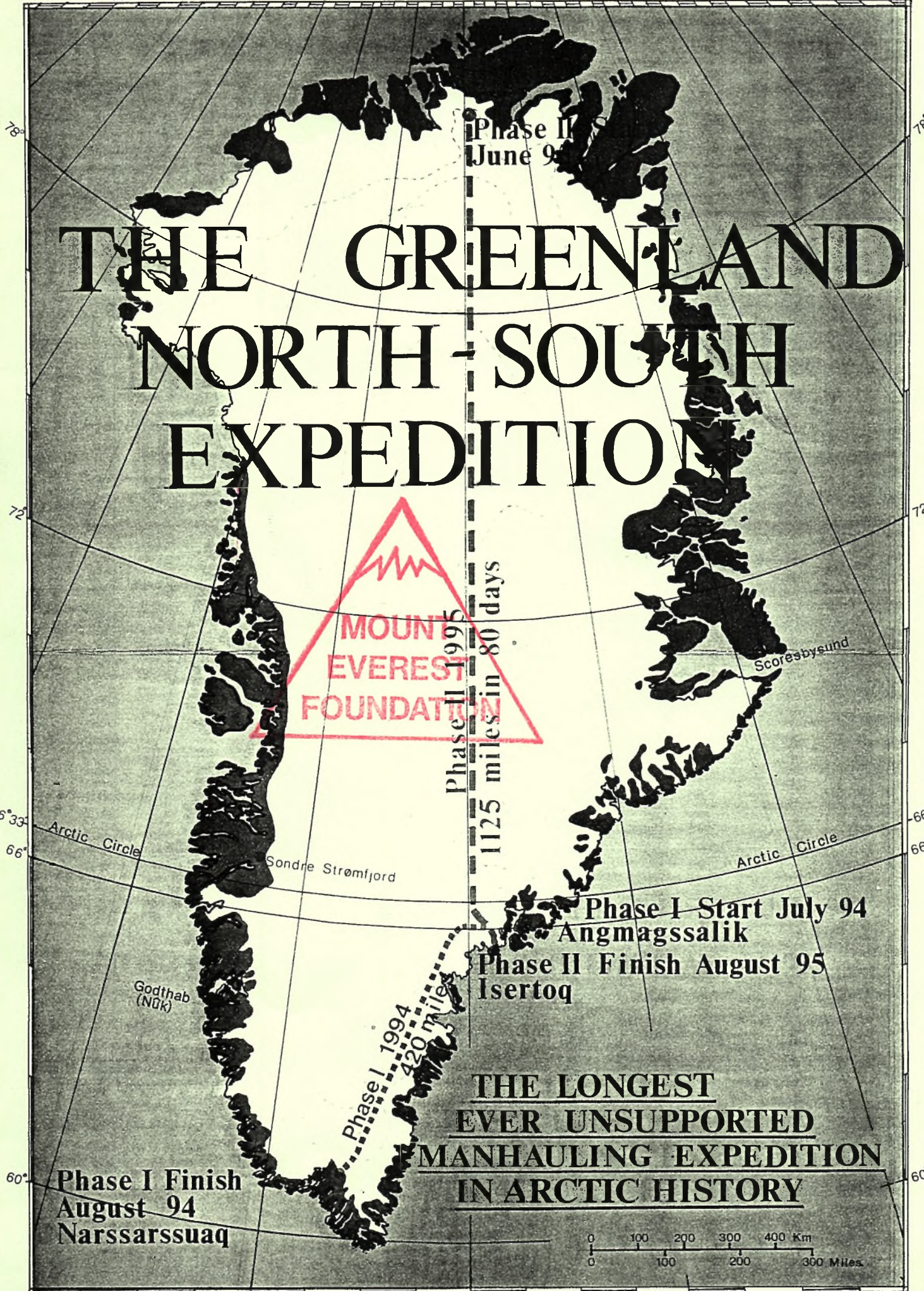


ACL 26023

94/3

88° 80° 72° 64° 56° 48° 40° 32° 24° 16° 8° 0° 8°



THE GREENLAND NORTH-SOUTH EXPEDITION

Phase II Start
June 94

MOUNT
EVEREST
FOUNDATION

Phase II 1995
1125 miles in 80 days

Phase I 1994
420 miles

Phase I Start July 94
Angmagssalik
Phase II Finish August 95
Isertoq

Phase I Finish
August 94
Narssarsuaq

**THE LONGEST
EVER UNSUPPORTED
MANHAULING EXPEDITION
IN ARCTIC HISTORY**

0 100 200 300 400 Km
0 100 200 300 Miles

+ 483

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EXPEDITION OBJECTIVES

The North-South Greenland Expedition is a two-phase project which will culminate in 1995 with the complete unsupported 1550 miles north to south crossing of the Greenland ice-cap. In the pages that follow, we are reporting on the successful completion of Phase I of this project which was conducted between 21 July and 27 August 1994.

The objective of Phase I was the first 450 miles unsupported crossing of the Greenland ice-cap from the shores close to the east coast settlement of Angmagssalik, to Narssarssuaq, a World War II US air base on the southern tip of Greenland. Phase I was a major enterprise in its own right but the underlying purpose of this six weeks expedition was to test our equipment, diet and our mental and physical ability in preparation for the much longer Phase II.

We are much indebted to Les Turnbull who had the original idea for the ice-cap journey which ultimately became Phase I. It was he who first identified the opportunity for a first unsupported crossing along this route and it was he who did much of the preliminary research which laid the foundations for our expedition. Indeed, Les was the leader of the South-East Greenland Traverse 1991, of which myself and Brian Hull were members, which was a first attempt on the Angmagssalik to Narssarssuaq crossing. Sadly, this expedition had to be aborted after 7 days' travel on the ice because of ill-health to a fourth member. This was a major set back to Les, Brian and myself but the failure of this expedition was the springboard for the North-South Greenland project.



Phil Jumeau, Alfred Stephenson (Patron of the South East Greenland Traverse 1991), Brian Hull and Les Turnbull a few weeks before departure for the 1991 attempt on the ice-cap crossing.

THE NORTH - SOUTH GREENLAND EXPEDITION

INTRODUCTION

The longest unsupported manhauling journey in Arctic history is the challenge Martin Dowson, Phil Jumeau and Brian Hull will undertake in the summer of 1995.

Starting their journey from the northern tip of Greenland, the three man British team will be isolated from any external backup. Travelling by ski, this world record breaking journey of 1125 miles South over the Polar Ice Cap will finish at the Arctic Circle some eighty days later.

The journey forms Phase 2 of a two part expedition which will traverse the whole length of Greenland's Ice Cap. In the summer of 1994 the Phase 1 journey will cover the 420 miles of Ice Cap South of the Arctic Circle.

The journeys will make extreme demands on the members physical and mental fitness, preparation and execution of the expedition could not be contemplated without the extensive combined experience and commitment of the team members.

DESCRIPTION

The journeys will take place in the summer months when daylight hours and climatic conditions are at their most favourable.

The three man team will cover the assigned routes without any form of backup, previously laid food depots, air support or mechanical transport. Travel will be on Nordic type skis and every item of food and equipment necessary for the journey ahead will be manhauled in specially designed sleds, initially weighing some one hundred and fifty kilograms.

In order to complete the 1125 miles in 80 days, an average daily mileage of fourteen miles per day must be maintained, notably higher than any previous arctic manhauling achievements. By using drag parachutes, winds from a favourable direction can be harnessed to help propel the sleds. Winds being an unknown factor however, manpower remains the basis for calculating the required daily mileage and provisions

PHASE 1 - 1994

The preliminary journey of 420 miles will allow full field trials of equipment, diet, technique and consolidate the members into a team prior to the more demanding second phase. The journey from Angmagssalik to Narsarsuaq has never been previously made, the area being extremely remote and unvisited. This is a serious expedition in its own right. Provisions for 40 days sledging will be taken.

