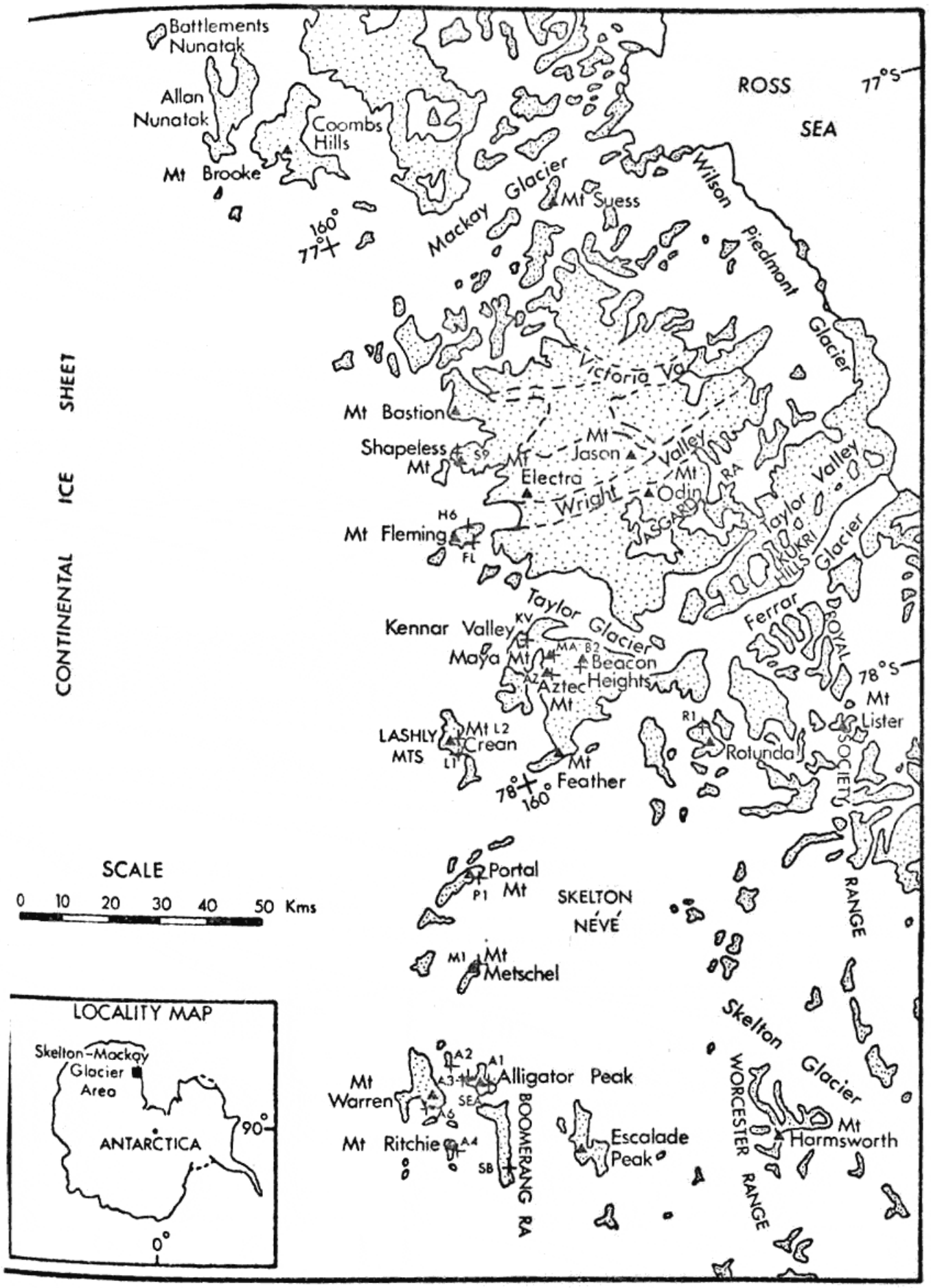
This report has been prepared for the benefit of the University Council of Victoria University, the University Research Grants Committee, the Ross Dependency Research Committee, and individuals who have asisted the Expedition in the execution of its research programme. It is not intended as a publication, and any scientific data contained herein may not be used or referred to in print without the express permission of the expedition leader and project leader concerned.


CONTINENTAL ICE SHEET
Battlements Nunatak
Allan Nunatak
Coombs Hills
Mt Brooke
Mackay Glacier
Mt Suess
ROSS SEA
77°S
Wilson Piedmont Glacier
160°
77°
Victoria Va
Mt Bastion
Shapeless Mt
S9
Mt Jason
Valley
Mt Electra
Wright
Mt Odin
RA
ASGARD
Taylor Valley
Mt Fleming
H6
FL
KUKRI HILLS
Taylor Glacier
Ferrar
ROYAL SOCIETY RANGE
Kennar Valley
KV
Maya Mt
MA
B2
Beacon Heights
AZ
Aztec Mt
78°S
Mt Lister
LASHLY MTS
Mt L2 Crean
L1
Mt Feather
78°
160°
R1
Rotunda
Portal Mt
P1
SKELTON NÉVÉ
RANGE
M1
Mt Metschel
SCALE
0 10 20 30 40 50 Kms
LOCALITY MAP
Skelton-Mackay Glacier Area
ANTARCTICA
90°
0°
Skelton Glacier
A2
A1
Alligator Peak
Mt Warren
A3
SE
BOOMERANG RA
Mt Ritchie
A4
SB
Escalade Peak
WORCESTER RANGE
Mt Harmsworth

CONTENTS

PREPARATIONS FOR VUWAE 18

A proposal outlining a programme involving five main scientifi. projects was submitted to the March meeting of RDRC. The programme originally involved six scientific members to carry out the following objectives and was approved and passed on to Antarctic Division.

1. To continue work on the Late Cenozoic McMurdo Volcanics on Mts. Erebus and Morning, and with the Dry Valley Drilling Project at McMurdo Station.

2. To continue the study of the Jurassic Mawson Volcanobreccia at Shapeless Mountain and to extend the study to Allan Hills.

3. To extend the collecting and mapping of salts in the McMurdo region to determine their origin and mechanisms of migration.

