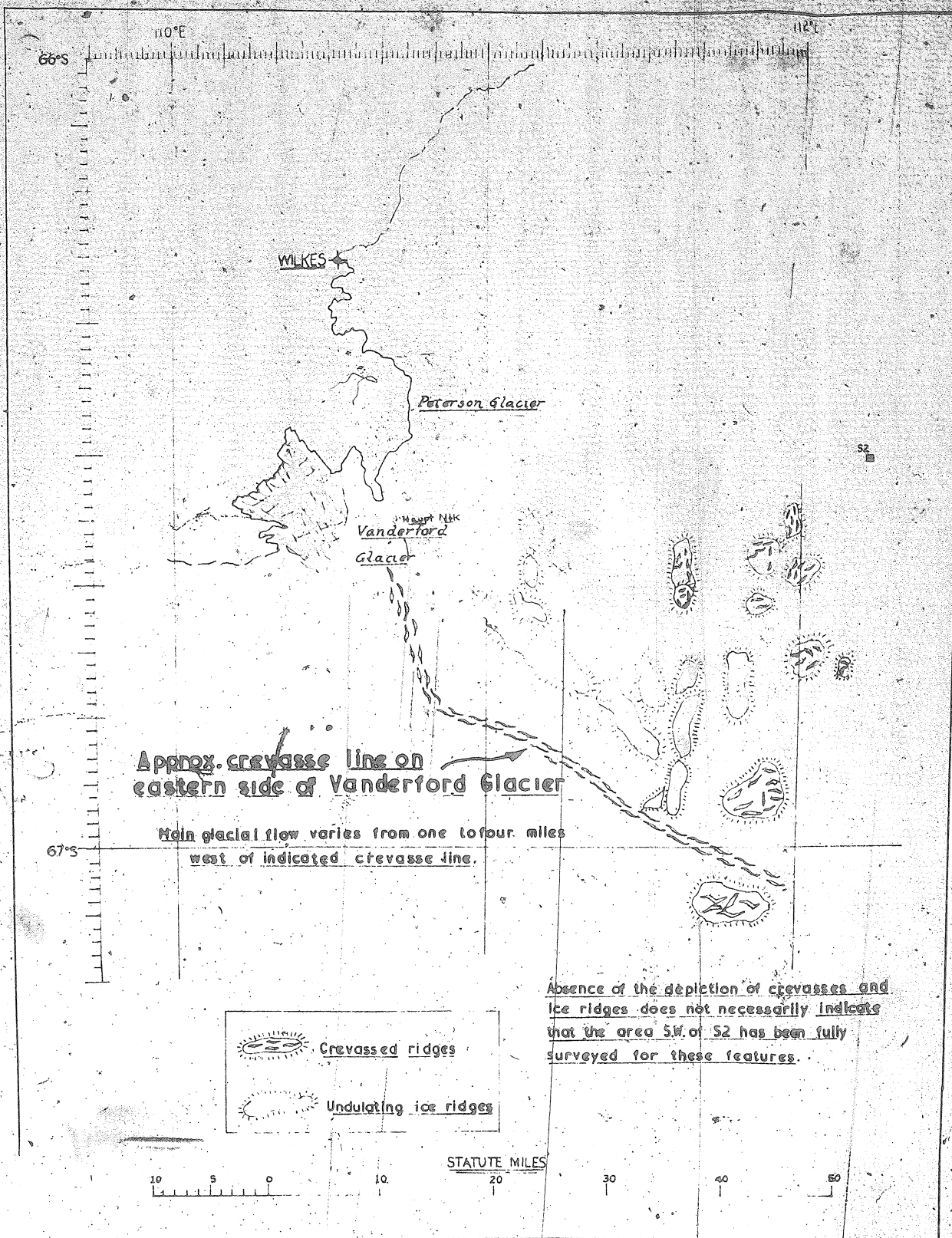




Absence of the depiction of crevasses and ice ridges does not necessarily indicate that the area S.W. of S2 has been fully surveyed for these features.

1	2	3	4	CRS	CRS	PL556
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Cape Point now relocated to this position
by series of astro-fixes completed by Budnick
in October 1964.

