1. INTRODUCTION

The Victoria University of Wellington Antarctic Expedition was mounted to complete the detailed investigations of the extensive ice-free area of Victoria Land between the Taylor and Mackay Glaciers, begun by members of the University in 1958.

The Wright-Victoria 'dry-valley' area of South Victoria Land, lying between latitudes 77°S. and 77°45'S. and longitudes 160°E. and 163°E., is the only substantial ice-free area in New Zealand's Ross Dependency. Extending over about 2500 square miles, it is probably the largest area of exposed rock in Antarctica. (Bunger's Oasis, near Mirny - another ice-free area, which has been studied by Russian scientists - is much smaller and the variety of rocks not as great). For this reason, the Wright-Victoria area was chosen by the University as a key region for Antarctic research.

The block is bounded to the south by the Ferrar and Taylor Glaciers; to the west by the inland ice, at an altitude of approximately 8000 feet; to the north by the Mackay, Miller and Debenham Glaciers; and to the east by the Wilson Piedmont Glacier, which averages about 12 miles in width and extends 50 miles from north to south along the western edge of McMurdo Sound. The area consists of continental rocks whose maximum altitude increases from about 5000 feet in the east to about 8000 feet near the edge of the inland ice. It is transected by two major east-west valley systems: the Wright Valley in the south and the Victoria Valley system to the north.

Although the country surrounding the block to the north, east and south was explored and mapped during the expeditions of Scott and Shackleton in the early part of the century, the inland area containing the bulk of the dry-valley system was unknown. Such remained the case until 1947, when the United States Navy conducted aerial reconnaissance flights which included the southern part of the area. Further flights by the U.S.N. and the Trans-Antarctic Expedition in the summers of 1956-57 and 1957-58 provided the first systematic photographic coverage.

In the summer of 1957-58, the N.Z. T.A.E. Northern Party, while engaged in a broad topographical and geological survey, travelled by dog teams round this 2500 square mile block, but were unable to enter it. In the same summer the first recorded entry was made, by a party who spent ten days in the Victoria Dry Valley. The party consisted of R.W. Balham (T.A.E.), leader; and R.E. Barwick (then a lecturer in Zoology at the University), A. Packard, and P.N. Webb (a Geology student at the University) who were members of theSummer Support Party of the T.A.E. As all members of this party except A. Packard were, or had been, students of Victoria, it was decided to name the Valley the University. This has since proved to be most appropriate, for from that time all exploration carried out in the area has been done by this University.

In the summer of 1958-59, a four-man expedition from Victoria let by Dr. C.B. Bull, with deputy leader R.E. Barwick and geologists P.N. Webb and B.C. McKelvey, spent two months in the Wright Valley, immediately south of the Victoria Valley. Detailed geological, topographical, biological and geophysical observations were made, and the expedition achieved remarkable success.

The assignment of the last V.U.W. Antarctic Expedition was to enter the northern half of this rugged and largely mountainous country, and so continue and extend the work of the two previous expeditions. An area exceeding 1000 square miles of ice-free country was covered; and all the expedition's objectives were achieved.

Financial aid for the expedition came from several sources. The Council of V.U.W. made available £500; the Research Grants Committee of the University of New Zealand £200; and the Ross

Dependency Research Committee £500, with the stipulation that this grant be expended in stores, clothing and equipment, non-consumable items remaining the property of the Antarctic Division, Department of Scientific and Industrial Research. The J.R. McKenzie Trust granted a sum of £200 towards the cost of a scientific instrument, and this money made it possible to buy a surveying theodolite costing some £315. Added to this direct financial support, the expedition received, through the generosity of various business houses throughout the country, gifts of stores, equipment and clothing or reductions from the normal cost of goods, amounting to a further £400. The five members used some personal clothing, field equipment and cameras to a value of about £300. Scientific equipment was loaned by the Meteorological Office, the Antarctic Division of D.S.I.R., and the University.