4. To continue work on the Devonian Aztec Siltstone, the fish-bearing 'red-bed' sequence.

5. To resample the Permian coal-measures at Mount Crean and Shapeless Mountain for pollen and coal-rank studies.

Major requirements finally requested from Antarctic Division were:

Toboggans, spares and tools	2 Nov. 1 - Jan. 12
Sleds	3 (Nansen)
Polar tents	3
Meade tents	2
Petrol	84 gals.
Kerosene for primuses	56 gals.
Food	23 20-man-day food boxes
DSIR assistant/mechanic	Nov. 1 - Jan. 21
Helicopter time	50 hours (14 flights)

The programme was later amended to include a total of eight scientific members, one of whom was to work as an assistant to the site geologists of the Dry Valley Drilling Project. Various changes to the itinerary were made as cuts in the amount of helicopter time available, from a requested 50 hours to a maximum of 36 hours, became known. A change in the schedule of flights to the Antarctic necessitated some reshuffling of trip members and a request for another DSIR field assistant for a short period.

Fuel requirements were revised during field preparations at Scott Base. Extra kerosene to be used as a coolant during drilling for palaeomagnetic samples was added to that required for cooking. The final figures requested were:

Petrol	96 gallons
Kerosene	125 gallons

EXPEDITION MEMBERS

The five main projects (combined into three main parties for field work) were made up as follows:

VUWAE 18A (McMurdo Volcanic Project)

Geologist	Philip Kyle	BSc (Hons.), Ph.D. student, Victoria University.
Field assistant	Ross Cooper	Antarctic Division, D.S.I.R.

VUWAE 18B (Mawson Breccia Project)

Geologist/Leader	Janet Crump	BSc (Hons.), Ph.D. student Victoria University.
Geologist	Russell Plume	BSc. Honours student, Victoria University.
Geologist	Graham Rowe	BSc. Honours student, Victoria University.
Field Leader	Ken Blackwood	Antarctic Division, D.S.I.R.

VUWAE 18C (Salts Project)

Chemist	John (Harry) Keys	MSc, Ph.D. student, Victoria University.

VUWAE 18D (Aztec Siltstone Project)

Geologist	John McPherson	BSc. (Hons.), Ph.D. student, Victoria University.

VUWAE 18E (Palynology Project)

Geologist	Rosemary Kyle	BSc (Hons.), Ph.D. student, Victoria University.

In addition, one student worked as an assistant geologist to aid the site geologists of DVDP, but was included in the planning of VUWAE.

Geologist	Paul Luckman	BSc, Honours student, Victoria University.

FINANCE

A grant from the University Grants Committee was used to pay for food, clothing, camping items, travel and freight, and to cover insurance of personnel and instruments. The University Council provided financial support for McPherson, Keys, Plume, Rowe, and Luckman.

FIELD GEAR

Field gear available in VUWAE stores in Wellington and Scott Base included sleeping bags and rolls, windproof gear, ice axes, packs and kitchen boxes. Replacements of worn or broken equipment were made using the finance from University Grants Committee. The remainder of the field equipment, including toboggans, tents and radios, was requested from Antarctic Division, as was down clothing which has previously been borrowed from Antarctic Division but which will be the responsibility of VUWAE in any future expeditions.

FOOD

The field parties are charged on a man-day basis irrespective of whether in the field or at Scott Base. Supplementary items such as fresh meat, canned fruit, chocolate and cake were purchased by the expedition before leaving New Zealand. Some allowance for obtaining such food from Scott Base was proposed both at Tekapo and in the Field Manual, but this can only occur if Scott Base itself is fully stocked at the time of the party's departure into the field.

NARRATIVE ACCOUNTS OF EXPEDITION

The following are the narrative accounts of the five main groups as previously listed. Several of these groups combined for part or all of the season when working in the same areas.

VUWAE 18A

At 1.30 a.m. on September 5, P. Kyle and others of the N.Z. Dry Valley Drilling Project (DVDP) drill crew took off in a U.S. Navy C130 Hercules from Christchurch. This, the third of four winter flights (Winfly) landed at McMurdo Station at 9.25 a.m. in clear calm weather to a rising sun and a temperature of - 25°C.

During the next 9 or so weeks Kyle was site geologist at DVDP 3. After ice was drilled from the casing of DVDP 2 the Longyear wireline drill rig was moved 3 m to the north and on September 20 DVDP 3 was commenced. Drilling continued until October 19 when the rig was dismantled for transportation to Marble Point. All the core was examined and logged in the Earth Science Lab. at McMurdo Station.

Following several false starts, P. Kyle, Ross Cooper (D.S.I.R. field assistant) and Sam Treves (DVDP project scientist) flew by helo to Mt. Erebus on November 11. After establishing camp the party climbed the 120 m to the crater to inspect the crater. The weather was clear and calm with a view of the inner crater only partly obscured by steam and vapour. This was the best view in two years of visits that Kyle had ever had into the crater. A dramatic sight greeted the observers. On the north-eastern side of the inner crater lava was flowing westward from a vent into a partially frozen lava lake. The surface of the 8 - 10 m wide flow was partly congealed green-grey flow banded ropey lava. As the highly viscous lava slowly flowed the surface would break revealing the deep red molten lava lying beneath the thin solidified skin.

The inner crater is divided into half by a small ridge running east-west. Lava was first observed on the northern side of the ridge during the 1972-73 season by a NZARP party which included Kyle. During the present visit the lava was still confined to the northern side of the dividing ridge; however it was apparent that a considerable amount of lava had flowed into the area. Much of what was irregular crater floor dotted with fumaroles in 1972-73 was now flat frozen lava. The southern side of the inner crater was snow-covered with a few groups of small, nosiy fumaroles.

After inspecting the crater the party returned to the camp. In the early evening Treves returned to McMurdo by helo. Cooper and Kyle had both developed thumping headaches by evening as a result of the altitude change. Following a good, but very cold, night's sleep the headaches had subsided. In deteriorating weather an inspection of fumarolic ice towers was made next morning to find a site to install a slow recording seismograph. In the afternoon 70 kg of equipment was carried to the site in a warm (+ 1°C) underground ice cave, 400 m downhill from the camp. The seismometer did not operate, however, and had to be returned to camp for repairs. We were exhausted by the heavy work but apart from that did not seem to suffer any altitude effects.