Cape Point

K 15 - 200

22-10 AM
21-10 AM
22-10 AM

27-9 AM
28-10 AM

WILKES
23-9-64

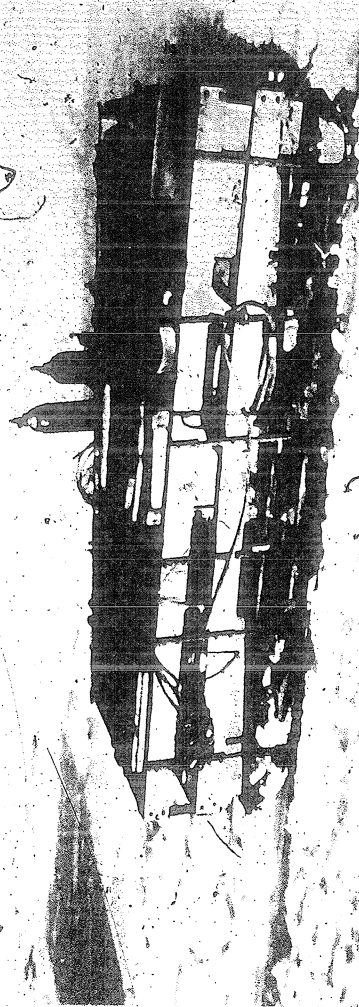
26-9 AM
27-9 AM

27-9 AM
28-9 AM

52 28-9 AM
5-10 AM

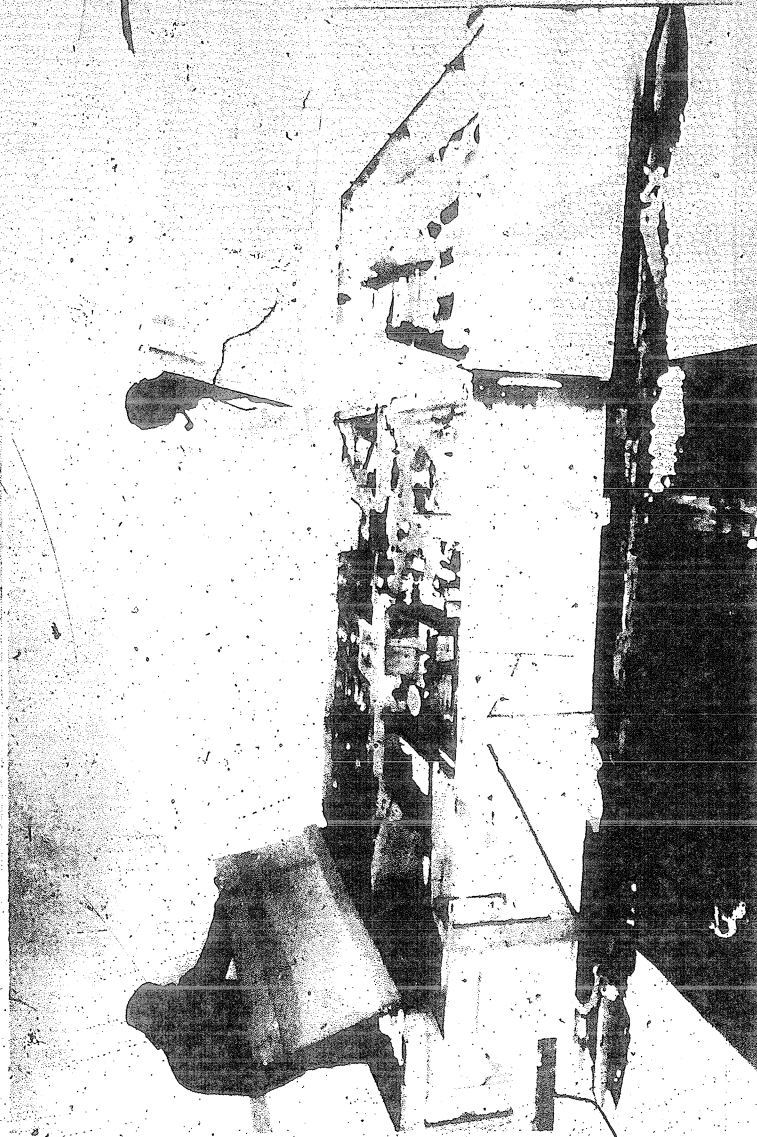
5-10 AM
10-10 AM
7-10 AM
10-10 AM

Wilkes Spring Traverse (glaciological) - 1964



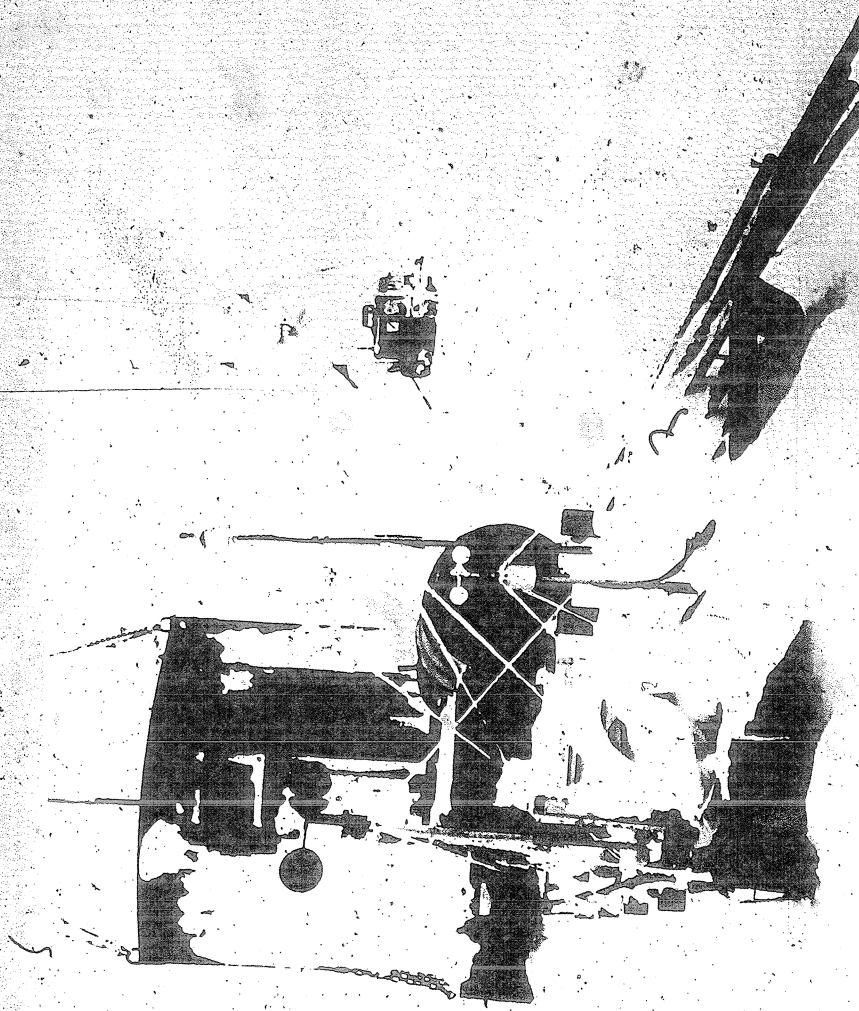
Engineers sledge — contains all spares, Herman Helsons, welding equipment, tools etc.
Built as a prototype for general cargo sledge.

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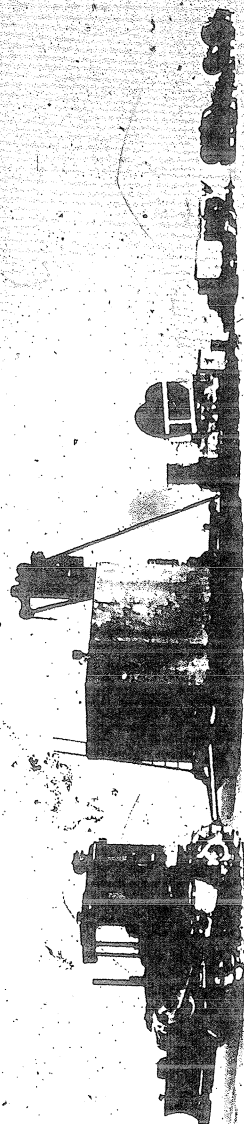
Food sledge — built as a prototype from pillow tank crates — sufficient food for 7 men for 3 months. Note insulated box on right.

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Autumn Traverse 1964 - Meteorological sledge.

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A.M.A.R.E. ice drill and associated equipment en route to 52 August 1964.