The start and end points of the journey are at coastal settlements making the travel and freight logistics economical and straight forward. Access routes onto and off the icecap at these points have been proved feasible, and will be achieved by load carrying from equipment depots made by boat at sea level.

PHASE 2 - 1995

The northern most point on the Greenland Ice Cap, Peary land, is not accessible from the sea. Consequently the members, food and every item of equipment necessary for the 1125 mile record breaking journey ahead must be flown in using a chartered Twin Otter aircraft onto the Ice Cap, from where a direct start South can commence. By finishing at the settlement of Isortoq, just South of the Arctic Circle, the longest unsupported arctic manhauling expedition ever undertaken will finish some distance South of Phase 1 start point, hence completing the full North to South traverse of the Greenland Ice Cap.

For further details contact:

The North-South Greenland Expedition
Phil Jumeau

Flat 8, 10 Saint Georges Square,
Lytham-St.-Annes, Lancashire, FY8 2NY.
Telephone (0253) 728512



From left: Brian Hull, Martin Dowson and Phil Jumeau

EXPEDITION MEMBERS

Brian Hull: Age 29

Based in Lancashire employed as a Field Assistant for British Antarctic Survey (B.A.S.), Antarctica.

Graduate in Mechanical Engineering (Bsc Hon.) at Salford University. Mountain leadership Summer and Winter Awards Certificates.

- Expedition Experience:*
- Member of Salford University Cape Farewell Expedition 1986 (8 wks).
 - Mountain leader with the British Schools Exploring Society (B.S.E.S.) expedition to Svalbard 1987 (6 wks).
 - Member of British South East Greenland Expedition 1989 (6 wks).
 - Chief Leader of B.S.E.S. Over Wintering expedition to Alaska 1989-90 (9 months).
 - Field assistant research for B.A.S., Antarctica 1990-91 (6 months).
 - Member of South East Greenland Traverse 1991 (3 wks).
 - South America climbs and treks 1991 (3 months).

Martin Dowson: Age 30

Presently living in the Midlands working as a Quality Engineer in the Automobile industry.

Graduate in Physics (Bsc Hons.) at Durham University.

- Expedition Experience:*
- October 1984 to December 1987 Atmospheric science research for British Antarctic Survey at Faraday Research Station, Antarctica.
 - Member of the British South East Greenland Expedition 1989 (6 wks).
 - Eight years climbing experience including three Alpine climbing seasons.

Dr Phil Jumeau: Age 32

Living in St. Annes and working as a Biology teacher at Lytham St. Annes High School.

Doctorate in Antarctic soil Arthropod Ecology at York University.

Graduate in Ecology (Bsc Hons.) at Lancaster University.

Post Graduate Certificate in Education at St. Martins College, Lancaster.

- Expedition Experience:*
- Biological research for British Antarctic Survey at Faraday Research Station, Antarctica (6 months).
 - Member of British South East Greenland Expedition 1989 (6 wks).
 - Science and adventure leader with British Schools Exploring Society (B.S.E.S.) expedition to Svalbard 1990 (6 wks).
 - Member of South East Greenland Traverse 1991 (3 wks).
 - Six years general climbing experience.

Patron: Robert Swan

Expedition account: North - South Greenland Expedition, Midland Bank,
St. Annes-on-Sea Branch. Account No. 31137328

EXPEDITION MEMBERS

Name	Occupation
Phil Jumeau	Biology Teacher
Brian Hull	Field General Assistant with BAS
John Sweeney	Field General Assistant with BAS

John Sweeney joined the expedition when Martin Dowson, the original third member of the expedition had to withdraw because of work commitment.



John Sweeney and Brian Hull during a lunch stop in white-out conditions.

Dr. P.J. Jumeau
Flat 8, 10 St. George SQ
Stannes, FY82NY
England

Permit

Name of the project or expedition: North-South Greenland Expedition: Phase I	Geographical area(s): Johan Petersen fjord - Narsassuaq
Principal investigator or expedition leader: Dr. Philippe Jumeau	Dates of field period(s): 11 July 1994 - 29 August 1994

This is a permit of the *operational and safety* aspects of your project / expedition, *exclusively*. It therefore does not represent nor does it imply an evaluation or recommendation of any *scientific* or *sport* activities included in your project or expedition.

The permit is issued on the following *general* conditions:

1. Greenland must be entered by the routes specified in the application. At the start of the project / expedition, notice must be given to the local police in Greenland which may inspect the equipment. Follow the route indicated in the application. Any change of route or cancellation of the project / expedition must be reported as soon as possible to the local police. When leaving Greenland the local police must be informed of the date and place of departure.
2. A copy of the present permit must be carried by each field party of the project / expedition and shall be presented upon request to any official authority in Greenland.
3. An updated list of names of all participants in the project / expedition must be received by the Danish Polar Center prior to the departure for Greenland.
4. Houses, cabins, or huts shall not be used unless previously arranged with the owner. Should an emergency require such buildings to be used, the place must be left clean and in good condition. In case it becomes inevitable to draw on fuel and / or provisions stored at the locality, the police must be notified accordingly as soon as possible. Be prepared to reimburse the owner the costs of the used goods.
5. If the project / expedition will take place within the National Park the stipulations in the "Executive Order of the Greenland Home Rule no. 16 of 16 June 1987 on the National Park in North and East Greenland" must be strictly complied with.
6. The project / expedition must comply with all current environmental protection regulations and observe that *in situ* pre-historic as well as historic relics (ruins, tent rings, middens, graves, cairns, other stone structures, or artefacts) are protected and shall not be damaged, altered, moved in whole or in part, or in any way disturbed.

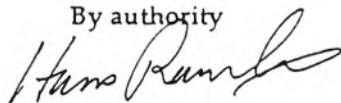
The present permit is granted on the following *specific* conditions:

This permit is only valid under the condition, that the radio permit fee has been payed.

Please note that the permit is revocable by the local police in Greenland with immediate effect should the project / expedition appear to involve obvious hazards in respect to the experience of the participants or the condition and capacity of the equipment, or should any of the above mentioned general or specific conditions not be complied with.

On behalf of the Danish Polar Center

By authority



Hans Ramløv

A copy of this letter (incl. your notification) will be sent to

KANUKOKA, Nuuk
The Chief Constable, Nuuk
The Research Co-ordinator, Nuuk
Tasilaq, Ammasalik

The Police Officer, Kangerlussuaq
The Greenland Command, Kangilinnguit
The Office of the High Commissioner, Nuuk
Narsaq, Narsarsuaq

EXPEDITION PLANNING AND LOGISTICS

- October 1991 - production of expedition prospectus
- January 1992 - Robert Swan agrees to become our expedition patron
- April 1992 - Prof. Nelson Norman (then RGIT Survival Centre Ltd.) contacted and suggests Dr Sandal's research team at Bergen University as source for science project
- May 1992 - agree to undertake psychological research project for Bergen University leading up to and during the expedition
- June 1992 - Prof. Nelson Norman (RGIT) agrees to act as academic referee to our expedition
- Cdr. Chris Furse agrees to act as expedition referee
- December 1992 - unsuccessful application for funding to National Geographic Society
- February 1992 - unsuccessful application for funding to Manchester Geographical Society
- March 1992 - unsuccessful application for funding to Malden Mills International Polartec Performance Challenge
- February 1993 - unsuccessful application for recognition and funding to the Royal Geographical Society
- July 1993 - application to Danish Polar Centre for Expedition Permit
- July 1993 - application for funding to Mount Everest Foundation
- November 1993 - interview with MEF in London
- December 1993 - offer of a grant from MEF
- February 1994 - application for funding to Gino Watkins Memorial Fund
- arranging boat charter with local hunter for journey from Angmagssalik to the main land
- March 1994 - offer of a grant from the Gino watkins Memorial Fund
- March 1994 - expedition insurance arranged through the BMC - note that the Danish authorities require you to be insured to approx. £100,000 for SAR before issuing the expedition permit
- April 1994 - booking of return flights to Iceland with Iceland Air, London
- booking of return flights Iceland-Greenland with Greenland Travel Inc., Copenhagen
- booking of equipment freight to Denmark and then on to Greenland with Leman, Bradford
- May 1994 - application to Greenland Telecom for radio permit to cover the distress beacon
- expedition permit granted