Severe blizzard conditions for the next four days restricted any movement from the tent. Attempts to repair the seismometer were unsuccessful and so the main scientific objective of the visit was over.

Over the next week poor weather allowed only trips a short distance from the camp. The crater rim was visited almost daily; however dense cloud and vapour obscured any view of the inner crater and the lava. Depth measurements of the main crater floor were made using an inclinometer and a 50 m measuring tape. A depth of about 130 m was estimated. Heavy snow cover around the crater rim limited any geological work. On the evening of November 24, Dr. Haroun Tazieff and Sam Treves arrived by helo. In very cold, windy conditions the party visited the crater; cloud again completely obscured any view into the crater. The following day the party returned to Scott Base by helo.

VUWAE 18B (includes C, D, E until Nov. 23)

On November 12 a party of seven set up camp on Shapeless Mountain. Of these Crump, Plume, Rowe and Blackwood were to spend 8 weeks at Shapeless mapping and investigating the Mawson Breccia, and doing some work on the Beacon sediments. R. Kyle, McPherson and Keys planned 10 days work on, respectively, palynology, Aztec Siltstone, and salt distribution, before moving south to the other localities. However bad weather, an extraordinarily heavy snow cover, and illness allowed a total of five days work only at Shapeless.

During the first 2 weeks the whole party experienced, to various extents, what was later determined as CO poisoning. The symptoms included headaches, dizziness, vomiting and collapse. At the same time high winds, then heavy snow prevented anything more than reconnaissance being done. A one-day toboggan trip to nearby Mount Fleming was undertaken by Blackwood, Crump, Keys, McPherson and Kyle on November 19. Here McPherson examined the Aztec Siltstone, though this was poorly exposed due to snow cover, and Kyle collected coal samples and tried unsuccessfully to drill sandstone for palaeomagnetic study.

On November 23 Kyle, Keys and McPherson left by helo for the Lashly Mountains. For the next 3 days Blackwood, Crump, Plume and Rowe carried out reconnaissance of the area. Early on the morning of November 27 Plume and Blackwood experienced dizziness and almost lost consciousness. By 9 a.m. that morning they had been evacuated to McMurdo for a check-up. Fresh supplies of kerosene and replacement primus stoves were delivered from Scott Base, but the remaining members of the party continued to suffer from headaches and faintness. The poisoning seemed to be accumulative, and with the bad weather conditions and little chance of outside work, this had become a real hazard. On December 1 Crump and Rowe were taken by helo to Vanda to recover.

An attempt to transport the whole party back to Shapeless on December 5 was unsuccessful because of bad weather. Since this seemed likely to continue, alternative areas of study in the Wright Valley, suitable for Honours projects, were worked on. On December 14 the weather cleared and Blackwood, Crump, Plume and Rowe returned to Shapeless. As the polar tents used in the first part of the season were of a heavier material than usual and were possibly causing or aggravating the carbon monoxide problem, they were replaced.

Bad weather and heavy snow again prevented any work, and delayed a pull-out until December 28. From then until the end of the season the party worked on sedimentary rocks in the Olympus and Asgaard Ranges bordering the Wright Valley.

Division of time in the field

Spent on geology	30 days
Lost due to bad weather, health, and heavy snow cover	24 days
Spent on helo shifts	6 days
	68 days

VUWAE 18 C,D,E

At 1300 hrs. on 23rd November, Keys, R. Kyle, and McPherson were shifted by helo from Shapeless Mountain to a platform below the South face of Mt. Crean, in the Lashly Mountains. Two sections, measured and described by an earlier VUWAE party (Barrett and Kohn, 1971), were studied during the next 8 days by R. Kyle, and McPherson, whilst Keys collected salts throughout the region. High winds from the Polar Plateau confined the party to the camp site for 2 of the days.

On December 2, the party was shifted by helo to Aztec Mountain, where a camp was established for Keys and McPherson. R. Kyle went on to Scott Base. Heavy snowfalls (up to 6 cm), both prior to arrival and during the 5 day stay at Aztec Mountain, made geological work on anything but the vertical faces extremely difficult, more especially the salt collecting. However, a detailed study of sections described by VUWAE 13 (Barrett and Webb, 1973) was carried out.

A helo shift to Mt. Metschel was achieved on December 7, but high winds (up to 50 knots) made it necessary to put down approximately 1 km to the East of the Mountain. These high winds continued for much of the stay at Metschel, but did not greatly interfere with the detailed geological investigation of the area.

On December 13 the party was shifted to the Alligator Peak region, and excellent weather permitted 5 days of detailed geological re-examination of sections described by VUWAE's 13 and 15 (Askin et al., 1971; Barrett and Kohn, 1971; Barrett and Webb, 1973). An attempt at drilling some of the massive red beds for paleomagnetic samples failed due to the highly fractured and friable nature of the material; however block samples were obtained.

A move by helo to Rotunda was made on December 19 and after establishing the camp, the helo lifted the party the 700 m to the top of the measured section at Rotunda (Askin et al., 1972; Barrett and Webb, 1973). Three successful days of geology were achieved before the return to Scott Base by helo on December 22. The return was via the snout of the Taylor Glacier, where a stop-off for 1½ hours enabled Keys to make a study and collection of the Taylor Red Deposit (Allis et al., 1973), visited by him the previous season.

References

Allis, R., Crump, J.M., Hunt, T.M., Keys, J.R., and Kyle, P.R. 1973. Immediate report of Victoria University of Wellington Antarctic Expedition 1972-73. Wellington, New Zealand. 39 pp.

Askin, R.A., Barrett, P.J., Kohn, B.P. and McPherson, J.G. 1971. Stratigraphic sections of the Beacon Supergroup (Devonian and older (?) to Jurassic) in south Victoria Land. Antarctic Data Ser. 2, Victoria University, Wellington. 88 pp.

Askin, R.A., Barrett, P.J., Kyle, P.R., and Laird, M.G. 1972. Immediate report of Victoria University of Wellington Antarctic Expedition 1971-72. Wellington, New Zealand. 37 pp.

Barrett, P.J. and Kohn B.P. 1971. Immediate report of Victoria University of Wellington Antarctic Expedition 1970-71. Wellington, New Zealand. 32 pp.