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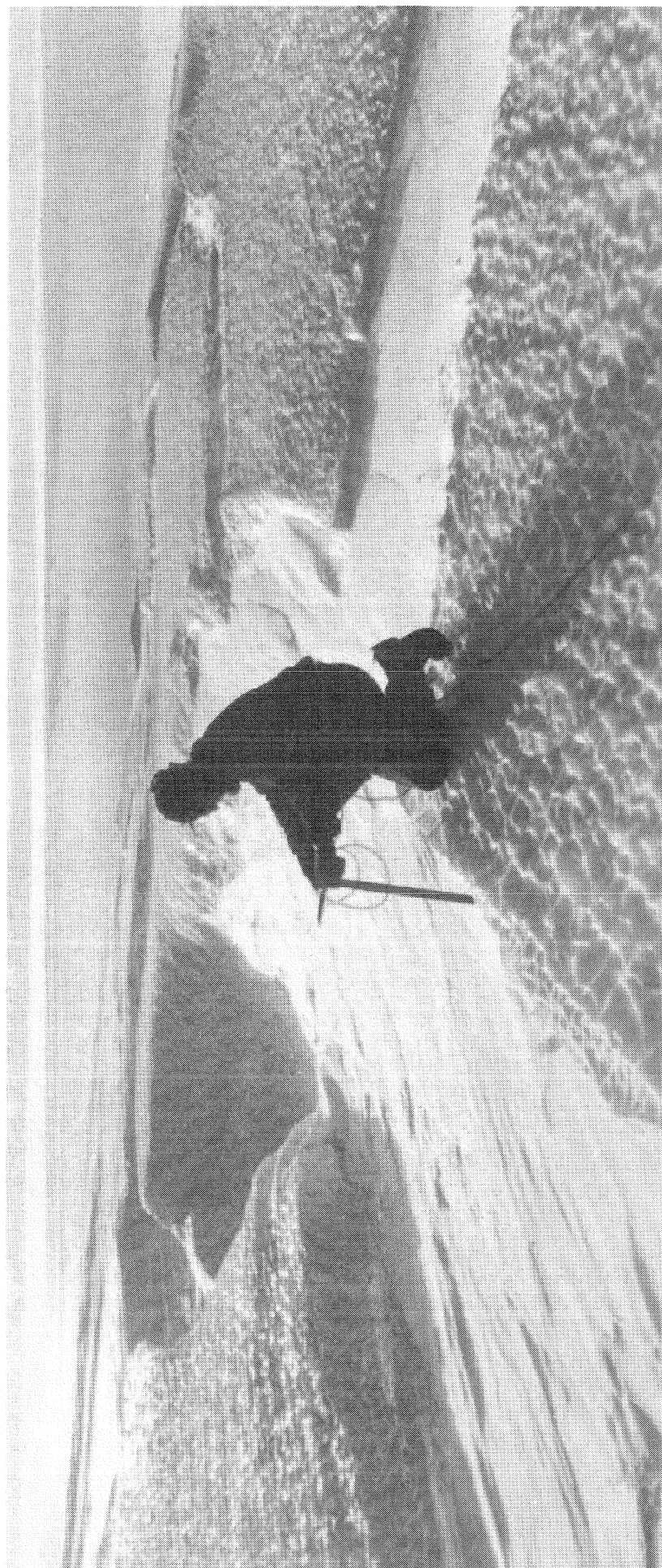
Autumn Traverses moving down moraine area mid-May 54 at rear holding sledges
& from running forward on slope.



Autumn Traverse 1964 — note scouring around cdrtan following blizzard.

1	2	3	4
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Crevassees near Casey. The slumped bridges are being tested; they screen the depths often many metres below. More dangerous, of course, is crevasseing completely hidden under new snow. [R.O'L.]

View from "Rodgers Ridge" looking towards Vanderford Glacier



Typical crevassed terrain encountered on B & C legs of geophysical traverse 1964

Spring traverse about to depart from Wilkes - 1964

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Spring Traverse—Sledges buried after a hour blizzard

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COMMUNICATION REQUIREMENTS

"ANGRY" 9's are required in the following vehicles:-

1. Robin Nodwell
2. Sno-Trac No. 5
3. Sno-Trac No. 6
4. Large Caravan
5. Small Caravan

plus one spare unit carefully packed in a box to be carried on a sledge.

Where possible all units should be provided with a suitable automatic power supply. In other instances a "prayer wheel" will suffice.

Priority on installation and/or testing

1. Large caravan and Sno-trac 5
2. Robin Nodwell & Sno-trac 6
3. Small caravan

The 3 new Vaughan walkie-talkies should be checked to ascertain whether it is possible to net them with the ANGRY-9's.

Also if any other walkie-talkies on the station can be put in working order they would be very handy on the traverse.

Tom Ellis and Neil Simmons will be responsible for the above work assisted by any one with a spare moment.

RADIO SCHEDULES

These will be arranged with John O'Shea prior to the traverse.

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REPORT ON
AN INLAND TRAVERSE FROM WILKES
14TH NOVEMBER 1964 TO 20TH JANUARY 1965

AIMS

1. To determine ice thickness, rock topography, crust thickness by seismic, magnetic and gravity measurements.
2. Measurement of regional magnetic fields.
3. To locate and map eastern site of Vanderford Glacier.
4. To determine surface topography.

PERSONNEL

R. O'LEARY	-	Leader
G. HULCOMBE	-	S/D/M & 2/10
R. WHITWORTH	-	Geophysicist
D. ROGERS	-	Radio Operator
N. SIMMONS	-	Radio Tech.
M. JONES	-	Mechanic/Driver

VEHICLES

Snowtrac 5
Snowtrac 6
D4-1
D4-2
Weasel (Seismic)

The traverse moved in two trains as follows:-

Train One

- 1 - D4 Tractor
- 1 - Otaco sledge loaded with fuel
- 1 - R.M.I.T. fibreglass caravan - (accommodation for O'Leary & Jones)
- 1 - Norwegian sledge to which was fitted several large boxes, painted white both inside and outside for carrying ice cores.
- 1 - Norwegian sledge loaded with seismic cables, drums and explosives.

Train Two

- 1 - D4 Tractor
- 1 - Freighter caravan (accommodation for rest of party)
- 1 - Wide Norwegian sledge loaded with engineers' tools, spares, Herman Nelson heaters
- 1 - Wide Norwegian sledge with food boxes
- 1 - Norwegian sledge loaded with stakes, LPG, detonators and miscellaneous.

Other Vehicles

Seismic Weasel
Snow Trac 5
Snow Trac 6

Saturday 14th November

Traverse departed from Wilkes at 1030 in fine weather. Some hold-up at rubbish tip when sledges and caravan of No.2 train piled up. Slight damage to BMZ tripod although still useable.

Rodgers, Simmons, and O.I.C. in Nos. 5 and 6 snowtracs doing barometric levelling every 0.2 miles with gravity reading every mile. Whitworth in seismic weasel measuring accumulation stakes placed by Morgan in Autumn. Perfect visibility until 2230 when ground rust obscured drums. Necessary to remain on drum line to locate stakes so camped for night.

Everyone very relieved to have started on traverse after nearly 7 days delay with poor weather.

Made 17 miles for the day.

Sunday 15th November

Departed 17 mile point at 0800 in beautiful weather - no wind and temperature around + 10°F. No preheating required on any vehicles.

Barometric levelling and gravity continued to S2. Seismic weasel threw a bogie wheel tyre at 25 mile mark, causing an hour's delay.

Arrived S2 at 2100 after an otherwise uneventful day's travel.

S2 area badly drifted mainly because of the location of ANARE ice-drill. Morgan apparently relocated this machine closer to S2 so that power from drill generator could be used in living sections of S2 during winter.

Monday 16th November

All out at 0500 - ice-drill relocated further from S2 and levelled to 3 minutes from vertical with theodolite.

Snow dunes and drift levelled so that Morgan can measure strain grid angles later in month. Flight sledges dug out and ice cores brought from Wilkes refrigerator stored underground in S2 tunnels.

Otaco fuelled sledge loaded with ATK and petrol from dump made in winter.

Glaciological anemometers read and gravity readings taken by Whitworth.

Visibility packed up at 1200, making it impossible to commence baseline survey for the commencement of geophysical traverse.