- 19 July 1994 - departure from Glasgow airport to Keflavic, Iceland
- 20 July 1994 - departure from Keflavic to Kulusuk, Greenland
- 21 July 1994 - helicopter flight from Kulusuk to Angmagssalik
- 21 July 1994 - boat charter from Angmagssalik to Nagtivit Kangertivit Fjord
- 21-23 July 1994 - load carrying to point where sledging could begin
- 24 July 1994 - begin crossing of ice-cap
- 27 August 1994 - last load carry down to Narssarssuaq: crossing completed
- 29 August 1994 - depart Narssarssuaq for Keflavic
- 1 september 1994 - depart from Keflavic for Heathrow



Brian Hull packing the Nansen sledge in the white desert that was our home for 27 days.

ACCESS ONTO THE ICE-CAP

Our intended route onto the ice-cap was the same as the one that we had successfully taken in 1991 during the South-East Greenland Traverse. This route had originally been recommended to us by both Dave Mitchell and Jim Lowther and had provided us with a rapid and safe climb onto the ice-cap (Fig. 1. box A). However, when we arrived in Angmagssalik, the mouth of Johan Petersen Fjord was blocked-off with icebergs and our boat charter was not able to take us to our intended landing site. We chose to be taken to the head of Nagtivit Kangertivit Fjord as an alternative point of access and from our landing site we found a relatively easy route along ridge which flanks the northern edge of the Bussemand Glacier (Fig. 1. box B). After three hours of walking with a full load the edge of the ice-cap is reached at a point 600m above sea level, and from there sledging can begin along a relatively crevasse free line.



Fig. 1. Access route onto the ice-cap of the South East Greenland Traverse 1991 (box A) and Phase I 1994 (box B).

DAILY SLEDGING TABLE

Date 1994	Day	Camp locn. N.lat W.long	Dist- ance km	Hours travel and av. km/h	Dirn. deg. mag.	Elev- ation m	Surfaces, met. data and relevant comments
22/7	-	65° 43'	-	-	-	600	load carrying on 22, 23 and 24
23/7	-	38° 44'					
24/7	1	65° 48' 38° 54'	12.0	4 3.0	321	1100	area of dry ice and deep slush.
25/7	2	65° 56' 39° 07'	17.1	5 3.4	327	1640	firm, crevassing well bridged
26/7	3	65° 56' 39° 44'	28.3	6 4.7	272	1600	firm, undulating no crevassing
27/7	4	65° 51' 40° 27'	32.2	7 4.6	252	-	firm, undulating no sastrugi
28/7	5	65° 42' 40° 59'	29.6	6 4.9	236	1625	very firm, walked in training shoes
29/7	6	65° 34' 41° 36'	32.5	6.5 5.0	243	1752	very firm, walking
30/7	7	65° 25' 42° 10'	30.0	6 5.0	240	1900	firm, walking. modify pulk
31/7	8	65° 10' 42° 24'	30.8	6 5.1	200	1956	firm, walking. depot duff pulk
1/8	9	64° 56' 42° 38'	29.0	6 4.8	205	2345	softer patches revert to skis.
2/8	10	64° 49' 42° 42'	13.9	3.5 4.0	202	2360	a.m. lie up, bad weather, very soft
3/8	11	64° 34' 42° 57'	29.2	6 4.9	203	2431	whiteout
4/8	12	64° 21' 43° 06'	26.1	6 4.4	197	2454	cold dry loose snow, hard pulling
5/8	13	64° 21' 43° 06'	-	- -	-	2454	rest day
6/8	14	64° 14' 43° 10'	13.0	3 4.3	194	2492	p.m. lie up, blizzard

7/8	15	64° 00' 43° 28'	28.9	6 4.8	212	2715	patchy, loose snow and thin crust
8/8	16	63° 48' 43° 43'	25.8	6 4.3	208	2830	patches loose snow. Bad visibility
9/8	17	63° 42' 43° 52'	14.2	3 4.7	212	2522	drift snow, p.m. blizzard
10/8	18	63° 29' 44° 11'	28.1	6 4.7	216	2742	patchy loose drift snow
11/8	19	63° 16' 44° 25'	27.7	6 4.6	205	3000	zero contrast
12/8	20	63° 03' 44° 40'	26.3	6 4.4	208	2793	zero contrast
13/8	21	62° 47' 44° 38'	29.9	6 5.0	176	2866	zero contrast, fresh snow surface
14/8	22	62° 04' 44° 37'	23.6	5 4.7	179	-	falling snow, poor contrast
15/8	23	62° 16' 44° 48'	34.2	6 5.7	196	2828	firm, contrast moderate. Used parawing
16/8	24	62° 16' 44° 48'	-	- -	-	2828	lie up, blizzard
17/8	25	61° 59' 44° 34'	34.5	7 4.9	159	2589	undulations, contrast poor. see nunatak
18/9	26	61° 26' 45° 54'	45.6	7 6.5	-	2020	used parawing sastrugi patches
19/9	27	61° 26' 45° 01'	25.0	9 -	-	700	crevassing, walk down Ostgletscher. Last sledging day.

Totals 667.5km = 415 miles
Daily average : 24.7km = 15.4 miles

DESCENT ROUTE TO NARSSARSSUAQ

The most demanding part of the expedition was the 50km descent from the edge of the ice-cap to Narssarssuaq (Fig. 2). It was demanding both physically and psychologically because it entailed relaying our remaining food, fuel, sledges and equipment on our backs over difficult rocky and vegetated terrain, as well as the crossing of two subsidiary glaciers flowing down from the ice-cap. The principal difficulty of this descent lies in the bottom third portion of the Kiagtût Sermiat glacier. Essentially, the best route down this glacier is to maintain a line close to the west flank of the glacier in its upper reaches and to gradually veer towards the centre of the glacier until a relatively trouble free line takes you diagonally across to the eastern flank of the glacier where you rejoin land. From there, there is an obvious and well trodden path which takes you to Narssarssuaq 10km away.



Looking north towards Kiagtût Sermiat glacier seen behind the rock promontories in the foreground.