Barrett, P.J. and Webb, P.N. 1973. Stratigraphic sections of the Beacon Supergroup (Devonian and older (?) to Jurassic) in south Victoria Land. Antarctic Data Ser. 3, Victoria University, Wellington. 165 pp.

Division of Time

Spent on Geology	19 days
Spent on helo shifts	4 days
Bad weather	6 days
	29 days

DVDP Assistant

On arriving in the Antarctic Paul Luckman spent four days in the field examining the volcanic geology of the Turk's Head - Tryggve Point area. He then worked for several months with the Dry Valley Drilling Project, as an assistant geologist on site and in the Earth Sciences Laboratory in McMurdo where he helped log and photograph the core.

SCIENTIFIC ACHIEVEMENTS

VUWAE 18A

1. As site geologist at DVDP hole 3, P. Kyle was responsible with Dr. S.B. Treves (the Project Scientist) for logging and examining the core. DVDP 3 reached 381 m in depth and recovered 341.16 m of core. The rocks penetrated consisted of ten lava flow units and five pyroclastic units. The oldest unit, 214 m thick, is believed to be a hyaloclastite. The units were assigned to four rock types, which are from youngest to oldest: hawaiite, augite-kaersutite basalt, olivine-augite basalt and hyaloclastite. Detailed descriptions of the core and thin sections similar to that prepared for DVDP 1 and 2 (Treves and Kyle, 1973a) have been written up (Kyle and Treves, in press).

2. Mt. Erebus was observed to be in a continuing state of activity similar to that reported last year (Giggenbach et al, 1973; Treves and Kyle, 1973b). Lava was observed flowing from a small vent into a partially frozen lava lake. Gas explosions in the crater were of a similar frequency but longer (6 - 25 seconds) in duration than those previously reported (Giggenbach et al, 1973).

References

Giggenbach, W.F., Kyle, P.R. and Lyon, G.L. 1973. Present volcanic activity on Mt. Erebus, Ross Island, Antarctica. Geology 1: 315-316.

Kyle, P.R. and Treves, S.B. 1974. Geology of DVDP 3, Hut Point Peninsula, Ross Island, Antarctica. Dry Valley Drilling Project Bulletin 3, in press.

Treves, S.B. and Kyle, P.R. 1973a. Geology of DVDP 1 and 2, Hut Point Peninsula, Ross Island, Antarctica. Dry Valley Drilling Project Bulletin 2: 11-82.

Treves, S.B. and Kyle, P.R. 1973b. Renewed volcanic activity of Mt. Erebus, Antarctica. Antarctic Jnl. of U.S. VIII: 156.

VUWAE 18B

The main objective of VUWAE 18B was to extend the study of the Mawson Breccia (Allis et al, 1973) both at Shapeless Mountain and at Allan Hills by:

(1) Detailed mapping of Shapeless Mountain;

(2) Mechanical analysis of randomly chosen square metres of breccia;

(3) Examination of the clastic dykes at Shapeless Mountain;

(4) Sampling for chemical analysis, dating, and palaeomagnetic study.

Because of unusually heavy snow cover, high winds, and sickness in the party, only five days were spent on geology at Shapeless, and none of the main objectives could be achieved. However, in the time

spent at Vanda recuperating, alternative projects for Plume and Rowe were planned and these were worked on in January. At Plane Table sections were measured and sedimentary features described, while at Mount Jason ichnofossils were examined and described.

References

Allis, R., Crump J., Hunt, T, Keys, J., Kyle, P. 1973. Immediate report of Victoria University of Wellington Antarctic Expedition 1972-73, Wellington, New Zealand. 39 pp.

VUWAE 18C

1. Detailed and systematic sampling of salt deposits and salt accumulations was performed in localities at: Shapeless Mountain, Lashly Mountains, Mt. Metschel, Alligator Peak, Beacon Valley and Rotunda.

Further samples from various places in the Dry Valley region were collected by other members of the expedition and by members of other Events. Sincere thanks are extended to these people.

2. The Salt Map of south Victoria Land (Keys, 1972; Allis et al, 1973) can be extended to these new localities which being geographically removed from the Dry Valley region will add a new dimension to the overall knowledge of salt distribution in the area.

3. The Taylor Mineral Discharge (Keys et al, in prep.) was further examined and also several chemically similar mineral strata discovered on the Skelton Neve. A series of strata of similar form but containing different minerals were also discovered on the Skelton Neve and at Rotunda. Samples of the minerals and the ice host were taken for analysis and crystallographic study.

References

Allis, R., Crump, J., Hunt, T., Keys, J.R., Kyle, P.R. 1973. Immediate report of Victoria University of Wellington Antarctic Expedition 1972-73. Wellington, New Zealand. 39 pp.

Keys, J.R. 1972. A study of salt origin, distribution and weathering processes in the McMurdo Sound region, south Victoria Land, Antarctica. Unpublished MSc. Thesis, Victoria University of Wellington.

Keys, J.R., Johnston, J.H., Freeman, A.G. (in prep.). The origin and analysis of the Taylor Mineral Discharge, south Victoria Land, Antarctica.

VUWAE 18D

1. Sections of Aztec Siltstone at Mt. Metschel and in the Alligator Peak area which had been visited in 1970-71 (Askin et al, 1971; Barrett et al, 1971; Barrett and Kohn, 1971) were re-examined and sampled on a very detailed scale for further petrographic and

chemical analysis. Careful observation was made of specific sedimentological phenomena, e.g. nodules, intraformational conglomerates, mudcracks, and ripple marks. The relationships between colour of beds and sedimentary features, e.g. burrows and vein networks, and the changes in bedding characteristics in both vertical and lateral directions were also studied. Units considered to be fossil soil horizons (Barrett et al, 1971; McPherson, 1973) were studied and photographed, and were sampled in both vertical and horizontal directions for changes in chemical composition indicative of former soil processes.

2. Sections of Aztec Siltstone visited by previous VUWAE parties (Askin et al, 1972; Barrett and Webb, 1973) but not by the author, were examined in the same detail as the others. These were at Shapeless Mountain, Mt. Fleming, the Lashly Mountains, and Aztec Mountain.

3. Further red beds from formations lower in the Taylor Group were examined and sampled at Rotunda. They were found to differ considerably from those of the Aztec Siltstone.

