the New Zealand leader. Messages are exchanged with the authorities in Melbourne and McMurdo and with the Russian leader at Mirny. The winter passes and on September 17 the great journey begins.

The second half of the book is devoted to a gripping account of the journey itself. The leader tells his story modestly but graphically, with more than a touch of humour. There is generous recognition of the sterling quality of each man in his team, and of the service rendered by the men left at base, as well as the willingness with which the Russians offered the trek members the use of facilities at Vostok, which was not at this time manned.

There were four vehicles, two big D4 tractors, and two weasels, towing in all nine sledges. Once they had passed the farthest south of the two previous Australian treks, one 180 miles south in 1960, the other 300 miles south in 1961, they were in unknown country. (The Russians had left from Mirny, far to the west, and had full air support.) Hardships were expected and encountered. On the high ice-cap it was desperately cold. The vehicles took a thashing on the rugged terrain, and such maintenance jobs as replacing a broken track with temperatures in the minus eighties (well over 100 degrees of frost) meant real suffering. "From outward appearances," says Mr. Thomson, "we were a motley collection of overblown, unkempt vagabonds: brows, eyes and cheekbones were all that could be seen of humankind away from the bushy beards and tattered, thick-padded garments." Frostbites were common. The high altitude and snow-blocked air-vents sometimes combined to reduce the oxygen in the caravan to a dangerously low level and caused severe headaches.

November 18, two months out. Vostok should be near. But were they dead on course? "White surface, white horizon, blue sky, nothing more. My eyes adjusted to the glare. I concen-

trated more, then caught a glimpse of somethting: a shimmering vertical dark line, there for a second or so, then fading, only to appear again

another second later." But Vostok it was. Almost three hours later they found "a hut wall bedecked with sacking and tarpaulin" and digging down came to an opening. Danny Foster was leading the way, while Bob Thomson played out the cable with a 'trouble lamp' attached to the weasel battery. "He stopped just inside and yelled 'Hullo! Hullo! Anyone home?' Even here, at the remotest place on earth, we had a feeling we were on private property and should at least knock or advertise our presence in some way before entering. The place was uninhabited of course: but neither of us would have been surprised if a Russian had rushed out calling 'Comrade, Comrade.' "

But they were surprised when at 11 a.m. they tuned the radio to London and one of the first items on the B.B.C. news was: "In the Antarctic an Australian party led by New Zealander Robert Thomson has reached the Russian Station Vostok at the South Geomagnetic Pole. The expedition took two months to cover the 900 miles from the Australian station at Wilkes."

Next day they all had a bath, their first for nine weeks. The bath water was "the cooling water that circulated through the generator engines. It was rusty, terribly oily, the stench only subdued by strong smelling soap and packets of soap powder. But it seemed wonderful."

The party left on the long journey back to Wilkes on November 25, leaving their surplus supplies, including cigarettes, coffee and a few goodies, on the table inside the main hut, with a note of thanks for the Russians, signed by them all. On January 9 they heard on their radio contact with Wilkes that **"Thala Dan"** was due to arrive next morning, and they still had 100 miles to go. Came storms, white-outs, mechanical troubles requiring replacements. But on the 14th they reached Wilkes after 120 days in the field.

Two 'devices' jar a little: too many verbatim radio messages, and too much fabricated conversation. But despite these (and it may be only a personal objection anyway) the over-all impression if of a great adventure narrated with vigour, candour, modesty and humour. It makes fine reading.

DDT PROBLEM IN ANTARCTICA

Recently New Zealand has taken action to ban the use of DDT on its farms. The ease with which this toxic chemical can travel has been revealed by recent Antarctic research.

DDT and other pesticides have previously been detected in the bodies of Antarctic birds, fish and seals, but analyses of Antarctic snow by the Institute of Polar Studies at Ohio State University have shown that it is also present in the snow in amounts up to 40 parts per billion.

DDT and similar pesticides are easily evaporated from the soil and carried by the wind, and presumably contaminated air masses from other continents are finding their way over the Antarctic. The discovery of DDT in places as far distant as the Antarctic is one of the chief causes of concern to scientists who wish to see the chemical banned.

In addition to the recent New Zealand action, a Swedish moratorium is due to start next year, and a study will be made of how much DDT contamination reaches Sweden from outside the country. In Britain, the advisory committee on pesticides and other toxic chemicals is expected to recommend a similar experiment.

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Some other issues are in very short supply. Copies of available issues may be obtained from the Secretary of the Society, P.O. Box 2110, Wellington, at a cost of 50c per copy meanwhile. Indexes for volumes 1, 2 and 3 are also available, 30c each.

Copies of our predecessor, the Antarctic News Bulletin, are available at 50c 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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