2. PERSONNEL

The party consisted of five men, only one of whom had had previous experience in the Antarctic. The members were:

R.W. Balham, Ph.D., leader. (Lecturer in Zoology - biologist, meteorologist)

R.H. Wheeler, M.A., deputy-leader. (Lecturer in Geography - surveyor)

G. Gibson. (Student in Geology - geologist)

A. Allen. (Student in Geology - geologist)

I. Willis. (Student in Physics - geophysicist)

There was one more in the party than there had been the previous year. This enabled the expedition to comply with an important rule of Antarctic travel - that field parties should consist of at least two men - without interfering with the activities of the biologist, whose work lies mainly in the freshwaters of the ice-free valley floor, and who, in the previous year's four-man expedition, had frequently been called away from his work to make up two-man survey parties into the field. The extra man permitted the biologist to carry on with his work in the valley while the two geologists, Gibson and Allen, working as one team, and the surveyor and geophysicist, Wheeler and Willis, working as another, carried out trips into the field. As a further safety measure, the programme was planned so that these two field parties would be working in the same area at the same time.

3. INTENDED PROGRAMME

The scientific programme was planned for a period of ten weeks in the field and was made as ambitious as possible. It was approved in full by the Ross Dependency Research Committee.

The tentative programme was as follows:

General

The main purpose of the expedition is to complete the mapping and studies begun by the two previous University expeditions in the Dry Valley systems north of the Taylor Glacier in South Victoria Land. Something over half of the 2500 square mile area has been mapped to date.

Work this summer should proceed in the west and north of the Dry Valley area, probably from two base camps set up in the upper and lower parts of the Victoria Dry Valley.

Geology

Extensions of the Beacon series south-west to the Taylor to link in with areas immediately across the Taylor studied by McKelvey and Webb in 1957/58 and of the same series to the north and to the west to link with regions mapped by the 1958/59 party and also by T.A.E. geologists should be made. During these visits the fossil locality near Shapeless would be re-examined and other localities sought in nearby rocks of the series. The so-called Mawson tillite would be sought further south. The dolerites associated with the Beacon and with the basement rocks would be further examined and mapped and the basement metamorphics and granites studied further. General geological mapping of the whole of the remaining area would be carried out.

Paleomagnetism

A considerable amount of collecting of oriented specimens of Dolerite and Beacon sediments is necessary. Last summer's party were unable to collect from the upper areas and have none from Beacon sediments.

Gravity Work

It is desired to extend the profile made by Dr. Bull last year westwards to the plateau, mainly to ascertain whether or not there exists the rock step thought to be the ultimate cause of the existence of the Dry Valley area. A further profile in the Victoria Valley would be useful and extensions north and south of this profile would also be made.

Determinations of ice thickness on one selected glacier, probably the Upper Victoria, would be made, and, if conditions permitted, a profile of Lake Vida would be obtained.

Topographic Survey

Only a limited number of extra survey points are required to give good ground cover. The estimated number is 5, of which only one needs to be south of the Wright, the rest situated in the Victoria Valley area.

Glaciology

General glaciological observations would be made wherever appropriate, in particular studies of recession by moraines, cirque morphology, altitude of cirque floors and so on. It should be possible to measure movement of one selected glacier and also to obtain information regarding annual accumulation at high levels above the firn line.

Meteorology

Two recording stations should be set up, both in the Victoria Valley - one at either end. Standard observations would be made by instruments, self-recording where possible, and the radiation balance measured. Measurement of the upper winds is very desirable, but might not be practicable.

Biology

Two main facets - limnological and biological survey of Lake Vashka and its vicinity, with special attention to the changes that take place over the summer period; also a general lichen survey, examining especially the distribution of lichen species.

4. LOGISTICS

The Government obtained the support of the United States authorities in providing for the party and their equipment air transport from New Zealand to McMurdo Sound; helicopter transport from Scott Base to and from Victoria Valley; and sea transport from McMurdo Sound to New Zealand.

Gibson, Allen and Willis, with approximately 3000 lbs of equipment, were flown to McMurdo Sound on November 13; and Balham and Wheeler followed three days later. The period between arrival at Scott Base and departure for Victoria Valley was spent in organising field equipment and repacking the stores into main base and three depot lots.

Through the co-operation of the U.S. Navy Air Squadron VX-6 (Captain Mansen), a photo-reconnaissance flight was made possible. Two U.S. Navy Otter aircraft flew all members, plus a U.S. Navy photographer, over the proposed operational area, and a series of oblique photographs was taken and made available to the expedition. The value of these photographs while the party was operating in the field and subsequently working up the data can well be imagined. The flights were also of immense value in familiarising members with the country they would be traversing and in locating likely sites for high-level food and fuel depots.