Hulcombe blackened his eye when starting battery charger generator. Apparently knocked him in eye.

Tuesday 17th November

All up at 0500 but blizzard blowing at about 40 knots.

Rogers who had been trained to carry out met observations on traverse has discovered that he has left the cloud recognitions manual and code at Wilkes.

Weather cleared a little about 1700 but not with sufficient visibility to commence survey.

.../2

Wednesday 18th November

Weather fine all vehicles away by 0800. Snowtrac 5 had bent suspension arms after moving 500 yards. Replaced by S.D.M. To make the departure more interesting the seismic weasel broke a track 200 yards further on! Finally commenced survey at 1000 using an unproven technique of running a straight line without using a theodolite (See Appendix A for details). Very tiring as a stake has to be inserted in snow every 0.2 miles and an average speed of 4 m.p.h. maintained to stay in front of D4's.

Completed 10 miles to C00 by 1400. Loaded fuel onto Otaco from depot made by Budnick in winter.

Hulcombe's eye giving him trouble - headaches and inflammation. Arranged sked for tomorrow with doctor.

Thursday 19th November

Fine day with maximum visibility. Azimuth for leg running south from C00 laid off. Left C00 at 0900 continuing straight line staking, barometric levelling every 0.2 miles and gravity readings every mile. Terrain undulating and fairly smooth. B00 reached at 1300 A00 at 1730. Blue ice with a thin layer of snow encountered 4 miles west of B00. Appears to be commencement of ablation zone.

Whitworth not happy about straightness of baseline, although there is no way except by a series of astro-azimuth shots of proving if the line is straight or not. O.I.C. commenced azimuth shots at 1800, but sun too low for accuracy.

Hulcombe's eye improving - discussed treatment with doctor on 1900 sked.

Friday 20th November

Fine day with light wind. Whitworth commenced seismic work at 0700 and worked until 2200 without any success in obtaining a satisfactory reflection. O.I.C. and Rogers carried out series of azimuth shots to check accuracy of 30 mile baseline. Appears to be about 7 minutes 50 seconds out in 30 miles which would be 300-350 yards in 30 miles. Whitworth still not satisfied and feels accuracy should be greater!

Doctor placed Hulcombe in bed for day to rest eye.

Jones and Simmons assisted Whitworth all day.

Saturday 21st November

Heavy whitout and light snowfall all day.

Whitworth continued various methods of trying to obtain a reflection but still no success. Possibly due to the shallowness of the ice - about 1000 feet or esle bedrock is shelving steeply away from this area. Either way it is putting us a long way behind schedule.

More azimuth shots attempted, but sun misshapen due to whiteout.

Fine day until 1530 when a sudden blizzard commenced. All worked until 2230 lifting 2 miles of geophone lines so they would not be buried by drift.

Seismic work might be completed tomorrow if weather clears up.

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Further azimuth shots taken, mainly to lay off new line south from A00.

Monday 23rd November

Weather cleared by 1100, enabling Whitworth to continue seismic work. Completed by 2300, but seismic geophone cables still to be picked up.

Final azimuth shots taken and new course of 89°52' staked for 1 mile for tomorrow's movement.

If work continues at other points at this rate we will be lucky to complete 100 miles. The lack of snow cover on the ice has meant that all explosive holes (about 30 at this point) have to be drilled with an ice corer taking up to 30 minutes per hole, compared with a hole in snow cut with an auger in 4 minutes.

Tuesday 24th November

All up at 0530 - Rogers and O.I.C. took levels of geophones while others packed up seismic gear. Snow trac 5 (Rogers and O.I.C.) left at 1100 followed by Simmons in Snowtrac 6. D4's and Weasel departed 1 hour later. Considerable difficulty in running stake line due to complete lack of snow to stand stakes. 1" auger used to bore hole in ice but stakes are 1½" diameter. By flattening stakes thus splitting into segments it is possible to enter stake into hole.

Arrived at A10 at 1600. Tractors found the rutted, blue ice extremely bumpy to drive over. The terrain between A00 and A10 is very undulating and in sections all sledges and caravans ran up onto D4's.

Small caravan mountings damaged by roughness of this terrain.

Wednesday 25th November

Fine day - everyone laying out seismic lines, geophones etc. by 0700.

Simmons, Rogers and O.I.C. started barometric levelling and gravity on a line due west from A10 towards Vanderford Glacier. After 8 miles, crevasses were encountered. ST6 broke through but was able to get out under own power. Party roped up and continued on foot, carrying gravity meter.

Travelled 800 yards in 3 hours during which Rogers and O.I.C. fell into several crevasses. Turned back to 8 mile point as gravity meter could have been damaged in one of these falls to say nothing of the effect on our nerves. A newly fallen layer of snow made it impossible to locate crevasses.

Returned to A10 to find seismic work completed.

Thursday 26th November

Picking up of geophone cables etc. completed by 0830 and departed at 0900, staking, levelling and gravity as usual.

Continual downslope towards glacier valley, although numerous domes (not crevassed) crossed. Surface is sheer blue ice with an odd patch of snow.

Arrived at A20 at 1430.

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Snow-trac party continued levelling and gravity south from A20 and encountered crevasses at 1.95 miles. Just as well as a sudden whiteout developed making travelling all guesswork - tracks not visible on ice.

Whitworth had several successful seismic shots during day.

Glacier appears to rise about 200 feet above valley floor.

Friday 27th November

Visibility poor until 1900 and not suitable for further probing of glacier edge to do gravity and levelling.

Jones and Whitworth continued seismic work while rest of party attempted to cut an ice core to 10 metres.

Struck blue ice at 6 feet so core cutting abandoned. Hulcombe, Rogers and O.I.C. surveyed 10000 foot line for continuous refraction profile and drilled and loaded 40 shot holes.

Temperature around +30°F all day with very strong glare whiteout.

Saturday 28th November

25 knot wind blew most of day making conditions outside rather uncomfortable.

Whitworth commenced profile shooting when seismic camera broke down. Worked on it until 2230 without locating fault.

Hulcombe, Simmons and Roger did levelling and gravity west from A20. Encountered crevasses at 5.4 miles so returned to A20.

Sunday 29th November

A beautiful, warm day (+36°F) marred only by the fact that Whitworth could not get his camera operating satisfactorily before 1400.

Rest of party sunbaked on tarpaulin until camera was OK.

Profile shooting completed by 2200.

Monday 30th November

Fine morning and Snowtrac party left at 0800 travelling eastwards from A20.

As it was obvious that the glacier could not be crossed at A20 an attempt will be made to cross on the "B" leg, although it is doubtful if this will be possible as the glacier appears to be even rougher further inland from A20.

Reached B20 at 1300 after a very rough ride over blue ice. D4's and weasel not in sight at 1400, so Snowtrac party travelled south from B20 to explore terrain. Made 8.3 miles before visibility worsened.

Terrain forward of 8 miles appeared OK for at least 1½ miles so it is possible that 1330 will be established in the required position.