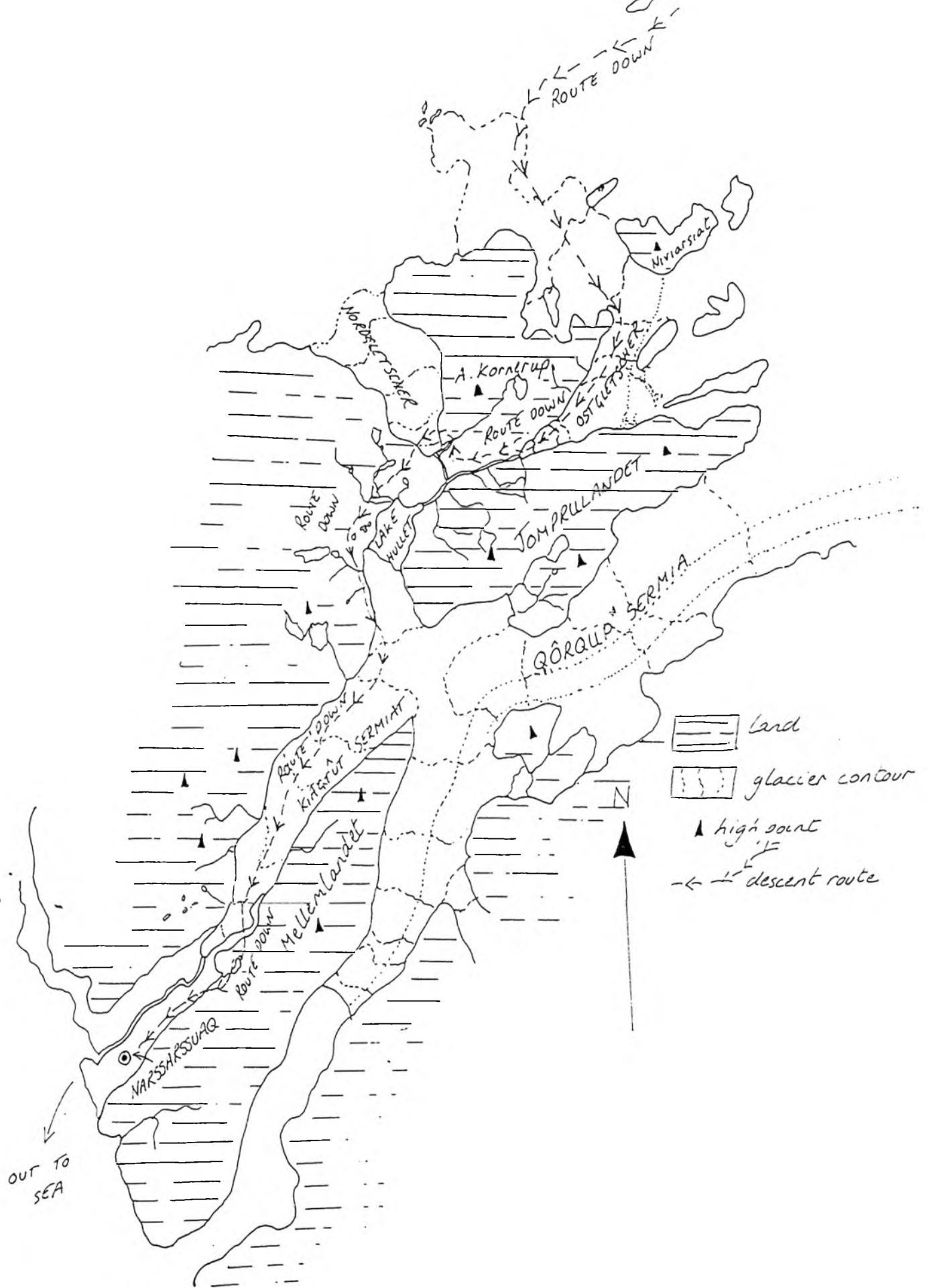


Fig. 2. Descent route from the ice-cap to Narssarssuaq.

EXPEDITION BUDGET: All figures are in pound sterling.

	Per man	Numbers:3	COST	INCOME	DEFICIT
		3			
Flights and other transport					
Glasgow-Keflavic + accomm.	444		1332		
Keflavik-Kulusuk	226		678		
Narssarssuaq-Keflavik	150		450		
Kulusuk-Angmagssalik	40		120		
Angmagssalik-Sangmitleq			228		
Total			2808		
Freight					
Crate and packaging					
St. Annes-Aalborg			212		
Aalborg-Angmagssalik			247		
Narssarssuaq-Aalborg			200		
Aalborg-St.Annes			229		
Danish export documentation			30		
Freight insurance			150		
Total			1151		
Expedition insurance					
	189		567		
Food					
	200		318		
Fuel					
			20		
Equipment					
Parawing					
			530		
Distress beacon					
			118		
Global Positioning System					
			0		
Radio permit					
			50		
Tent					
			387		
Stove					
			92		
Sledges					
			0		
Medical supplies					
			100		
Total			1277		
Administration					
Expedition prospectus					
			500		
Post-expedition report					
			150		
Correspondence					
			58		
Telephone					
			58		
Travel					
			6		
Accommodation					
			0		
Total			772	250	
Personal contribution					
	1705			5115	
Grants					
				1550	
TOTAL FOR PHASE I					
			6913	6915	-2

EQUIPMENT REPORT

Personal equipment: Personal equipment was supplied by the expedition members. Variations in equipment arose from personal preference and depended on what was already owned. Any extensive comments which are considered important are made after the equipment listings.

Rucksack 70-80 1	Karrimor Alpiniste, Lowe Cerre Torre II
Waterproof rucksack	2 large size Jack Wolfskin liners
Sleeping Bag	Mountain Equipment Everest, Redline and Caravan Synthetic bags.
Bivvy bags	Goretex, various models.
Sleeping bag liners	Cotton, meraklon or none.
Sleeping mats	2 members used Thermarest and Karrimat
Leather Nordic ski boots	1 member used a Thermarest only
Skis 210 cm	1 member used Asolo Snowfield, 2 members used Artex boots.
Bindings	1 pair of waxing Asnes Sondre Telemark each
	Rottfella Super Telemark Cable 75mm
	1 complete set of above as spares.
Skins	2 or 3 pairs Pomoca synthetic, 38mm wide
Poles 145 cm	Swix Mountain, 1 pair each plus 1 pair spare
Crampons	various models of 12 point articulated strap on crampons
	Spare bars, nuts and bolts for above
Gaiters	Berghaus Yetis, non insulated
Training shoes	1 pair each
Swiss Army knife	1 each
Water bottle	1 1
Thermos Flask	1 1 stainless steel
Snow glasses	Various models, 1 pair each plus 2 spares
Snow goggles	Various models
Watch	Various

Clothing

Underpants	As required and preferred
Socks	4-6 pairs as preferred
Thermals tops/bottoms	1-2 or none, various meraklon type
Tracksters	1 pair each, Ron Hill or equivalent
Buffalo jackets	2 members had Big face shirts, 1 member used Special Six shirt, all with hoods
Buffalo over jacket	2 members used Belay Jackets, 1 member used a BAS parka
Buffalo windproofs	1 pair of pertex overtrousers each 1 windshirt was "shared"
T shirt	1 each
Warm trousers salopettes.	Quilted, Heli Hansen or fleece
Waterproofs	2 members took GoreTex cagoule and leggings.
Hats	1 Headover ear band and "baseball caps" plus other preferences
Gloves	1 pair waterproof outer mitt lined with pile or Dachestein and various makes of fingered gloves
Face mask neoprene	2 members took these but they were never used
Shorts	1 pair or boxer shorts

Climbing

Harness	Various makes
Ice axe	1 each, various short walking type
Ice hammer	1 only
Carabiners	6 each
Slings	2 each
Prussiks	3 each
Ice screw	1 each

Miscellaneous personal items

Wash and dental hygiene kit
1-2 books each
Scientific Questionnaire papers
Permit and insurance documents and copies
Writing material/diary/address lists
Medical supplies (detailed in medical report)
Passport, Currencies, credit card, Eurocheques, airtickets

Expedition Equipment:

Sledges	2 glassfibre Pulks with P-Tex runners designed by Gaybo canoes Ltd. 1 12 ft manhaul wood Nansen made of ash with P-Tex runners
Nansen sledge bags	3 nylon rectangular shaped bags
Traces	2 rigid traces made from aluminium poles, 1 flexible wire rope trace and 3 Rope traces.
Pulling harnesses	1 each and one spare. Home made with padded shoulder straps and hip belt
Parawing	1 Ultra light 15 metres square area
Snow shovels	2 Whitco
Snow saw	1 wood saw
Ski waxes and glues	2 tubes of skin adhesive, 3 sticks of grip wax for temperatures around 0 to -5 Deg. C; 3 sticks for colder temperatures; 2 tubes of Klister for temperatures around 0 Deg. C; 1 block of glide wax
Ropes	2 9mm x 45m Kernmantel
Tent	Wild Country Mountain Hyperspace
Stove - Primary	Optimus Loke 85 with nesting pans
Sparesfor stove	Mini pump and tank top/relief valve, 2 nipples, 2 prickers, valve spindle, various washers, inner and outer caps
Stove - Spare	Small Optimus pressure cooker with 1 pan
Fuel and containers	30 litres of Kerosene carried in total in 6 plastic 5 l petrol cans; Sigg type bottles used for filling stove
Priming fuel	1.5 l meths plus 100 meta tabs
Ignition	4 disposable lighters, 6 boxes matches
Funnels, plastic	1 small and 1 medium for pouring fuel
Toilet roll	10 in total
Eating ustensils	3 plastic bowls, cups and spoons each and 1 wooden stirrer
Pan scourers	4 sponge/scourers

Navigation

GPS	Sony PX plus batteries - 3 sets of internal batteries, 1 set for external power pack
Sextant	Ebco plastic
Artificial horizon	Antifreeze used for liquid
Almanac and tables	Reeds Concise Almanac, HMSO concise reduction tables and pocket calculator
Compass	1 Silva 15TD, 1 Silva 4, and 1 Sunto
Maps 1:250 000	1 complete original, 1 photocopied set
Aerial photographs	1 set of originals of southern Greenland
Sledge distance wheel	1 bicycle wheel with simple "tick" meter mounted on articulated forks behind pulk; 2 spare "tick" distance meters

Other spares taken alongside those listed above:

Glues - 1 each of Super glue, Araldite and Evo Stick.
Sledge repair - 1m of thonging, 20m balloon cord, various woodscrews, bolts for rigid traces.
Tools - Pliers, adjustable spanner 100m, spanner, round and half round files, screwdriver and interchangeable bits, junior hacksaw plus 2 blades, 2 stanley knife blades.
Haberdashery - Needles, various, plus 1 reel thread and 2 reels of whipping twine, Webbing 3m of 25mm and 1m of 50mm wide, scraps of tent material and pertex, Bungee cord 2m each of 5mm and 3mm, Guy line cord 10m, 1 zip puller, 20mm velcro 1m.
Crampon straps and spare rivets.
1 P-TEX candle
1 ski tip

Photography: The following was taken between the three members:

- 2 SLR cameras with belt and padded cases
- Lenses 50mm, 24mm, 35 - 80mm zoom
- 35mm compact camera and case
- 35 mm film - 20 rolls of slide film, 6 rolls of print film, and 4 rolls of black and white print film
- Spare batteries, lens cloths, skylight and polarizer filters

Notes on equipment and clothing

Buffalo clothing: We cannot emphasise enough how good this pertex covered fibre pile clothing was for our use. Everyday each of us wore a Buffalo shirt (Big face shirt or Special 6) and pertex windproof trousers over our tracksters. Because we were able to ventilate the shirts easily, we avoided overheating. This helped us in preventing the dehydration which could have otherwise set in very rapidly during the prolonged hours of exertion. The extra jackets were used during lunch breaks and when striking camp. We did not take duvet jackets or similar jackets. The two Buffalo jackets provided sufficient insulation. The BAS parka was, as expected, warmer than the belay jackets, for which we should have used an extra hood. All in all, Buffalo is a superb clothing system which we thoroughly recommend for this type of use.

Wild Country Mountain Hyperspace tent: The valance was a critical feature of this tent due to the strong winds and blowing snow which we experienced. The rectangular shape of the interior made it relatively spacious for the three of us without the extra weight of a larger tent.

Stove: We opted for the Loke 85 as a paraffin burning stove. The nesting pans and wind/heat shield arrangement contributed to good fuel economy. However, it could at times be far from user friendly. It was inconvenient to pump, prone to losing pressure, difficult to fill and required more priming fuel than other standard paraffin stoves. That said, stoves can be a personal preference and it certainly was economical on fuel; we used half a litre a day for the three of us to prepare numerous hot drinks and hot water for washing pans and even ourselves.

Skins: We took one pair of Colltex natural mohair skins. Since these slide forward more easily than the Pomoca skins they required less effort from the user. However, the rate of wear on anything but the softest snow was alarming. They required repairs after 50 miles. The pomoca by comparison proved indestructable, showing no appreciable sign of wear after 400 miles. Reducing the width of the 38mm Pomoca skins by 10mm or so reduced the drag whilst still leaving plenty of grip. Extra glue was applied to the tail ends.

Boots: The Artex boots used by two members proved a little high around the ankle and stiff to bend. This resulted in blisters. One pair of the above began to crack across the sole behind the three pin binding holes after only 400 miles from new. Both pairs of Artex boots developed these cracks to some degree and both suffered extensive wear on top of the tongue from the binding clamp. The upper of one boot was about to separate from the sole at the toe. By comparison, the Asolo boots were three seasons old and suffered no such problems.

Crampons: Wearing crampons whilst load carrying on dry glaciers stresses them beyond normal use. For this reason, it is critical to carry the spares needed for every eventuality.

Training shoes: Because of the good hard snow surface in the early part of the crossing, we made easier and faster progress by walking in trainers. We would advise anyone to take a pair, it gave our legs and blistered feet a great relief from skiing and they were useful about camp. We also wore them whilst load carrying over rough terrain.

Sledges: The two sledge types (wooden Nansen and fibreglass pulk) were taken as an experiment in an attempt to determine their relative merits. Because one pulk was abandoned early on in the crossing, comparison of pulling effort is difficult to determine. Experiments conducted in the Antarctic suggested that because of its extra length the 12 ft Nansen would be easier to pull than the shorter 2.3m (7.5 feet) pulks with the same loads. No noticeable difference was apparent to us when pulling one sledge each in the first few days of the trip. Two people pulling the same Nansen lost appeal towards the end of the trip when the personal freedom of ones own sledge was valued more. With two person pulling the same sledge, any difference in skiing pace or stride resulted in a inefficient duo. Advantages in terms of load carrying performance is largely a matter of personal preference. Both sledge types were tested by all members and the concensus was that either will do the job in a satisfactory manner. With no past experience of either, it is likely that the modern Pulk with its all in one tank/bag cover will be the most appealing. This looks a much neater arrangement than the individual bags strapped onto the Nansen. There is no reason why a Pulk could not be made longer, but it would have to be a one off design. Pulks vary tremendously in cost from the off the shelf models to larger ones made to the expedition's specification, but they are certainly cheaper than Nansen sledges which currently cost around £900. Being shorter the pulks were lighter in weight (28lbs cf 45lbs) and easier to carry up and down the ice-cap.

Traces: We underwent a number of changes in trace designs. A range of options was taken deliberately to allow for change over different terrain. One rigid trace broke almost immediately. As a consequence the expedition member concerned switched to a rope trace. This was considered to be more comfortable. It was thought that, theoretically, the rigid trace would be the most efficient method. However, the final arrangement which the three of us opted for was a rope trace attached to the sledge with a 30 cm loop made from several strands of bungee cord. This gave a comfortable , if somewhat spongy pulling force, a far cry from the efficiency of wire or poles, but prevented our bodies from feeling like used punch bags at the end of the day.