4. Suitable massive units of the Aztec Siltstone were selected for paleomagnetic sampling. Orientated drill sampling was attempted, but failed due to the highly fractured and friable nature of the siltstones. Bulk orientated samples were taken instead, but even these were difficult to remove in suitably large pieces.

References

Askin, R.A., Barrett, P.J., Kyle, P.R., Laird, M. 1972. Immediate Report of Victoria University of Wellington Antarctic Expedition 1971-72. Wellington, New Zealand. 37 pp.

Barrett, P.J., Kohn B.P., Askin, R.A., and McPherson, J.G. 1971. Preliminary report on Beacon Supergroup Studies between the Hatherton and Mackay Glaciers, Antarctica. New Zealand Journal of Geology and Geophysics, Vol. 14, No. 3, 1971. pp. 605-614.

Barrett, P.J. and Kohn, B.P., 1971. Immediate report of Victoria University of Wellington Antarctic Expedition 1970-71. Wellington, New Zealand. 33 pp.

Barrett, P.J. and Webb, P.N. 1973. Stratigraphic Sections of the Beacon Supergroup (Devonian and Older (?) to Jurassic) in South Victoria Land. Antarctic Data Series No. 3. Publication of Geology Department, Victoria University of Wellington.

McPherson, J.G. 1973. Stratigraphy and petrology of the Aztec Siltstone, south Victoria Land, Antarctica. Australian and New Zealand Association for the Advancement of Science, 45th Congress, Perth (Abstracts).

VUWAE 18E

1. Detailed sampling of Permian sandstones and siltstones for palynological study was carried out at Shapeless Mountain and the Lashly Mountains, which had both been previously visited and described by VUWAE parties (Barrett and Kohn, 1971; Askin et al, 1972). The microfloral assemblages from these samples will be compared with the Australian Permian palynological zonal scheme in order to set up a Permian-Triassic zonal scheme for the Victoria Group in south Victoria Land.

2. Coal samples from the Permian coal-measures at Mt. Fleming and the Lashly Mountains were collected for analysis.

3. The mode of occurrence of the coal beds and the nature of their associated sediments was studied in the above localities.

4. Measurements of fossil plants (e.g. calamitid stems) were made at the above localities.

References

Askin, R.A., Barrett, P.J., Kyle, P.R. and Laird, M. 1972. Immediate report of Victoria University of Wellington Antarctic Expedition 1971-72. Wellington, New Zealand. 37 pp.

FIELD TRANSPORTATION

The Shapeless party took 2 Johnson toboggans out into the field, as they did last year, to be used largely for day trips. Although these toboggans had been proved adequate for this purpose last year, and all the necessary spares were available in the field, continuing trouble with the fuel system was experienced. Traction was considerably improved by the addition of ice-cleats to the track. Details of the performance of these toboggans can be found in the report to Antarctic Division by Blackwood.

Air support was provided by twin-turbine UHI-N helicopters. This included transport to and from the field for all the field groups and an emergency evacuation, and enabled Keys and McPherson to carry out an efficient trip to five separated localities in minimum time.

ACKNOWLEDGEMENTS

The expedition is grateful for the financial assistance provided by the University Grants Committee for equipment and supplies and by the University Council for grants to students.

We thank the pilots and crews of the U.S. Navy VXE-6 Squadron who willingly and cheerfully provided air support.

The assistance and co-operation given by Harry Jones, Shaun Norman and the Scott Base staff was much appreciated.

We thank Antarctic Division, Christchurch, for all the work that goes into supporting such an expedition.

The Weather Office, Wellington, kindly lent the expedition meteorological instruments.

Our thanks as always to Professor Clark, Department of Geology, V.U.W., for his interest and enthusiastic support, and to Dr. Peter Barrett, Director, Antarctic Research Centre, V.U.W. for his help.

APPANEIX I - FLIGHT REQUIREMENTS VUWAE 18

Table 1 - Original Schedule

Date	Project	Purpose	Origin	Destination	Weight (lb)	Aircraft	Hours
Sept 5	A	Transport 1	Christchurch	Scott Base	250	C130	
Oct 22	C	Transport 1	Christchurch	Scott Base	250	C141	
Before Nov 2	A,B,C,D,E	Air Cargo	Christchurch	Scott Base	900		
Nov 2	B,D,E	Transport 3	Christchurch	Scott Base	750	C141	
Nov 7	B,D,E	Put in 4	Scott Base	Shapeless Mt.	3000	Helo (2)	4
Nov 8	B	Transport 2	Christchurch	Scott Base	500	C141	
Nov 11	B,C	Put in 4	Scott Base	Shapeless Mt.	1600	Helo	3
Nov 17	C,D,E	Transfer 3) Pick up 1)	Shapeless	(Mt. Crean (Scott Base	1600	Helo	3¼
Nov 18	(DVDP)	Transport 1	Christchurch	Scott Base	250	C141	
Nov 26	A	Transport 1	Scott Base	Christchurch	250	C141	
Nov 29	C,D,E	Tranafer 2) Pick up 1)	Mt. Crean	(Aztec Mt. (Scott Base	1600	Helo	2½
Dec 2	E	Transport 1	Scott Base	Christchurch	250	C141	
Dec 5	C,D	Transfer 2	Aztec Mt.	Mt. Metschel	1500	Helo	3
Dec 11	C,D	Transfer 2	Mt. Metschel	Alligator Peak	1500	Helo	3¼
Dec 17	C,D	Transfer 2	Alligator Peak	Rotunda	1200	Helo	3
Dec 22	C,D	Transfer 1) Pick up 1)	Rotunda	(Shapeless Mt. (Scott Base	1500	Helo	2 3/4
Dec 23	B,C	Transfer 3) Pick up 2)	Shapeless Mt.	(Allan Hills (Scott Base	4000	Helo (2)	4
Dec 27	B	Transport 2	Scott Base	Christchurch	500	C130	
Jan 17	B,C	Pick up 3	Allan Hills	Scott Base	1600	Helo	3½

Date	Project	Purpose	Origin	Destination	Weight (lb)	Aircraft	Hours
Jan 20	B,C	Transport 2	Scott Base	Christchurch	500	C130	
Feb 17	(DVDP)	Transport 1	Scott Base	Christchurch	250	C130	