Returned to B30 at 1800. Seismic work completed by 2130.

Tuesday 1st December

Traverse moved out for B30 at 0800 in poor visibility. Stakes left in every ½ mile to guide D4's. Made B30 by 1330 but actual 10 mile point was a dome completely devoid of snow and with small crevasses. Suitable snow at 9.3 miles so decided to do seismic

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work in this area.

Snowtrac party continued south from B30 and struck pressure ice and crevasses at B30 +1.4 miles. Then travelled west from B30 for 1 mile to encounter the same terrain. Glacier is very evident in this area with pressure ridges up to 40' in height. Definitely no possibility of crossing at this point.

Seismic commenced about 1600 and continued to 2200, in very strong wind and drift.

Wednesday 2nd December

Seismic work continued during morning and completed at 1500. Snowtrac teams did a micro-gravity survey of 4 one mile arms, 90° apart from B30.

Commenced levelling and gravity along line east from B30 to C30. At 1.8 miles encountered 15 foot wide crevasses.

Again travelled east from C30-2 for five miles in good terrain. Appears there will be a safe route to the "C" leg if this line is followed.

Whitworth considers that to go this way will "deform" the grid pattern i.e. it will create a "square". 10 miles by 8 miles, which is not desirable for his plans.

He wishes to return to top of baseline and travel down "C" leg. Still does not solve problem of the tie between B30 and C30.

Thursday 3rd December

Left B30 at 0930 and after a bone shattering trip over blue ice to B10 arriving at 1800.

Two sledges have cracked runners - probably caused through roughness of ice and lack of snow.

Semi white-out conditions between B20 and B10, although what appeared to be a small crevassed bill about $\frac{1}{2}$ mile east of our route, actually proved to be a faulted ridge rising about 300' above the average height of the surrounding undulating country. Seismic work commenced at 1900 continued for 4 hours.

Friday 4th December

Sno-trac team left B10 at 0900 to tie in gravity on ten mile line between B10 and A10. Usual staking method carried out, plus barometric levelling and gravity. Found that drum at A10 was 300 yds beyond the measured ten miles from B10 and 180 yds to the left of the staked course. This proves that staking method of maintaining an accurate straight line is satisfactory. The above errors are cumulative for the travel from A10 to A20 to B20 then to A10 via B10 (total 40 miles).

Returned to B10 at 1400 where seismic work had been completed by Whitworth, Hulcombe and Jones.

Hulcombe, Whitworth, Simmons and Officer-in-Charge then ran a gravity and levelling line from B10 +1.7 miles to feature observed yesterday. Travelled 4.2 miles before reaching base of feature.

Commenced climbing at 2000 and encountered crevasses soon after.

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All roped up and carrying gravity meter continued climb. Crevasses up to 30' in width but with good snow bridges. Could not reach top by 2300 so abandoned aims of measuring height barometrically. Reached caravans at B10 at 0030.

Left B30 at 0930 in 30 knot wind which raised drift to about 15 feet making it very difficult to do accurate staking even at 0.1 mile intervals. Crevasses observed 1 mile north of B10 but nothing serious.

Arrived B00 at 1400 and immediately commenced seismic work, one half of party laying out continuous refraction profile, the other on seismic reflection shots. Knocked off at 2000.

Sunday 6th December

Seismic work continued during day on reflection work. Hulcombe and Rogers charging shot holes on refraction profiles, with Jones, Simmons and Whitworth on reflections. Officer-in-Charge "incapacitated" with loss of vision in left eye. Probably due to continual use of binoculars.

Weather deteriorated at 2000 - work ceased.

Monday 7th December

Some difficulty in sinking boreholes for refraction charges, due to ice about 1 foot below surface - only in patches, luckily.

Whitworth commenced refraction shooting at 1400 while Rogers and C. J. L. put 10 metre core for glaciology. Hulcombe on vehicle repairs.

Refraction shooting progressed satisfactorily until 1830 when 100 lb shot was to be fired. A radio operated time break was in use on 2720 Kcs and at the count-down for firing, a stray signal prematurely triggered the camera, ruining the whole refractions profile project.

Weather deteriorated at 2100.

Tuesday 8th December

50 knot blizzard blew up during night and was welcomed by all as it gave a respite from the 16 hours per day for past 3 weeks.

Ceased at 1700 and then commenced to snow heavily.

Wednesday 9th December

Blizzard blew up again about 0330. Worst blizzard experienced this year, probably due to heavy snowfall last night.

Thursday 10th December

Blizzard continued all day, although wind dropped to 25 knots. This had the effect of completely covering sledges etc. whereas with the higher wind velocity, they were scoured to some extent.

Conditions too poor to complete cutting of 10 metre core.

Friday 11th December

Wind dropped during night, so all out by 0700 digging out sledges.

10 metre core completed, but still not possible to continue staking at C00. Whiteout, plus heavy snow continued all day.

Whitworth continued with seismic experiments inside Weasel during day.

.../7

Saturday 12th December

Morning was whiteout and falling snow, restricting visibility to 100 feet.

At 1500 vis. cleared slightly so commenced staking to completely making it impossible to stake at 0.1 mile intervals even.

After 2 hour halt, vis. improved so moved off again to reach C00 at 1900. Staking method proved very accurate as the line, B00-C00 was within 4 feet of the C00 stake.

Weasel shed a bogie tyre on arrival at C00.

Sunday 13th December

Beautiful, sunny morning. Jones, Whitworth and O.I.C. completed seismic work in 4½ hours. Others working on vehicle maintenance.

Left C00 for C10 at 1530 in whiteout conditions and travelled 8 miles before bang halted by crevasses.

Made camp at 8 miles and Rogers and Officer-in-Charge moved forward on foot to determine extent of crevasses field.

Found a 44 gallon drum and food cartons (USN) about 1 mile west of 8 mile point. Apparently from the abortive U.S. traverse of 1959.

Received coded message from Pollard saying he was having trouble with Bonnici, Brophy and Budnick in regards to work on new station site.

Simmons had been complaining of a bad back for may weeks and Jones had rectal trouble, so decided to return to Wilkes. Left at 1700.

Remainder of party did barometric levelling and gravity readings through crevassed area on foot for remainder of day.

Tuesday 15th December

Party continued survey through to 10 mile (B10) which was clear of crevasses.

Wilkes party returned to 8 mile point at 1800 after a direct run from Wilkes (48 miles).

Wild theodolite being used for general navigation, turning of right angles etc. now required by Morgan at S2 later in the month. U.S. transit theodolite brought from Wilkes by Officer-in-Charge.

Whitworth and Officer-in-Charge left C00 +8 miles at 2100 on a course of 053° true to deliver Wild to S2. Read anenometers at S2 and reached caravans at 0200.

Wednesday 16th December

D4's left at 0800, preceded by Snotracs on a rather arcuitous route, previously inspected, to C10.