Parawing: The Parawing has been shown to be the way forward by Messner in both the Antarctic and Greenland. We enjoyed only two days of favourable tail winds during which time the Parawing were used. Still, the negligible weight of the Parawing (only about 1 kg shared between the three of us) was a small price to pay for the increased mileage that we covered in the course of these two days. Also, since we were not relying on the the Parawing for mileage in excess of what we could haul, any use was both a bonus and an education. It is an expensive item but it seems to be the best way to date of harnessing the wind. The pulk pulling harness needed to be used in conjunction with leg loops to take the lifting force off the canopy.

Global Positioning System and sextant: Our original plan was to use a sextant only. Having taken both with us, the sextant soon became redundant. Camp position, distance travelled, direction of travel and approximate altitude (within 200m) were taken daily using the GPS. This particular model did not operate well at temperatures much below freezing, but once it had warmed up, it functioned without loss of almanac memory. The external power pack was soon drained, possibly due to shorting caused by moisture in the plug. The plastic sextant with the concave tables, was an economical and light weight back-up.

Sledge-wheel: With a GPS, the wheel was more of an experiment than a necessity. However, the meter that we attached to it proved to be accurate to within one percent and this was a welcomed instrument which enabled us to monitor our progress during the course of the day.

Sledge loads: The estimated weight of each loaded sledge was 130kg.

Useful addresses:

Wild Country Tents
Terra Nova Equipment Ltd.
Ecclesbourne Park, Alfreton,
Derbyshire, DE55 4RF.

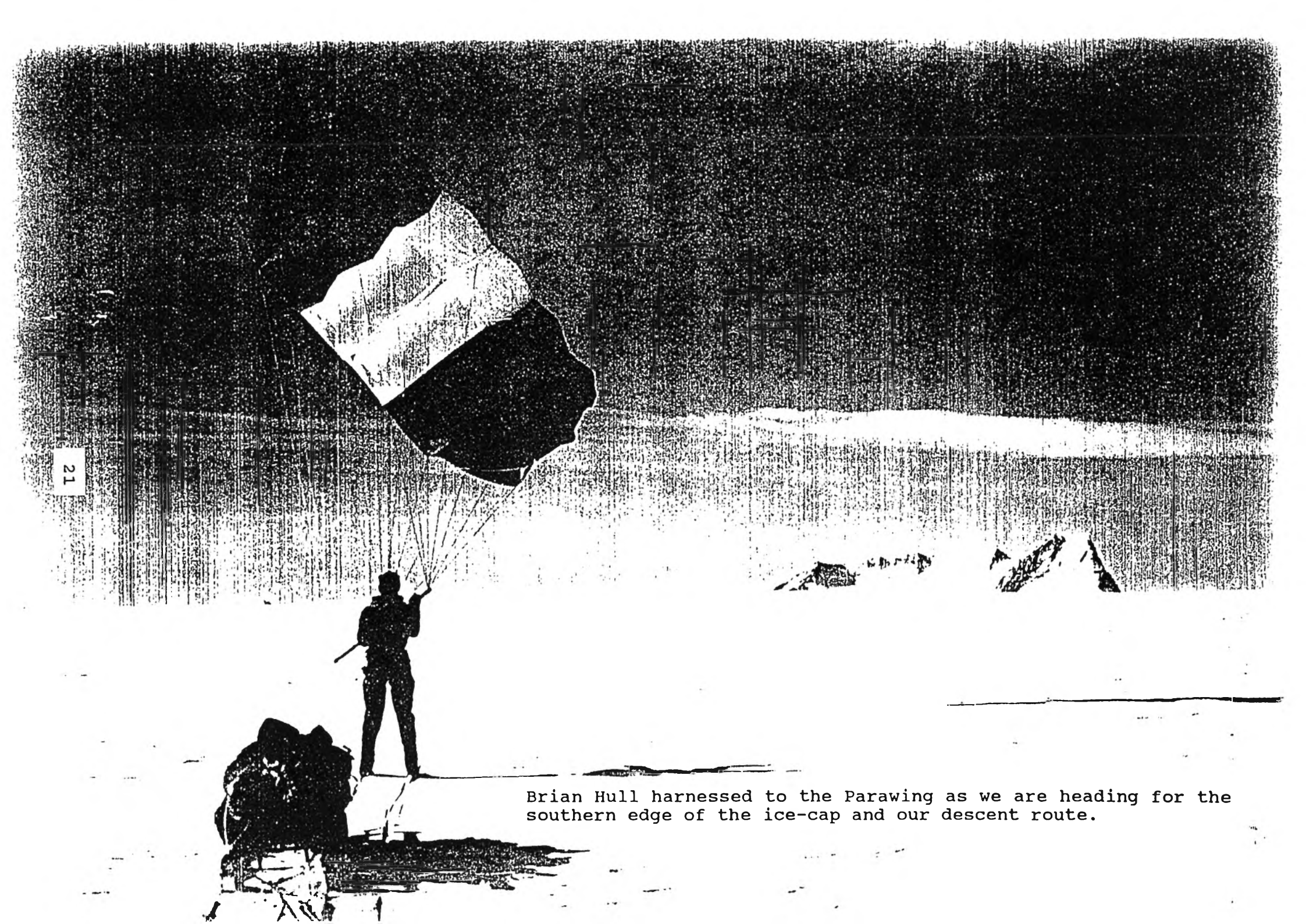
Tel. 0773 833000
Fax. 0773 831088

Optimus Stoves (Importers)
Camping Gaz UK.,
Holcot Ln., Sywell,
Northants, NN6 0BE

Buffalo
Sleeping bags and clothing,
Unit 3, The Old Dairy,
Broadfield Rd., Sheffield,
S8 0XQ

Tel. 0742 580611
Fax. 0742 509323

Spares for Optimus Loke
City Hardware (Electricalical)
P and B Benschel and Sons Ltd.,
6/10 Goswell Rd.,
London EC1M 7AA
Tel. 071 2534095
Fax 490 2654



Brian Hull harnessed to the Parawing as we are heading for the southern edge of the ice-cap and our descent route.

Parawing
Wolf Beringer
Noldeweg 1,
D - 73547 Lorch,
Germany.

Pulks and sledges
Snowsled Ltd.
Street Farm Workshops,
Doughton, Tetbury,
Gloucestershire. GL8 8TH
Tel 0666 504002
Fax 502731

Aluminium , Tubing etc.
Simmal Ltd.
Unit 479/480
Walton Summit Centre,
Bamber Bridge, Preston
PR5 8AX
Tel 0772 324277
Fax 627486

P-tex plastic
IAC Plastics
Burnley, Lancs.
Tel 0706 212225

Ski equipment
Free Heel ltd.,
Aviemore, PH22 1QH,
Scotland.
Tel 0479 811153
Fax 0479 811153

FOOD REPORT

Full rations were taken for 40 days and an extra 5 days' contingency, consisting of the more basic robust foodstuffs such as tinned butter, cereals, milk powder, biscuits and main meals. Table 1 below provides a break down of the food items eaten per person per day during the expedition. Since our daily mileage was soon in excess of that required, we had the luxury of being able to diverge from the original menu and quantities as and when desired. Not everyone managed to eat the whole rations in the first few days of the crossing, probably because of the sudden change in diet, the exertion which affected appetite and the sledging action which was putting strain on the stomach. Some of the calorific contents are estimates since not all packaging provided a nutritional breakdown.

The diet could have contained more calories and/or less weight but it was decided that this should be carefully balanced in favour of palatability. In hindsight we felt this was a good decision despite the extra grammes that we carried with us.

Table 1: Average man day quantities.