Total estimated helo requirements : 35½ hours

Table 2 - Actual Schedule

Date	Project	Purpose	Origin	Destination	Weight (lb)	Aircraft	Hours
Sept 5	A	Transport 1	Christchurch	Scott Base	250	C130	
Oct 28	C	Transport 1	Christchurch	Scott Base	250	C141	
Before Nov 2	A,B,C,D,E	Air Cargo	Christchurch	Scott Base	900		
Nov 2	D	Transport 1	Christchurch	Scott Base	250	C141	
Nov 7	B,E	Transport 2	Christchurch	Scott Base	500	C141	
Nov 9	B	Transport 2	Christchurch	Scott Base	500	C141	
Nov 12	B,C,D,E	Put in 7	Scott Base	Shapeless Mt.	4000	Helo (2)	6½
Nov 18	(DVDP)	Transport 1	Christchurch	Scott Base	250	C141	
Nov 23	C,D,E	Transfer 3	Shapeless Mt.	Mt. Crean	1500	Helo	3¼
Nov 26	A	Transport 1	Scott Base	Christchurch	250	C141	
Nov 27	B	Medical evacuation of 2	Shapeless Mt.	McMurdo	500	Helo	
Dec 1	B	Medical transfer 2	Shapeless Mt.	Vanda	500	Helo	3/4
Dec 2	C,D,E	Transfer 2) Pick up 1)	Mt. Crean	(Aztec Mt. (Scott Base	1600	Helo	2½
Dec 5	B	(Unsuccessful) transfer 4	Vanda	Shapeless Mt.	1200	Helo	2
	E	Transport 1	Scott Base	Christchurch	250	C141	
Dec 7	C,D	Transfer 2	Aztec Mt.	Mt. Metschel	1500	Helo	3
Dec 13	C,D	Transfer 2	Mt. Metschel	Alligator Peak	1500	Helo	3
Dec 14	B	Transfer 4	Vanda	Shapeless Mt.	1200	Helo	2
Dec 19	C,D	Transfer 2	Alligator Peak	Rotunda Mt.	1500	Helo	3
Dec 22	C,D	Pick up 2	Rotunda Mt.	Scott Base	1500	Helo	2

Date	Project	Purpose	Origin	Destination	Weight (lb)	Aircraft	Hours
Dec 26	C,D	Transport 2	Scott Base	Christchurch	500	C130	
Dec 29	B	Transfer 4	Shapeless Mt.	Vanda	4000	Helo (2)	6
Jan 8	B	Pick up 1	Plane Table	Scott Base	250	Helo	1
Jan 9	B	Transport 1	Scott Base	Christchurch	250	C130	
Jan 20	B	Pick up 1	Vanda	Scott Base	250	Helo	½
Jan 22	B	Pick up 1	Vanda	Scott Base	250	Helo	½
Jan 24	B	Transport 2	Scott Base	Christchurch	500	C130	

Total estimated helo requirements: 35½ hours

APPENDIX II - ITINERARY

VUWAE 18A

Sept 5	P. Kyle to McMurdo (Winfly).
Sept 5 - Nov. 10	P. Kyle site geologist at DVDP 3 drill hole - McMurdo Station.
Nov. 11	P. Kyle, Cooper (D.S.I.R. field assistant) and Treves to Mt. Erebus by helo. Treves returns to McMurdo.
Nov 12-24	Observations at Mt. Erebus.
Nov 24	Tazieff and Treves by helo to Mt. Erebus.
Nov 25	P. Kyle, Cooper, Tazieff and Treves return to Scott Base.
Nov 26	P. Kyle and Taxieff return to New Zealand.

VUWAE 18B (plus VUWAE 18 C, D, E up to Nov 23)

Oct 28	Keys Christchurch to Scott Base.
Nov 1	McPherson Christchurch to Scott Base.
Nov 2 - 6	Field preparations.
Nov 7	Crump and R. Kyle Christchurch to Scott Base.
Nov 8	Field preparations.
Nov 9	Plume and Rowe Christchurch to Scott Base.
Nov 10	Field preparations.
Nov 11	Field preparations. Blackwood and Keys move equipment to Marble Point by toboggan.
Nov 12	Two helos shift Crump, Kyle, McPherson, Plume, Rowe and equipment from Scott Base to Shapeless. Also shift Blackwood and Keys from Marble Point to Shapeless.
Nov 13-16	Tent days.
Nov 17	Geological day.
Nov 18	Prepared for toboggan trip to Mt.Fleming.
Nov 19	Geological day at Mt. Fleming.
Nov 20	Prepared for helo shift for VUWAE C, D, E to Lashly Mountains.
Nov 21-22	Tent days.
Nov 23	Keys, Kyle and McPherson shifted by helo to Lashly Mountains. Blackwood, Crump, Plume and Rowe remain at Shapeless.
Nov 24-26	Geological days.
Nov 27	Medical evacuation of Blackwood and Plume to McMurdo. R. Cooper replaces Blackwood at Shapeless.
Nov 28	Blackwood and Plume to Vanda.
Nov 28 - Dec 1	Tent days at Shapeless.
Dec 1	Helo lifts Crump and Rowe out to join Blackwood and Plume at Vanda. R. Cooper to Scott Base.
Dec 2 - 4	At Vanda; party recuperates from effects of CO poisoning.
Dec 5	Unsuccessful attempt to transport party back to Shapeless.
Dec 6-14	Crump, Plume and Rowe did reconnaissance work for alternative projects in Wright Valley.
Dec 14	Blackwood, Crump, Plume and Rowe by helo to Shapeless.
Dec 15-28	Tent days.
Dec 29	Party to Vanda by helo.
Dec 30 - Jan 1	Sorted gear, preparations for local field trips in Asgaard and Olympus Ranges.

Jan 2 - 7	Geological days - Plume and Blackwood on Plane Table, Rowe and Crump on Mt. Jason.
Jan 8	Plume to Scott Base, Blackwood to Vanda, by helo.
Jan 9	Plume to New Zealand.
Jan 9 - 19	Geological work on Mt. Jason.
Jan 20	Crump to Scott Base by helo.
Jan 22	Rowe to Scott Base by helo.
Jan 24	Crump and Rowe to New Zealand.