The expedition (five men plus 3500 lbs of food and equipment) were lifted in three flights by U.S. Navy helicopter (Lt. B. Hooper) from Scott Base to Lake Vashka, at the western end of Barwick Valley, where the main base was established on November 27. In addition, food and fuel depots were placed by helicopter at Lake Vida, at the eastern end of Victoria Valley (supplies for 120 man-days); on the Apocalypse Peaks at 2800 feet (60 man-days); and in a cirque between the Upper Victoria and Millar Glaciers at 3200 feet (60 man-days). It had been hoped to lay the depot on the Apocalypse Peaks at about 4000 feet, but deterioration in the weather, with a lowering of cloud base, made it impossible to reach this height. Nevertheless the expedition were most grateful to Lt. Hooper for his willingness to attempt the flight.

The main base supplies included 210 man-day rations.

The expedition was flown back to Scott Base by U.S. Navy helicopter, with support from a U.S. Navy Otter aircraft from Marble Point to Scott Base, on February 1. The party had spent a total of 67 days in the field.

5. GENERAL

The health of the party was excellent; "off" days being due solely to sprained muscles, or in the first few days to sore feet.

Before the expedition left Scott Base for the field, members of the N.Z. Alpine Club kindly gave a short course of instruction on techniques of travel on snow and ice, with emphasis on safety precautions and procedures in the event of accidents.

The expedition was well equipped with field radios, having three portable and one larger set for use at base. Bi-weekly schedules were maintained with Scott Base, and originally daily morning schedules were maintained between field parties, with an emergency listening watch each evening at 2200 hours. After the accident to the government Sno-Cat party, D.S.I.R. issued a general directive instructing detached elements to make radio contact with field base at 12-hourly intervals. If for any reason a party did

not come up at the appointed hour, a watch was kept each hour until contact was made.

The expedition had as its guest for two weeks Mr. Bob Rutford, a graduate student in Geology from the University of Minnesota. This summer he and his advisor Dr. Campbell Craddoch were in the Antarctic primarily to familiarize themselves with the problems of Antarctic geology. Next year they will be members of the University of Minnesota Expedition which will be going into the remote Sentinal Mountains in Byrd Land. Rutford was particularly interested in studying our field gear and techniques, and was so impressed with our equipment (i.e. tents, primuses, windproof clothing) and stores (i.e. meat bars, biscuits) that he plans to outfit the entire expedition in New Zealand.

6. WORK ACCOMPLISHED

A brief account of the work accomplished in the various disciplines is set out below. It must be emphasised that the conclusions and results presented in this report are provisional only, and await further analysis and consideration.

Altogether 67 days were spent in the field - only three fewer than had originally been planned. This was largely due to the excellent transport arrangements made by Mr. G. Toney, U.S.A.R.P. co-ordinator at McMurdo Sound.

The two main field parties spent a large portion of their time away from the main base, and each covered between 500 and 600 miles on foot.

The schedule of work was planned to fall into four major areas, each supplied with a depot of food and fuel. Thus the back-packing of these necessary but heavy items was cut to a minimum. The areas were: Lake Vida and environs, including the Olympus Range to the south and the Purgatory Peak area to the north; the country between the Upper Victoria and Miller Glaciers; the Apocalypse Peaks and Balham Valley; and the country surrounding the main base at Lake Vashka. The only trips involving days away from an established depot were to the Webb Glacier area. The field parties worked at the maximum limit of range for back-packing, members carrying loads seldom less than 70 lbs and at times exceeding 100 lbs.

The work followed in general the tentative programme already given. However no gravity work was possible this year since the only available gravimeter (belonging to Geophysics Division, D.S.I.R.) was required elsewhere in the Antarctic.

A. GEOLOGY

Physiography and Glaciology

Owing to the restricted time that was available, no long-term glacial projects were attempted, but field observations were made whenever possible.

The Victoria Valley, formerly ice-filled is now free of ice for most of its 40-mile length. Remnants of the glacier system are now: The Lower Victoria Glacier, an invading tongue of the Wilson Piedmont, to the east; The Upper Victoria Glacier, flowing from a large ice-field to the north-west; and the Webb Glacier to the west. Bordering ranges reach an average height of 4500 feet and on these, hanging cirques and valleys show a general accordance of floor levels. These cirques often have remnants of ice on thier backwalls which commonly show small terminal moraines as evidence of recent wasting and retreat. No such evidence was seen at the snouts of major glaciers.