Seismic work commenced at 1000, while Snowtrac party started staking between C10 and B10. Reached 4 miles when lead Snowtrac (Rogers and O.I.C.) dropped into a crevasse. No damage apparent although unable to retrieve vehicle with other Snowtrac. Returned to C10 to obtain recovery gear. Successfully retrieved ST6 in 4 hours without damage.

Seismic work completed by 1900, but no move possable due to rising winds and drift.

.../8

Thursday 17th December

Blizzard up to 50 knots from 0200. Whitworth filling in time sitting in Weasel doing dummy runs on seismic equipment.

Friday 18th December

More blizzard similar to yesterday.

Saturday 19th December

Weather tapered off during morning but drift and wind kept visibility down to 30 yds., preventing further travel south. Suspect area about 1 mile south of C10 is crevassed.

Cleared by 2000. Travelled south for 1.4 miles before running into crevasses. Then went out 4 miles east from C10. Zone plateau appears to commence at 2 mile point.

A safe route around crevasses to south flagged.

Sunday 20th December

Weather fine, except for light drift.

After walking through 2 miles of crevasses, carrying 4 x 2 oregon, barometers, and gravity meter found clear plateau.

Snowtracs brought around crevassed area and a farther 8 miles travelled to C20.

The inland extent of the ablation zone appears to finish about 6 miles west of the S2 south trail.

Monday 21st December

Sno-trac party left C10 at 1100 and restaked 4 miles west to point where Snotrac went into crevasse last week.

Extended stake line and levelling by 3000 yards on foot across a very crevassed and rough sections.

Returned to C10 then laid a west azimuth from C10+1 mile towards hill previously climbed on western side from B10+1 miles.

Rest of party spent day digging out sledges etc.

Tuesday 22nd December

A snowtrac party left at 0930 to level along line west from C10+1 towards hill (now unofficially known as Rodger's Ridge).

Eastern side of hill crevassed but able to drive Snowtracs parallel to them until the crevasses petered out. Consequently able to reach top of hill and view the other side which was crevassed and broken. A sudden whiteout reduced visibility to almost nil. Found path through crevasses on foot with vehicles following behind. Took 3 hours to travel 1000 yards. Learned a lesson regarding taking vehicles into widely crevassed areas unnecessarily.

Whiteout lifted about 1500, so drove 6 miles south from "Rodgers Ridge" before finding access to the west. Then returned north to western side of "Rodgers Ridge" and continued levelling etc. to B10.

Left B10 at 1700 for B20 arriving at 1900.

Continued levelling from B20 to C20 arriving there at 2230. All very tired having travelled 58 miles in rather poor conditions. For a change, a good day's work was achieved.

.../9

Tractors and weasel had left C10 at 1000 and reached C20 at 1500 after an uneventful 10 miles. Seismic work commenced but with poor results. No reflections probably due to numerous small crevasses in ice.

Wednesday 23rd December

Seismic work continued all day - 18 shots in all, with fairly reasonable results.

Further signs of U.S. 1958 traverse here.

Seismic work finished at 2200.

Thursday 24th December

Left C20 at 0830 in good visibility. After 2 miles Jone's D4 broke through into a crevasse. Fortunately Otaco sledge behind tractor held it from dropping too far. Recovered in 2 hours.

Crevasses encountered at C29 so D4's halted. Levelling to C30 completed by Rogers and O.I.C. on foot. Most crevasses about 20 feet wide but bridges fairly thick. They appear to extend about 1 mile past C30, and for many miles to the west.

Decided to do seismic work at C32 and in course of moving to the east to avoid crevasses, Hulcombe's D4 fell in a crevasse. Again the load behind saved the tractor from falling. Extricated OK. Finally made camp at C32 after travelling 8 miles dodging crevasses.

Simmons, Rodgers and O.I.C. returned to C30 on foot and staked a straight line to C32. Great difficulty in crossing crevasses as many were 30 feet wide.

Friday 25th December

Levelling party continued work on foot between C30 and C32. Simmons very reluctant to work in crevassed area. Considers scientific results not worth his neck! Returned to caravans at C32 to find small caravan had caught on fire due to heater flooding. Everything - books, bedding, food - covered with soot. Spent all afternoon cleaning caravan before partaking of an alfresco Xmas dinner in large caravan.

Seismic work partially successful.

Saturday 26th December

Blizzard commenced during morning, preventing any outside work.

Heater re-installed in caravan and worked perfectly. No definite reason for fire yesterday, other than a change of wind direction caused a negative pressure inside the caravan, which in turn caused a continual down-draft in the heater flue, thus partially extinguishing the flame and creating a surplus of fuel flow which ran out on the floor.

Unable to stay in caravan to sleep and eat due to smell of burnt fan belts, epoxy resins etc.

Sunday 27th December

Blizzard still blowing around 50 knots. Very warm (about +28°F) and drift almost like rain.

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Monday 28th December

Blizzard as bad as ever - 55 knots with very heavy drift - temp. +31°F.

Tuesday 29th December

Blizzard again.

Wednesday 30th December

Blizzard continued all day except for a 3 hour lull in morning when all turned to start seismic work. Driven inside by refreshing winds and drift but not before weasel broke track in 3 places.

Rogers contacted Dumont D'Urville to fill in time and heard "Thala Dan" was stuck in pack 60 miles out.

Thursday 31st December

Work commenced about 1300 when blizzard stopped abruptly.

Simmons and O.I.C. did reconnaissance for 2 miles from C29 eastwards before turning back because of weather deterioration.

Unless weather improves, it appears that we will not be able to proceed further south.

Friday 1st January, 1965

Whiteout in early morning, with heavy snow later.

Not work done except rolling up of geophone lines.

Saturday 2nd January

Whiteout and snow lifted by 1400, so commenced 10000' refraction profile.

Azimuth from C29 to B29 laid in readiness for an improvement in weather conditions to run line to B29.

Sunday 3rd January

Whitworth, Jones & Simmons continued refraction profile, while rest cut a 10 metre core. Air temp. (+35°F) made removal of core from barrel impossible as it immediately adhered to walls when exposed to air.

Abandoned core cutting until air temp. drops.

Last cyclometer feet to pieces so further measurements of distance for surveying grid will be by the inaccurate Snotrac odometers.

To finish off the day, the seismic blasting machine stripped its gears.

Monday 4th January

Heavy snow and wind from west. Managed to do 3 hours seismic work during afternoon.

Tuesday 5th January

Weather fine, enabling party to complete seismic work and cutting 10 metre core.

Levelling of 10000' profile completed and levelling from C29 to B29 commenced but turned back when weather deteriorated.

Wednesday 6th January

Blizzard all day with wind to 55 knots. According to some U.S. reports, the Vanderford Glacier area is notorious for this type of

.../11

weather even when it is fine at Wilkes, 80 miles away.

Thursday 7th January

Still blizzarding.

Friday 8th January

Same as yesterday.

Saturday 9th January

Weather eased off during night but drift was too heavy to move towards "B" leg before 1800 when a finally successful attempt was made. Terrain crevassed and several ice domes for most of 10 miles to B29.