VUWAE C, D, E from Nov 24

Nov 24	Geological day.
Nov 25	Tent day.
Nov 26	Geological day.
Nov 27	Tent day.
Nov 28	Geological day.
Nov 29	Geological day.
Nov 30	Geological day.
Dec 1	Geological day.
Dec 2	Helo shift for Keys and McPherson to Aztec Mountain, and for R. Kyle to Scott Base.
Dec 3	Geological day.
Dec 4	Tent day.
Dec 5	R. Kyle to Christchurch.
Dec 5 - 6	Geological days.
Dec 7	Helo shift to Mt. Metschel for Keys and McPherson.
Dec 8	Geological day.
Dec 9	Tent day.
Dec 10	Geological day.
Dec 11 - 12	Tent days.
Dec 13	Helo shift for Keys and McPherson to Alligator Peak.
Dec 14 - 18	Geological days.
Dec 19	Helo shift for Keys and McPherson to Rotunda Mountain. Geological day.
Dec 20 - 21	Geological days.
Dec 22	Helo shift for Keys and McPherson to Scott Base, with an hour's stop at the snout of the Taylor Glacier to collect salt samples.
Dec 23	Keys and McPherson to New Pole Station by C-130.
Dec 24 - 25	Packing at Scott Base.
Dec 26	Keys and McPherson to Christchurch.

Date	Time	Temp °C	Wind (knots)	Wind dir.	Cloud cover	Visibility	Comments
MOUNT EREBUS (77°32'S; 167°8'E; map elevation 3600 m)							
Nov 11	1200	-23	1-2	S		Unlimited	
12	1045	-25.5	5-10	S	4/8 H	"	
13	1030	-27	5-25 gusts 35	S	Whiteout	25 m	Wind increasing during day; gusts to 60 knots
14	1030	-25	15-30 gusts 50	SE	Whiteout	20 m	2 cm fresh snow
	1700	-32	30-40 gusts over 60	SE	Whiteout	20 m	Heavy snow cover
15	1030	-28	15-30	SE	Whiteout	100 m	Fresh snow overnight
	1600	-28	0-25	SE	Whiteout	100 m	Partial clearance 2000 - 2400
16	1030	-30	5-25 variable	SE	Whiteout	100 m	
	2100	-31	10-20 gusts 40	SE	8/8 L	Broken 6 km	
17	1030	-27	10-15 gusts 25	E	Nil	Unlimited	Wind increasing, whiteout by evening
18	1030	-27.5	0-5	S	3/8 H 8/8 below camp	18 km	Snow overnight
	1700	-28.5	15-20 gusts 25	S	7/8 below camp	Broken 10 km	Cloud rising causing whiteout periodically through day
19	1040	-28.5	1-2	S	Broken whiteout	0.5 km	Snow overnight (1 mm), still snowing
20	1030	-28.5	1-5	SE	Ground cloud 0.5 km north	1 km to N 12 km to S	Falling snow; 7/8 cloud at camp, clear to S.
21	1030	-30.0	0-5	SE	6/8 L, ground cloud 0.5 km N	0.5 km to N 5 km to S	Falling snow

Date	Time	Temp	Wind (knots)	Wind dir.	Cloud cover	Visibility	Comments
22	1030	-29	0-2	NW	Nil	Unlimited	
23	1030	-28	10-15	N	Whiteout	100 m	Snow overnight
24	1030	-27	15-20	N	3/8 H; ground cloud	2 km	Cloud variable throughout day, drift overnight

Date	Time	Temp °C	Wind (knots)	Wind dir.	Cloud cover	Visibility	Comments
SHAPELESS MOUNTAIN		(77°24.5' S; 160°22"E; map elevation 2200 m)					
Nov 15	1100	-22	50	S	-	200 m	Blowing snow. Previous 2 days had similar weather
16	2100	-23	30	S	-	200 m	Blowing snow
17	2100	-21	3	NE	Overcast	500 m	Light snow
18	1000	-22	5-70	S	2/8 Cumulus, Cirrostratus	Unrestricted	Wind increasing, visibility dropping, light snow
19	1100	-22	-	-	7/8 Altocumulus	Unrestricted	
20	1200	-20	5-10	N	8/8	500 m	Light snow
21	1400	-20	5	N-NW	Overcast	200 m	
22	1400	-20	5	N	Overcast approaching whiteout	500 m	
23	2200	-24	7	S	-	Unrestricted	Clear
24	1000	-23	12-15	S	-	Unrestricted	Drifting snow
25	1800	-21	15-18	S	1/8 Altostratus	Unrestricted	
26	1200	-21	5	S	5/8 Cirrostratus	Unrestricted	Clear and calm, visibility later decreased
27	2400	-24	Gushing up to 10	S	-	Unrestricted	Clear
28	1500	-25	5-10	NE	Overcast	500 m	Light snow
29	0800	-25	-	-	Overcast	800 m	Snow
Dec 1	0900	-25	25	S	8/8 Cirrostratus	500 m	Blowing snow
14	1800	-20.5	15	S	-	Unrestricted	Clear, sunny

Date	Time	Temp °C	Wind vel.	Wind dir.	Cloud cover	Visibility	Comments
Dec 15	1430	-15	5-10	N	8/8 Altocumulus	5 km	Light snow
16	1700	-18	5	NE	Overcast	400 m	Light snow
17	1400	-18	2-3	NE	Whiteout	200 m	Snow
18	1400	-17.5	5-10	E	8/8, 6/8 Altocumulus 2/8 Cirrostratus	500 m	Light snow
19	1100	-16	1-2	SSE	7/8 Cirrocumulus	Unrestricted	Light snow
20	1900	-19	-	-	8/8 Cirrostratus	Unrestricted	
21	1200	-17	-	-	5/8 Cirrostratus	Unrestricted	Hazy
22	1500	-17	5	NNE	8/8, fog	100 m	Snow
24	1200	-19.5	1-2	NNE	Overcast	100 m	Heavy snow
25	1200	-20	15-20	S	Overcast	200 m	Drifting snow
26	1630	-17	10-15	S	-	Unrestricted	Drifting snow
27	1230	-16.5	5-10	N	7/8 Altocumulus	Unrestricted	Snow later in day
28	1200	-19	15-20	S	5/8 Cirrostratus	700 m	Drifting snow
29	0900	-18	20	N	-	Unrestricted	Drifting snow
MT. JASON (77°29' S; 161°33'E; map elevation 1800 m)							
Jan 2	2000	-4	15	SW	2/8 Cirrostratus	Unrestricted	Clear, sunny
3	1400	-4	4	SW	-	Unrestricted	Clear
4	16300	-1	5-10	S	1/8 Cirrostratus	Unrestricted	Clear
5	1400	-4	0-5	SW	-	Unrestricted	Clear
6	1230	-5	5-10	S	1/8 Stratus	Unrestricted	Clear
7	1430	-8.5	-	-	7/8 Altocumulus	Unrestricted	Clear
8	1230	-9	0-5	S	4/8 Stratus and altocumulus	Unrestricted	Clear