The valley floors are mantled by thick moraine which rarely shows any glacial structures, but is invariably patterned by frost polygons. Although the moraine varies greatly in size and rock composition, no glacial striations were seen. Large areas of sand occur and well developed sand dunes are found to the north and east of Lake Vida. The effect of wind erosion was shown by a differential polishing on the faces of larger rocks, and quite frequently by fields of well-developed faceted pebbles.

The form and setting of Lake Vashka suggests it originated as a kettle- a deep remnant of ice left in the moraine by irregular glacial retreat. Large boulders and fine sandy bands now exposed on the surface of the lake ice support this theory. It is possible that the majority of the lakes on the valley floors originated in this way. and many may never have been entirely melted. Certainly the small lake at the head of Balham Valley and the empty depression at the junction of Balham and Barwick Valleys are of this form.

Stream beds leading into these lakes differ greatly, depending on the type of moraine on which they develop. The streams flowing westward from the Packard and Lower Victoria Glaciers over flat sandy floors have a braided course up to 100 yds. wide. In contrast the western stream flowing into Lake Vashka is often 20 feet wide but cut 10 feet deep in coarse moraine. A great quantity of water would be required to develop a bed like this, although this summer only a trickle was running here and there. Along these streams in Barwick, Balham and Upper Victoria Valleys, well developed strings of paternoster lakes were found.

Basement

Basement rocks occur over almost the entire length of Victoria and Barwick Valleys. They are best exposed at the eastern end of the valley because the Ferrar Dolerites and overlying Beacon sediments obscure them toward the west.

The oldest rocks are the metamorphics of the Ross System, early Palaeozoic or Pre-Cambrian in age. These include graphitic marbles, schists, granulites and gneissic rocks, all with a constant trend of 280°.

At Lake Vida a salmon-pink or grey-coloured granite of the Admiralty Intrusives crosses the valley in a north-south direction, cutting the metamorphic rocks discordantly. Occasional pebbles of this granite are found in the basal Beacon sediments and it might be the major source rock of the sandstone.

Further eastward, the schists and gneisses are cut by a porphyritic granite which is well developed in the Purgatory Peak and Miller Glacier areas. Its age and relationship to the 'Vida' granite are not certain, but laboratory study of specimens will help to determine this.

The basement rocks, of both Ross system and Admiralty Intrusives, have been intruded by a wide variety of acid and basic dikes ranging in composition from aplites to pyroxenites. It is hoped that further study of these will give a relative age for the members of the Admiralty Intrusives.

Beacon Group Sediments

Beacon sediments are restricted to the western half of the valley with the most easterly exposures occurring on peaks to the north of Lake Vida. Sequences of Beacon sandstone show a marked thickening toward the west, for while the most easterly outcrop was only 50 feet of basal sediments, a virtually continuous sequence of 3500 feet was examined west of the Webb Glacier. In one eastern section, onlap of near horizontal sediments onto a planed basement surface dipping at 12° west shows the area of sedimentation at that

time was gradually extending towards the east.

Small variations in a generally uniform quartz sandstone mark off broad divisions of the sedimentary column. The lowest bed is a conglomerate layer which passes upwards into a cross-bedded quatrz sandstone with numerous worm tracks and abundant pyrites as scattered crystals or concretions. Overlying this are 500 feet of pure quartz sandstones with occasional beds showing mud-cracks and ripple-marks. Several coarse conglomerate layers up to 6 feet thick follow, marking the base of a 2500 feet thick coal-measure sequence of cross-bedded sandstones, felspathic grits and green-coloured siltstones. Numerous thin carbonaceous layers occur at intervals throughout this sequence. and occasional impure coal seams reach a maximum thickness of 3 feet.

Samples of fossil leaf and stem impressions from this sequence have not yet been studied, but they might give an age to the sediments which are at present loosely dated as ranging from Devonian to Jurassic. Shale and carbonaceous siltstones were sampled for pollen-analysis also. No results are yet available.