ITEM	AMOUNT (g) per man/day	CALORIES KCal/g	MANUFACTURER/SUPPLIER AND TYPE
Cereal	130	520	Mornflake Crunch and Oats
Milk powder	90	460	A.Lusk, Nestle, Nido
Biscuits (12/day)	160	700	A.Lusk, AB biscuit
Butter	110	825	A.Lusk, Dutch tinned butter
Honey/Jam	25	80	Gales honey/various jams
Cheese	30	120	Various
Marmite	4	12	Marmite
Cereal bars each	300	1500	Blackfriars flapjacks
Drinking choc	50	190	Cadbury's
Main meal	160	640	Various, see below
Fruit cake	100	350	John Fox Bakery
Custard	20	70	Rowntrees/Birds
Tea bags	2	-	Tetley
Totals	1179	5277	

Table 2: Daily breakdown

<u>Breakfast</u>	<u>Sledging Snacks</u>	<u>Evening Meals</u>
Cereal Crunch	Cereal bars, 2-3	Main meal, 4 flavours
Oats	Biscuits 3-6	Fruit cake
Milk	Butter	Custard
Biscuits 3-6	Cheese	Tea/Hot choc
Butter	Hot choc	Cereals bars 1-2
Tea/Hot choc		Biscuits 3-6

Notes:

Mornflake Cereals: Preference gradually swung from an intended ration of 55g Oats and 45g Crunch to one of almost exclusively Crunch, the Hawaiian flavour being preferred over the chocolate flavour. Desiccated coconut was taken as a high calorie supplement to the breakfast cereals but it was soon omitted since we all found it hard to digest.

Blackfriars Flapjacks: These come in about 14 different flavours. We took 6 options. Weighing in at 90g to 115g they proved very satisfying and given the variety, everyone could have their favourites. Easy to eat with gloved hands and providing plenty of calories, they were a superb addition to the ration. As John put it, the Chocolate and Brazil Nut coated ones had all the luxury of a bar of whole nut chocolate whilst providing some substantial belly timber.

Drinking chocolate: This proved a favourite and life giving

drink during the sledging day. Particularly good with the Nido milk powder which adds valuable calories and taste whilst being far more convenient than the average lumpy powdered milk.

Evening Meals: Four varieties taken were :

Option 1 Rice 125g boil in the bag
Butter 25g

Option 2 Mutton De-Hi mince meat 100g
Potato powder 70g

Option 3 Couscous 100g
Crushed nuts 33g
Oil/Butter 20g

Option 4 Macaroni cheese 133g
Butter 20g
Milk 10g

On the whole these proved equally popular, all went down well though the mutton and potato were the most filling.

Biscuits: Traditionally known as AB biscuits, these are robust biscuits which remain intact in transit and which are well packaged as six in a strong plastic wrapper weighing 80g. Made from brown flour they are wholesome and, to quote Tillman, ideally suited to "conveying large amounts of butter and jam to the mouth". No one tired of them. Available from A. Lusk.

Butter: Not as high in calories as oil, but chosen for the taste. The tinned variety is the ideal way of packaging (500g tins), obtained from A. Lusk.

Useful addresses:

Mr Keith Preston,
Andrew Lusk and Co.
Lower Addicroft, Upton Cross
Liskeard, Cornwall PL14 5AH

Acknowledgements:

We are greatly indebted to the following for help with food sponsorship :

Mornflake foods Ltd. for breakfast cereals
Blackfriars Bakeries for flapjack cereal bars
Mr John Fox for baking his "Greenland fruit cake"
Gales for honey
Rowntree for custard

MEDICAL REPORT

None of the members were medical doctors. We compiled the first aid kit from experience, personal needs and advice from medical friends, the final decision being our responsibility. No major illnesses or traumas occurred during the trip. The medical supplies were split between three sledges plus a "blister kit" bag containing the everyday, popular items. The totals shown below include personal supplies such as materials for blisters prevention. No injectables were taken to avoid problems with frozen or broken ampoules, the compromise of tablets and suppositories being opted for.

Strapping/bandages/plasters:

- Zinc Oxide none stretch adhesive tape 2.5cm wide 5 rolls
5cm wide 2 rolls
- Elastoplast adhesive crepe bandage 7.5cm wide 2 rolls
- Paragon strapping tape 7.5cm wide 1 roll.
- Crepe bandage 7.5cm wide 2 rolls
- Tubigrip Ankle/wrist 1 metre
Calf/knee 1 metre
- Elastoplast 7.5cm wide strip 3x1 metre packets
- Assorted plasters 1 packet
- Micropore 2.5cm wide 2 rolls
- Spenco second skin, 2 kits of skin and extra adhesive knit.
- Chiropody felt, self adhesive 150x150cm, 2 squares.
- Sterisitips x 4 sheets.

Dressings:

- Melolin non stick 10cm by 10cm x 3
- Conforming bandage 7.5cm wide x 2
- Cotton wool, 1 small roll

Pain control:

- | | | |
|---|-------|----------|
| - Paracetamol | 0.5g | 50 tabs |
| - Aspirin | 300mg | 50 tabs |
| - Ibuprofen | 400mg | 100 tabs |
| - Dihydrocodeine | 30mg | 20 tabs |
| - Morphine opioid | 10mg | 30 tabs |
| - Anti-nausea for use in conjunction with the above | | |
| Stemetil | 5mg | 20 tabs |

Antibiotics:

- | | | |
|-------------------|-------|-----------------|
| - Amoxycillin | 250mg | 25 tabs |
| - Metronidazole | 200mg | 25 tabs |
| Metronidazole | 1g | 6 suppositories |
| - Oxytetracycline | 250mg | 25 tabs |

Digestive and bowel complaints:

- Antacids Gaviscon 20 tabs
- Stoppers Imodium 24 tabs
- Piles Anusol ointment 3 tubes
- Anusol suppositoires x 12

Skin:

- UV Stat factor 15. 4 x 100g tubes of sun cream
- UV Stat lip salves x 4
- E45 moisturising cream 75g tube
- Vaseline 50g
- Canesten 2 x 50g tubes.
- Mycota foot powder 30g.
- Betadine Antiseptic ointment 50g tube.
- Tincture of Iodine (friars balsam)

Eyes:

- Amethocaine x 3
- Cyclopentolate x 3

Hardware/Miscellaneous:

- Scissors 2 pairs
- Thermometer Normal 1
- Low 1
- Safety pins 10
- Scalpel disposable 1
- Airway 1
- Green needles 3
- Vitamins/mineral pills - personal supplies

Notes:

- Items we meant to take but forgot include Cavit for fillings, Adcortyl for mouth ulcer treatment, Zovirax for cold sores and oil of cloves for toothache.
- Items which in hindsight would have been useful are :
 - Anti-inflammatory cream (i.e. Ibuprofen based)
 - More Spenco second skin (even though it is expensive)
 - A razor in the first aid kit for shaving hairs from areas about to be strapped or otherwise repeatedly covered with adhesive tape.

Use of medicines: The following "medical" complaints were experienced during the expedition :

- Blisters on the heels and around the tops of boots of two people proved a daily complaint. It is no coincidence that these two wore the stiffer Artex boots. Treated with a variety of the following : Spenco second skin secured with Paragon tape or adhesive knit, self adhesive chiropody felt, medicated plasters, zinc oxide tape, micropore and sterilised with Betadine or tincture of iodine. The Paragon adhesive tape (intended for strapping) proved best for holding padding or second skin in place.
- Ibuprofen tablets were taken by one member for existing inflammation problems and by two members for traumatic inflammation problems incurred during the trip. These included a ankle strained during skiing and a knee strained during load carrying. Doseage 3-4 tabs 400mg a day
- Ice-packs were applied regularly to chronic or traumatic inflamations, particularly by the above mentionned patient(s). This is an undervalued method of controlling inflamation almost guaranteed to occur on such a strip, and which only needs the addition a few strong A4 sized plastic bags to the medical kit.
- A knee was strapped with Paragon tape and adhesive elasticated bandage for one day's walking. The above mentionned ankle was supported by regular crepe bandage.