Date	Time	Temp °C	Wind (knots)	Wind dir.	Cloud cover	Visibility	Comments
Jan 9	1000	-7.5	0-5	S	2/8 Altostratus	Unrestricted	Clear
10	1700	-6	10	S	4/8 Stratus	Unrestricted	
11	1330	-8.5	10	NE	6/8 Altocumulus	Unrestricted	Light snow
13	1300	-11	0-5	W	Overcast	2 km	Light snow
14	1300	-11	-	-	7/8 Altocumulus	Unrestricted	
15	1315	-12.5	5-10	S	3/8 Altocumulus	Unrestricted	
16	1530	-12	5-10	S	3/8 Altocumulus	Unrestricted	Clear
17	0930	-11.5	5	S	-	Unrestricted	

Date	Time	Temp °C	Wind (kts.)	Wind dir.	Cloud cover (eighths)	Visibility	Remarks/other weather features
LASHLY MOUNTAINS (77°52'S, 159°32'E; helicopter altimeter reading 2570 m)							
Nov 23	1800	-21	7	S	Fraction H	Unrestricted	Calm at 1400
24	1730	-26	25	W	Nil	Unrestricted, but some drifting snow	Wind direction at camp slightly N of W due to near by mountain wall. Camp in sheltered locality.
25	1730	-22	12	W	Fraction H	Unrestricted	Winds gusting 25-30 kts. in morning. Decreasing from 1200 hrs. on
26	1630	-22	10	W	1 H	Unrestricted	Max. gust 7 kts. at 0500.
27	2230	-29	23	W	Nil	Unrestricted, but some drifting snow	Windy all day.
28	1830	-16	Calm	-	7 M	Unrestricted	Cloud spread from NE during afternoon. Wind dropped early morning. Light snow falling.
29	2230	-26.5	2	W	7 M	Unrestricted	Snowfall almost ablated.
30	2100	-25	18	SW	Partly obscured 7 M	800 m	Snowing, halo round sun, drifting snow
Dec 1	1400	-23	8	W	6 H	40 km	Halo round sun, ice prisms
2	0700	-23	Calm	-	Nil	Unrestricted	Cloud decreasing since 2000 1/12/73
AZTEC MOUNTAIN/BEACON DRY VALLEY (77°48'S, 160°30'E; altimeter reading 1830 m)							
2	1300	-16	2	NE	8 L (Alt 1900 m)	6 km	Snow falling
3	1800	-16	Calm	-	8 L/M	9 km	Clear at 0300, snowing by 1000
4	1345	-16.5	Calm	-	7 M	3 km	Snow falling. Total snow-fall since 1800 on 3/12/73 ca 1.5 cm

Date	Time	Temp °C	Wind (kts.)	Wind dir.	Cloud cover (eighths)	Visibility	Remarks/other weather features
Dec 5	1730	-17	2	W	2 L (Alt. 2200 m)	Unrestricted	Barometric pressure dropping
6	1700	-15.5	Calm	-	4 M	Unrestricted	Snow falling very lightly. Pressure rising.
7	1100	-13.3	0-5	Variable NW-NE	Nil	Unrestricted	Pressure still rising.
MT. METSCHEL (78°17'S, 159°01'E; Altimeter reading 1530 m)							
Dec 7	1400	-15.3	25	SW	Nil	Unrestricted	
8	1200	-15	25	SW	7 M	25 km	Wind reached 50 kts during night
9	1400	-13	20	SW	8 M	25 km	Overcast since 1700 8/12/73. Calm from 1700 8/12/73 to 0000 9/12/73
10	1500	-12.5	S	SW	5 H	Unrestricted	Halo. Pressure dropping
11	0750	-18	30	SW	1 H	Unrestricted	Max. gust 35 kts.
12	0600	-19	15	SW	1 M, 3 H	50 km	Max. gust 20 kts. Pressure still dropping
13	1300	-15	20	SW	Fraction H	Unrestricted	Max. gust 25 kts. Wind reached 40 kts. during early hours of 13/12/73
ALLIGATOR PEAK (78°27'S, 158°41'E, Altimeter reading 1550 m)							
13	2230	-16	27	SW	Fraction H	Unrestricted	Max. gust 30 kts.
14	1800	-15	21	SW	Nil	Unrestricted	Max. gust 25 kts. High winds constantly
15	2115	-13.3	Calm	-	3 H	Unrestricted	Cloud started arriving 1400 and wind dropped soon after
16	1700	-13	9	NE	2 M, 2 H	40 km	At 1200 8/8 H, halo, temp. -10°C

Date	Time	Temp °C	Wind (kts.)	Wind dir.	Cloud cover (eighths)	Visibility	Remarks/other weather features
Dec 17	2130	-14	Calm	-	3 M, 5 H	5-8 km	Snow falling lightly and intermittently. Pressure rising.
18	0830	-13.5	2-10	SW	3 M, 5 H	12 km	Wind since 0100. Total sno accumulation km. Pressur dropping; halo. Occasional snow falling still
19	1330	-13	10-32	SSW	2 M, 4 H	Unrestricted	
ROTUNDA (78°00'S, 161°34'E; Altimeter reading 1640 m)							
Dec 19	2300	-13.7	Calm	-	1 M, 4 H	Unrestricted	
20	1630	-11	Calm	-	1 L, 4 M, 2 H	Unrestricted	
21	1800	-9	0-5	E	1 L, 4 H	Unrestricted	Pressure rising
22	0900	-12	Calm	-	3 M, 2 H	Unrestricted	