Ferrar Dolerites

Intruding the basement and the Beacon group are near-horizontal sills of the Ferrar dolerites. A sill intruding the basement has a uniform thickness of about 800 feet, and dips westwards at 5°. The Beacon group is shattered and complexely intruded by a dolerite of different composition. This upper dolerite is at least 4-5000 feet thick, and the Beacon sediments can be considered as rafts floating within the dolerite. Bifurcation and complexity of intrusion of this upper sill increase towards the west.

Many specimens were collected for laboratory investigation.

Economic Geology

No significant mineral discoveries were made, but some minor occurrences were noted.

Pyrite and Chalcapyrites: Minor amounts of these two copper minerals occur in orthoclase dikes west of the Packard Glacier.

Haematite: A minor occurrence of haematite was found north of Lake Vida. It is only a few square yards in area and of no importance.

Amethyst: At the base of the lower dolerite an impure variety of amethyst occurs in small veins. It is not of gem quality.

Coal: Thin impure seams of coal with a maximum thickness of 3 feet were found south of the Webb Glacier. It is of no importance.

Soils

Restricted areas of soil which occurs within the region were sampled and profiles were examined. Generally they show a cemented topsoil, with a dry friable subsoil above the permafrost level. In Balham Valley red, green, and mottled soils were found. Specimens await further examination and some data will probably be handed over to the Soil Bureau, D.S.I.R.

Permafrost

Observations, and some excavations, were made on permafrost phenomena. Relationships to the deposition of salts and the formation of soils were noted.

Evaporites :

Evaporite salts forming in depressions were studied. Usually only a thin surface crust, one example near Lake Vashka had salts 30 inches thick and saline waters with a temperature of 20.5°F. The composition of salts awaits analysis, though the bulk is probably calcium sulphate.

B. SURVEY

The place names referred to in this report are provisional. Surveys were made from six peaks, Willis, Schist, Miller District I, Miller District II, Abner's Head and Abner North. Rounds of angles onto prominent peaks, including some of the T.A.E. and previous University Expedition survey stations were made and complete photographic panoramas taken. All surveying was done in clear weather except from Schists Peak, which despite two attempts thwarted the survey with cold weather and poor visibility.

The survey coverage was successful (as far as can be judged in the field) and sufficient so that no more stations were needed within this area except for the partially successful Schist Peak survey. The peaks climed were 4500-5000 feet altitude and through judicious selection they entailed the minimum of mountaineering. It is intended that the data collected will be taken to Lands and Survey Dept. and plotted by Wheeler and Willis.

C. PALAEOMAGNETISM

This year an extensive collection of orientated rock samples for palaeomagnetic studies was planned. It included samples from the upper and lower dolerite sills, the feeder dikes, the acid and basic dikes intruding the basement granite, the finer grained red and green bands interbedded in the Beacon sandstone and the dolerite instrusions in the latter.

The collection was successfully completed as far as possible, about 150 orientated samples being taken.

Unfortunately no interbedded red and green bands were found in the Beacon sandstone of the Victoria Dry Valley area, although approximately 3500 feet vertical extent was covered in several localities. Consequently this part of the collection could not be made.

D. BIOLOGY

The main projects were the examination and recording of the numerous birds and sub-fossil seals found in the area; the collecting of lichens, mosses and algae; the search for insects and the collecting of plankton from the fresh waters. Some chemical analysis of the fresh water was also carried out.

Seals

All expeditions into the "dry-valleys" have found the carcases of sub-fossil seals from the coast to areas far inland, and this expedition was no exception. Seals were discovered over the whole length of the Victoria Dry Valley system, up to 45 miles inland near the head of Balham Valley and within a few miles of the inland ice. Twenty six seals were found, most of them on the floors of the valleys, although one was on a saddle at 2100 feet. They usually occur on moraines, on outwash or river-laid gravels or basement rock, under conditions which preclude their deposition by retreating glaciers. The available evidence supports the views held by R.E. Barwick (V.U.W.A.E., 1958-59): that the seals have travelled into the area over a long period of time, that they travelled over present-day terrain, and that they have remained undisturbed since

death. the condition of the carcases varies greatly from single disarticulated bones to well-preserved whole animals with skin and hair attached. Only 8 of the 26 seals found were sufficiently well preserved to allow identification of species: four were Crebeater and four were Weddell seals. Several carcases at different degrees of preservation were brought back for C. 14 dating.