Arrived back at C32 at 0130 to find Hulcombe and Jones working on a D4 which had thrown a track. Worked until 0315 when weather deteriorated.

Sunday 10th January

Heavy drift all day but party worked for 6 hours to get track back on D4.

After repairs to D4 were completed commenced digging out sledges. Will take a risk on them being buried again although they were moved immediately the digging was finished.

Monday 11th January

Blizzard all day.

Tuesday 12th January

Blizzard all day.

Wednesday 13th January

Wind to 30 knots with drift all day. Whitworth tried all day to get BMZ and gravity meter readings, but wind was too high to obtain accurate readings until 2000 when there was a lull to about 10 knots. Immediately readings were obtained, digging out commenced and trains moved off in 30 knot drift at 2200.

Whitworth discovered there was an error in his gravity readings at C20, so it was decided he would follow vehicle tracks to c20, then proceed to S2 via C00, while rest of train went direct to S2 from C32.

Obtained brief glimpse of sun at 2345 - sufficient to set astro compass. Used sastrugi from this point until 0300 when sun became visible again. Just as well as sastrugi orientation varied up to 30° depending on the aspect of slopes etc.

Conditions very poor for accurate navigation with visibility down to 50 yds. most of journey.

15 hours and 51 miles after leaving C32, hit S2 spot on in vis. of 300 yds. Feel sure Columbus was no more elated than I!

All very tired and turned in immediately after calling on Morgan and Freeman in S2 accommodation.

Whitworth and Simmons had arrived 6 hours earlier and had been fortunate enough to have tracks of previous weeks to guide them the full distance.

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Thursday 14th January

Party slept all day, although an attempt was made by Rogers, Simmons and O.I.C. to reach the dome and commence glaciological triangle at 2300. Vis. too poor so postponed until tomorrow.

Friday 15th January

Dome party left at 0900 in good visibility except for last 6 miles when low cloud made it difficult to locate stakes placed in autumn.

Arrived dome at 1330 and left at 1400 on the Cape Folger azimuth previously laid by Budnick in autumn.

Surface very soft - unable to travel in top gear.

Arrived S2 at 2200 after staking every 0.1 miles to maintain accuracy in poor vis. Folger line passes S2 about 3 miles S.E.

Freeman, Morgan and Whitworth spent day locating strain grid stakes, while Hulcombe and Jones dozed the enormous drifts around S2 caused by the location of the ice drill. Also 45 drums fuel laid out at 10 yard intervals to prevent drifting.

Saturday 16th January

Very successful day - all strain grid stakes located - probably for the first time since the U.S. placed them in 1958.

All work finished by 1800, and party departed at 2200 leaving Morgan and Whitworth with the Nodwell and the Weasel on a sledge.

Snotrac party levelled back to Folger line and then proceeded towards Folger, meeting D4's which had proceeded along S2 trails direct.

Stopped at 0130.

Sunday 17th January

Fine day and temperature very comfortable. Left at 1030 and made 29 miles for day. More mileage could have been achieved but did not bother as we are now 20 miles or so from Wilkes via Cape Folger.

Monday 18th January

Left at 0900 and reached coast after 11 miles travel. Last stake 71 miles from dome and appeared to be about $1\frac{1}{2}$ -2 miles from the coast.

D4's made a direct route to Wilkes, leaving at 0915. Commenced to level to Folger drums and after 3 miles ran into crevasses and turned inland. No.5 Snowtrac hit a covered crevasse and broke a front idler assembly. Thanks to Freeman's ingenuity the vehicle was not immobilised and Wilkes was reached at 1600 - at the same time as D4's.

ANALYSIS
OF SPRING TRAVERSE (GEOPHYSICAL)

WILKES

1964

The original plan laid down by the Bureau of Mineral Resources was the establishment of a grid pattern, 90 miles in depth and 60 miles in width and consisting of 10 mile squares, south of S2. The north baseline was to pass through S2 in an east-west direction with 30 miles of the grid pattern to the east of S2 and 20 miles to west.

Preplanning during winter indicated that a minimum fuel requirement of 80 drums would be required to achieve this distance - a total of 800 miles for each D4 and 1700 miles for each Snotrac. Accordingly a winter depot trip was made to establish fuel dumps at three points along the northern baseline of the grid so that a depot of fuel would be available for each 200 mile of route travel - i.e. south down one leg and north on the adjacent leg.

For logistic convenience it was decided to move the grid pattern westwards of S2 so that there were 30 miles to west and 20 miles to the east. At this stage it was assumed that the terrain S.E. of S2 was normal plateau, except possibly for 10-20 miles inland from the Vanderford. The 1958 U.S. glaciological party had traversed part of this area and although reports of their foamey were not available at Wilkes or Melbourne it was assumed that if any unusual terrains was present, this information would have been shown on National Mapping maps. Furthermore an ANARE aircraft had flown along the axis of the Vanderford and again it was assumed some evidence would have been shown on maps. Unfortunately, all of the writer's assumptions were incorrect and the type of terrain encountered contributed 18% of the time lost during the traverse.

The geophysicist, Whitworth, had planned the scientific work of this traverse for 18 months prior to commencement and consequently presented a highly integrated and comprehensive plan based on a party of 6 men. Although the Bureau of Mineral Resources has always been content with results of seismic and gravity stations established on routes navigated by astro-compass and position line fixes. Whitworth insisted that his work required far greater accuracy to the order of 1 yard in 10000 yds. To achieve this accuracy would have meant the surveying of lines by theodolites for approx. 1200 miles. Naturally this method was out of the question and a compromise method was used, with better accuracy than the astro compass, but not the theodolite.

A very accurate astro-azimuth line was laid by Budnick at S2 in the autumn along the east-west baseline for 1500 ft. using bamboo stakes. From this line, stakes were placed every 0.2 miles and aligned by using binoculars focussed on the 6 or 8 stakes behind.

This method proved accurate to 300 yds in 40 miles. Distance was measured by cyclometer.

Whether or not the effort required to obtain this accuracy was justified is a moot point. Placing a stake in snow was not a

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great problem except for the continual hopping in and out of the vehicle. However, as it turned out the bulk of travel was over ice and this necessitated boring a 6 inch hole with an ice auger. This was extremely tiring after a few miles and made party members rather cynical about various facets of Antarctic science. In fact, Whitworth's continual demand for infinite accuracy in all work done added considerably to the overall time taken to complete any aspect of the programme.

Two legs of the grid passed through crevassed areas, necessitating the carrying of timber (for crossing crevasses) micro-barometers, stakes i.e. auger, and gravity meter. This procedure added to the time taken over a distance normally covered by vehicle in 30 minutes. Some areas traversed on foot took 2 days per mile. In every instance if the leg had been offset by 1 mile from the crevassed area the levelling etc. could have been done by vehicle. Whitworth refused to do this, even though other nations use this method and apparently end up with satisfactory results.