Birds

A total of 38 carcases of skua gulls were found within a few hundred yards of Lake Vashka. Most of them were lodged in the cracks of the frost polygons where they had presumably been blown by wind. The reason for this surprising concentration of dead gulls, forty miles from the sea, in an area which can offer nothing in the way of food except by a long chance a wandering seal, is unknown.

Live skuas were found in the vicinities of Lakes Vashka and Vida. Five were noted this year and one during the ten-day visit to Lake Vida in 1958.

Their numbers must be far in excess of those actually reported; four out of the six birds were first noticed when, flying overhead, they cast their shadows on the people below.

Lichens and Mosses

Lichens and mosses are uncommon in the area and occur only in a narrow range of habitats. Their distribution was found to fall into a well-defined pattern. They are found on bed rock or on stable boulders, generally above 3300 feet. They are not found on unstable rocky slopes, scree fans or metamorphic rocks. Twenty-one specimens of lichens comprising four or five species, and three specimens of mosses of two species were found.

Fresh-Water studies

Collections of algae, and water samples for culturing of plankton were made from the range of available habitats. The ecological programme, covering a comparison between the deep, ice-covered lakes, the shallow lakes which are usually ice-free during the two summer months and the connecting streams, was curtailed by the cold temperatures experienced this summer. Little free water appeared around the edge of Lake Vashka, no water flowed in the streams, and only some of the shallow lakes thawed.

Some chemical analysis of the water of Lake Vashka was made in the field. The hydrogen-ion concentration was determined, water was "fixed" for later oxygen determination, and samples were subjected to ion-exchange resins to calculate the salt content. Bulk supplies of water were brought back for laboratory analysis.

No insects were found.

E. METEOROLOGY

Continuous recordings of temperature, relative humidity and barometric pressure were made at main base from November 30 to January 31. A continuous-run anemometer was also operating. Standard observations of temperature (ambient, maximum and minimum); wind direction and velocity; cloud cover, height and direction of movement; and weather phenomena were made at 1200 and 1800 hours. Wind, cloud and weather observations only were made at 0900 and 2100 hours. A secondary station, recording temperatures and relative humidities, also operated at Lake Vida, 15 miles to the east, for four weeks.

During the previous V.U.W. expedition into the Wright Valley to the south, Bull found that in the western end of the valley the wind blew from the west, with low humidity and relatively high temperatures, or from the east, with high humidity and relatively low temperatures; while at the eastern end there was invariably an easterly wind. The purpose of establishing two stations this year, on towards the west and the other to the east, was to obtain more data on this wind structure.

The data has not yet been fully analysed, but the following results are to hand:

Temperature

The average temperature for December was 32.2°F. and for January 27.8°F. The maximum temperature was 54.2°F and the minimum 9.6°F, both occurring in December.

Judging from ice-conditions on the lakes and streams, and from the experiences of the two previous expeditions into the area, the temperatures recorded this summer were considerably colder than in a normal year. This was also the case at Scott Base and other points in McMurdo Sound.

The temperature did not rise above freezing point for two days in December and eleven days in January. The longest cold spell was from January 18 to 23 when the temperature remained constantly below freezing point.

Slight thawing occurred at Lake Vashka on three occaions in December following three two-days periods when the temperatures rose above 40°F. Apart from these occasions the lake remained permanently frozen to the edges.

No running water (apart from accasional trickles from thaw-pods) was noted in any of the streams in the entire valley system. This was quite different from the summer of 1957-58, when in January large streams were running into the east and west ends of Lake Vida. The the west of Lake Vashka a stream has, in other years, made a deep cut through the moraines, which would require a considerable flow; but this year no water was running. Therefore the attempt to measure the inflow into Lake Vashka (from which no water flows out) was curtailed. Even some of the small shallow lakes in the valley system remained ice-covered.

Wind

Constant winds, relatively high temperatures and low precipitation are characteristic of the dry-valleys.

The wind at the main bases averaged 8.4 miles per hour. The highest wind-run over a 24 hour period was 24 miles per hour. The highest gust was not recorded, but it probably exceeded 60 knots: The hand aremometer, capable of recording winds up to this velocity blew to pieces on January 24.

In the Wright Valley, which is long and narrow and confined for the most part between 5000 feet walls, the winds at the western end blew either directly up or down valley. They tended to follow a rhythm with easterlies blowing during the afternoon and westerlies during the morning. Easterly winds prevailed in the eastern part of the valley.

Wind in the Victoria Valley system immediately to the north did not follow this pattern; it was invariably from the east throughout the length of the area.

That the easterly wind is predomenant in the Lake Vida area can be deduced from the conformation of the barchan sand dunes to the north of the lake.

The heaviest winds at Lake Vashka came from the south. It must be understood however that the general picture of wind flow in this mountainous region is governed largely by orographical features.

Precipitation

Snow fell at valley-floor level on twelve days. On most occasions it melted after a few hours, but twice it remained for several days.

Less precipitation occurred in the vicinity of Lake Vashka than in the areas immediately to the east and west - again the results of the orographical wind complex.

7. ACKNOWLEDGMENTS

It is with much gratitude that the expedition acknowledges the assistance given by the many individuals and bodies - too numerous to mention by name - who made the venture possible. Special thanks are due to the following:

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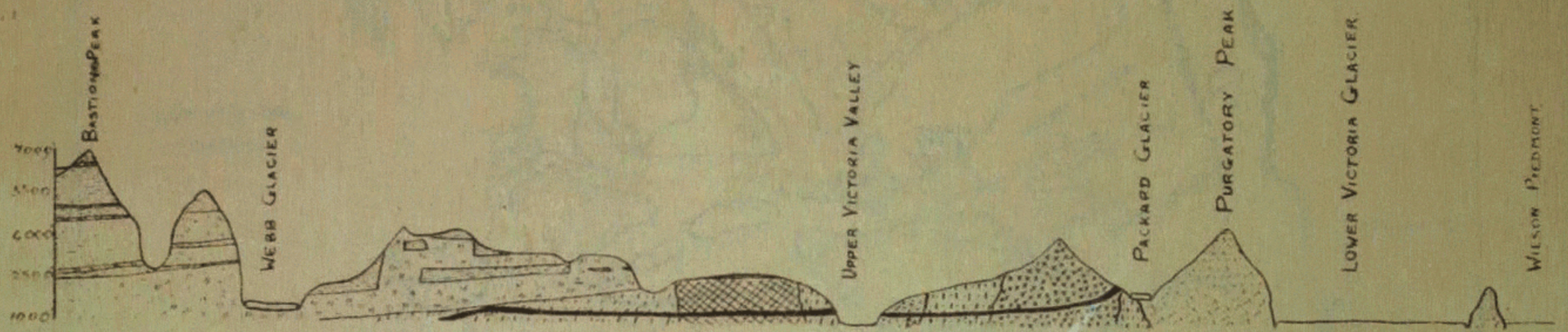
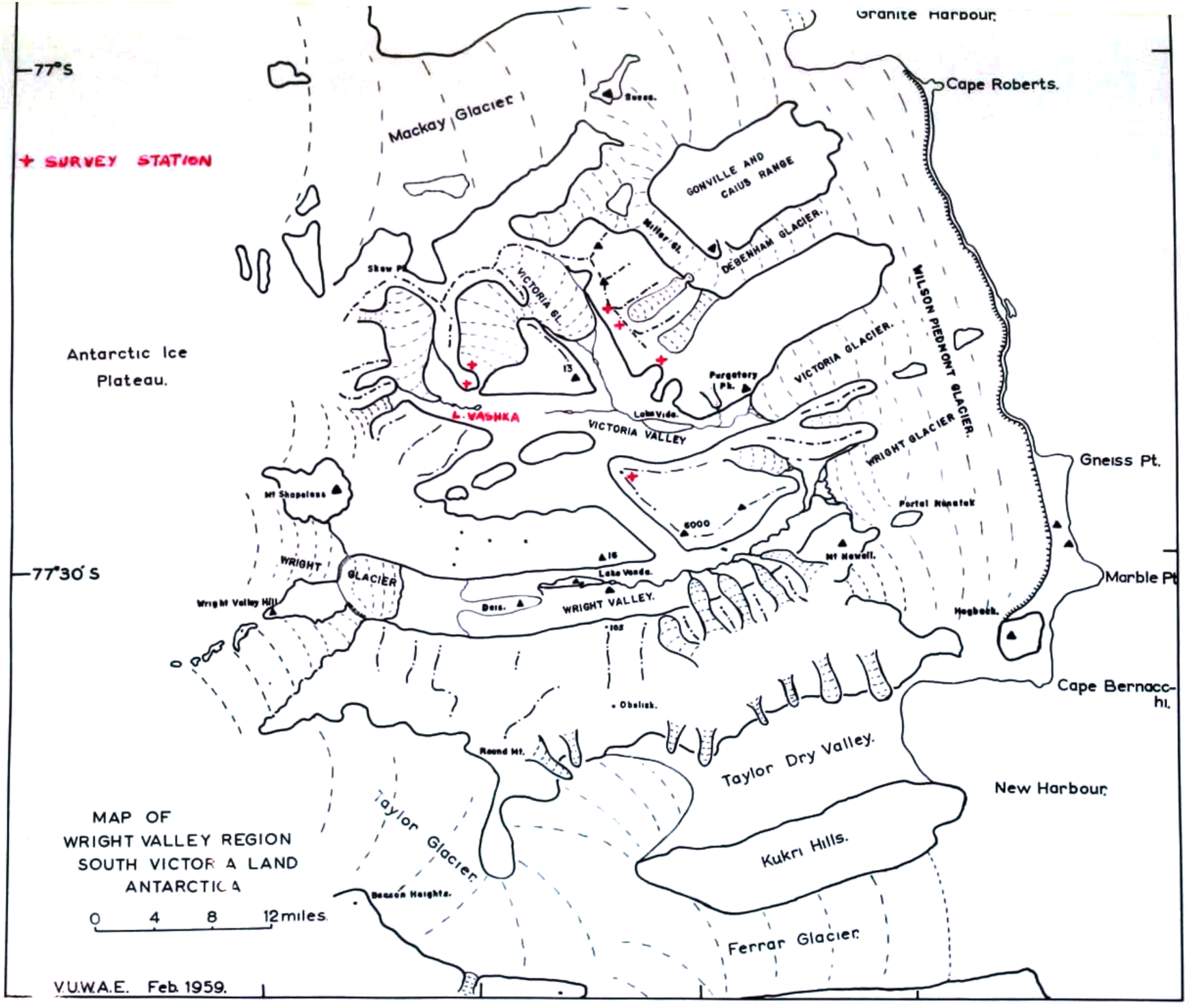
Arthur Ellis & Co. Ltd., Anlsebrook & Co. Ltd., Bing, Harris & Co., Bond & Bond Ltd., Cadbury Fry Hudson Ltd., Collier & Beale Ltd., Colonial Sugar Refining Co. Ltd., Fleming & Co. Ltd., Glaxo Laboratories (N.Z.) Ltd., Hansells (N.Z.) Ltd., Harrison-Ramsay Pty. Ltd., The Kiwi Bacon Co. Ltd., Kodak (N.Z.) Ltd., Lane, Walker, Rudkin Ltd., Levin & Co. Ltd., Mountain Equipment Ltd., The Nestle Food Co. Ltd., The N.Z. Co-Operative Rennet Co. Ltd., N.Z. Dairy Products Marketing Commission, Sanitarium Health Food Co., Universal Trading Co., Westpoint Glove Co. Ltd., for gifts of food and materials or substantial reductions of normal prices.

Geological Section From Ice Plateau To Coast Through Purgatory Peak, Victoria Valley

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DEBENHAM GLACIER.
Skew Pk.
VICTORIA GL.
13
L. VASHKA
Lake Vide.
VICTORIA VALLEY
Purgatory Pk.
VICTORIA GLACIER.
WILSON PIEDMONT GLACIER.
WRIGHT GLACIER.
Gneiss Pt.
Mt Shapeless
6000
Portal Nunatak
Mt Newell.
WRIGHT
GLACIER
Wright Valley Hill
Lake Vanda.
WRIGHT VALLEY.
Marble Pt
Hogback.
Cape Bernacchi.
Obelisk.
Round Mt.
Taylor Dry Valley.
New Harbour
Taylor Glacier
Kukri Hills.
Beacon Heights.
Ferrar Glacier
MAP OF
WRIGHT VALLEY REGION
SOUTH VICTORIA LAND
ANTARCTICA
0 4 8 12 miles
V.U.W.A.E. Feb. 1959.