If the level of accuracy maintained during this traverse was essential, the technique of staking a straight line using binoculars, is very successful. With practise, 3.8 mph could be maintained doing barometric levelling every 0.2 miles and gravity readings every mile. The whole traverse was planned on a time and motion basis, with some flexibility for poor working conditions etc. If this type of traverse is to be continued in future years, the methods and sequence of performing various phases used during this traverse could be used with success, especially on plateau terrain.

Features of the traverse were:-

(i) The reliability of all vehicles - approx. 2800 vehicle miles were covered with few breakdowns. S.D.M. was very particular about preventative maintenance.

(ii) The quantity of scientific data obtained for each 10 route miles travelled. In each 10 mile, an average of 14 seismic shots were fired, BMZ measurements taken, gravity readings taken every mile and in unusual topographical features, every 50 yards, barometric levelling every 0.2 miles, and a 10 metre ice core every 30 miles.

(iii) The surprising lack of information on Australian maps as mentioned in para 3.

(iv) The difference of simultaneous weather conditions at Wilkes and C30.

Recommendations

(i) At the earliest opportunity the area inland from the

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Vanderford Glacier be aerial photographed so that maps can be amended.

(ii) That all traverses, especially of this nature, be pre-planned in detail, in Melbourne by persons and departments concerned, rather than leave the decision of the scientific planning to the expedition scientist whose standard of accuracy and ambitions could be beyond the realms of practicability.

(iii) That the current practice of using a vehicle (Nodwell or Weasel) exclusively as a seismic vehicle be discontinued and consideration be given to the design of a suitable layout in a caravan of the RMIT fibreglass type. The continual cry by Bureau of Mineral Resources geophysicists for a vehicle that will do 15 mile per hour etc. is not realistic and at no time during 1964 was it necessary for the seismic vehicle to be away from the D4 tractors.

Considering that 44% of available time was lost due to weather and 18% due to terrain, it is small wonder that only a small portion of the grid was covered. Also the original plan was based on the assumption that the traverse would commence in September but this not possible due to insistence that the glaciological programme, commenced in the autumn, should be completed in the spring. Consequently, the geophysical traverse did not leave until early November. Despite all this, the B.M.R. are apparently very satisfied with the results obtained by Whitworth.

LOGISTICS - GEOPHYSICAL TRAVERSE - WILKES 1964

<u>Vehicles</u>	<u>Fuel Consumption</u>	
D4 - 1	1 m.p.g.	} assuming very soft terrain
D4 - 2	1 "	
Snotrac - 5	3 "	
Snotrac - 6	3 "	
Weasel -	1 "	
<u>Sledges, Caravans etc.</u>	<u>Load</u>	<u>All-up Weight</u>
Otaco Sledge	Fuel	11 tons (max)
Engineer's Sledge	Tools, Spares etc.	2 1/2 tons
Food Sledge	Food	2 tons
Explosive & Ice Core Sledge	Explosives, Cores etc.	1 1/2 tons (Max)
Seismic Sledge	Scientific Equipment	1 1/2 tons
Large Caravan	Some Food, etc.	3 tons
Fibre Glass Caravan	Some Food, etc.	1 1/2 tons
Miscellaneous Sledge	L.P.G., Explosives etc.	1 ton
		<u>24 tons</u>

ESTIMATED FUEL CONSUMPTION EACH 200 MILES (ROUTE)

<u>Consumer or Vehicle</u>	<u>Distance to be covered</u>	<u>ATK</u>	<u>GAS</u>
Snotrac 5	400 miles		150 gallons
Snotrac 6	400 "		150 "
Weasel	200 "		200 "
D4-1	200 "	200 gallons	
D4-2	200 "	200 "	
Alternator 110V	-		60 "
Charger	-		40 "
Fyreside Heater	-	40 "	
Trombon "	-	40 "	
Herman Nelson	-		40 "
D4 Starter Motors	-		20 "
		<u>480 gallons</u>	<u>660 gallons</u>

Drums required on each 200 mile leg

12 ATK

15 GAS

FUEL CONSUMPTION - WILKES TO START FIRST-LEG VIA S2 DISTANCE - 90 MILES

Snotrac 5	30 gallons	
" 6	30 "	
Weasel	90 "	
D4-1		90 gallons
D4-2		90 "
	<u>150 gallons</u>	<u>180 gallons</u>
Total requirement	3 1/2 drums <u>GAS</u>	4 drums <u>ATK</u>

EXISTING STOCKS FUEL IN DEPOTS ON BASELINE

At start of second 200 mile leg Actually Required

19 ATK	12 ATK
13 GAS	15 GAS

DEFICIT - 2 GAS SURPLUS - 7 ATK

At S2 (start of third 200 mile leg) Actually Required

19 ATK	12 ATK
14 GAS	15 GAS

DEFICIT - 1 GAS SURPLUS - 7 ATK

FUEL TO BE TAKEN FROM WILKES FOR FIRST 200 MILES PLUS JOURNEY
- WILKES TO START POINT VIA S2

<u>Total Requirement</u>	<u>GAS</u>	<u>ATK</u>
Wilkes to Start Point	3½	4
Actual Leg	<u>15</u>	<u>12</u>
	18½	16
Plus <u>deficit</u> gas at depots		
3½ drums	<u>3½</u>	—
Less surplus ATK at depots		
14 drums		
	<u>22 GAS</u>	<u>2 ATK</u>

RETURN TO WILKES FROM DOME CENTRE AFTER COMPLETION OF GEOPHYSICAL WORK

Party A - Dome to Cape Folger then to Wilkes

D4 - 1	80 Gallons	ATK	<u>Distance</u> - 90 miles
Snotrac 5	20 "	GAS	
Snotrac 6	20 "		

Party B - Dome to Cape Poinsett, then Folger to Wilkes

D4 - 2	13 Gallons	ATK	<u>Distance</u> - 150 miles
Weasel	13 "	GAS	

2 drums GAS depoted Cape Poinsett
∴ 60 gallons GAS required at commencement from Dome.

<u>TOTAL REQUIREMENT</u>	
<u>FOR RETURN TO WILKES</u>	5 ATK
<u>FROM ICE DOME</u>	4 GAS } DRUMS

OTACO SLEDGE TO BE LOADED WITH:

	<u>GAS</u>	<u>ATK</u>
Wilkes to start Leg I	3 $\frac{1}{2}$	4
Actual Leg	15	2
Deficit GAS at depots	3 $\frac{1}{2}$	
Return to Wilkes	<u>4</u>	<u>5</u>
	<u>26</u>	<u>11</u>

GAS - 27

ATK - 11

Lube Oil - 2

40 drums

DISTRIBUTION OF FUEL & RELOADING AT DEPOTS

	<u>GAS</u>	<u>ATK</u>
TRAIN ARRIVES S2 WITH	25	9
DROP AT S2	-5	
USE TO START OF LEG I	-1	-2
DROP AT WEST DEPOT	-2	
PICK UP AT WEST DEPOT	<u> </u>	<u>7</u>
	<u>17</u> GAS	<u>14</u> ATK

THIS FIGURE, 17 GAS & 14 ATK GIVES RESERVE OF 2 DRUMS EACH.

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