Acknowledgements:

We want to thank Drs A. Collinson, C. Sidderfin and I. Gemil for their advice and John's sister for purchasing many of the drugs.

Useful addresses:

Expeditions which do not include a medically qualified member require a license to purchase, carry and export controlled drugs. In the U.K. this is obtained from :

Home Office Drugs Branch
Queen Anne's Gate,
London
SW1H 9AT.

SCIENTIFIC PROJECT

Our first point of contact for scientific work to be undertaken during Phase I, was Prof. Nelson Norman of the then RGIT Survival Centre Ltd. in Aberdeen (new address supplied under useful addresses). Prof. Norman suggested that we should contact Prof. Holger Ursin and Dr. Gro Sandal at the Division of Physiological Psychology, University of Bergen, Norway. The outcome was that Phase I was included in their research programme which has as its long term objective the study of the psychological aspects of isolation and confinement during space travel.

Psychological data from polar expeditions are considered as highly relevant to the planning of and selection of personnel for future space missions, where participants will have to interact and collaborate over prolonged periods of time. Polar groups function under conditions that involve many of the same stress factors as those experienced by astronauts in space e.g. crowding, reduced privacy, high work load and long term isolation from regular support systems, and our role in the research was to complete a series of questionnaires, before, during and after the expedition which would add to the existing data.

Table 3 Questionnaires completed as part of the study

Timing	Questionnaire
Before departure	Confidential Personal Data Form (x1) SYMLOG Adjective Rating Method (x2) Interpersonal Reaction Scale (x2) Ursins Health Inventory (x1) Declaration of Consent
During expedition	SYMLOG Adjective Rating Method (x9) Antarctic Questionnaire (x9)
After expedition	SYMLOG Adjective Rating Method (x1) Ursins Health Inventory

Confidential Personal Data Form

The CPDF provides basic information about the participants. It makes possible the identification of similarities and differences related to demographic characteristics and previous experience in similar environments.

SYMLOG Adjective Rating Method

SYMLOG is an acronym for "a system for the multiple Level Observation of Groups". Symlog is a an observation system where the personalities of the persons involved and their relationships with each other is the focus of interest. The questionnaire describes different behaviour patterns, or ways of expressing in relation to other people in relation to other people in group situations. For each of the descriptions the subject is asked to

state whether this way of expressing is displayed "not often", "sometimes" or "often". We were required to rate ourselves, the other team members, the team as a whole and to give our perception of the "ideal team" (Appendix 1).

Antarctic Questionnaire

This simple questionnaire tests moods, motivation, group cohesion and efficiency, leadership and social functions. The answers are coded from 0-9 on small strips of paper to cut down on bulk and weight (Appendix 2).

The data that we collected as part of Phase I is going to be used in several articles to be published in psychological journals. The first manuscript will report data from 4 polar expeditions (including Phase I) as well as two experimental space simulation studies for the European Space Agency (ESA). In this first manuscript, associations between personality characteristics and coping/adaptation will be examined. Data from the Personality Characteristic Inventory, Antarctic Questionnaire and Health Inventory will be included in this article, but other data will be reported on later.

Useful addresses:

Dr. Gro Sandal,
University of Bergen,
Dept. of Biological and Medical Psychology,
Division of Physiological Psychology,
Aarstadveien 21,
N-5009 Bergen,
Norway,
Fax: 475 29 6535



Prof. Nelson-Norman,
University of Aberdeen,
Dept. of Medicine and Therapeutics,
Polworth Building,
Foresthill,
Aberdeen AB9 2ZD
Tel: (0224) 681818
Fax: (0224) 699884

APPENDIX 1 **SYMLOG adjective rating form**

Below are descriptions of different ways of expressing, in relation to other people in group situations. For each description, you are asked to state whether the behavior is displayed not often, sometimes or often. You are asked to rate each member of the group, (including your self), the group as a whole and how you would describe an "ideal" team member at that actual time. Please answer according to your immediate, full impression of what the item describes. Try not to pay attention to previous responses and remember to answer all 26 items. The form for answering the items is on the next page.

1. Active, dominant, talks a lot
2. Extrovert, outgoing, positive
3. Purposeful democratic
4. Assertive, business-like
5. Authoritarian, controlling, disapproving
6. Domineering, tough-minded, powerful
7. Provocative, egocentric, shows off
8. Jokes around, expressive, dramatic
9. Entertaining, sociable, smiling, warm
10. Friendly, equalitarian
11. Work cooperatively with others
12. Analytic, task-oriented, problem solving
13. Legalistic, has to be right
14. Unfriendly, negativistic
15. Irritable, cynical, won't cooperate
16. Shows feelings and emotions
17. Affectionate, likable, fun to be with
18. Looks up to others, appreciative, trustful
19. Gentle, will to accept responsibility
20. Obedient, works submissively
21. Self-punishing, works too hard
22. Depressed, sad, resentful, rejecting
23. Alliented, quiet, withdraws
24. Afraid to try, doubt on own ability
25. Quietly happy just to be with others
26. Passive, introvert, says little.

APPENDIX 2 ANTARCTIC QUESTIONNAIRE UiB/ESM

Answer with numbers from 1 to 9: 1 : not at all, 9 : very much

----- Line up answer slip here-----

Code or Initial:

Date :

Do you feel tired? (1: not at all, 9 very much)

Are you going to make it?

Do you now agree with the goals of the leader?

Are you happy you came along?

How many team members perform well?

Are you happy with the general spirit of the team?-----

Does the leader perform well?

Do you often think of your family?

Do you miss your family?

Do you miss your woman (women)?

Is the expedition a positive experience for you?-----

Do you feel anxious?

Are you worried?

Do you feel that you are coping with the challenges?

Are you depressed?

Are you physically fit?-----

Have you been angry during the last 24 hours?

Do you feel well?

Do you sleep well?

Are you participating in the decisions?

Does the leader listen to you?-----

Do the other team members listen to you?

Have you talked to anyone during the last
24 hours on any personal matter?

-----Line up answer slip here-----

ACKNOWLEDGEMENTS

We are indebted to numerous people who helped us in the many months of planning leading up to the expedition, but we would like to extend our special thanks to the following for their advice, their time, their generosity and their enthusiasm for adventure:

Robert Swan	our Patron
Prof. Nelson Norman	our scientific referee
Cdr. Chris Furse	our character referee
Les Turnbull	who first introduced Phil and Brian to Greenland
Alfred Stephenson	Patron of our aborted attempt in 1991
Dr. Gro Sandal	University of Bergen
Bill Ruthven	Mount Everest Foundation Secretary
Dr. Coffey	a man with real vision
John and Una Fox	bakers of the "Greenland cake"
Mark Johnson	Blackfriars bakeries
Peter Winther	our Danish friend and Greenland boat driver
David Mitchell	Transpolar Drift Expedition
Jane Bennett	Mountain Equipment
Pat Myerscough	Mountain Equipment
Hamish Hamilton	Buffalo Equipment
Brian Thomson	Free Heel ltd.
Wolf Beringer	Parawing
David Cawdell	Preston Marina
Jeff Ross	Jotron UK ltd.
Mic and Jorgen	Greenland Travel
Duncan Ellison	British Mountaineering Council
Mr Payne, Headmaster	Lytham St. Annes High School
The School Governors	Lytham St. Annes High School
David Taylor	word processing
Mrs Hull	freight supervision
Lucy Belanger	expedition secretary

Finally, to Martin Dowson who, because of work commitment, had to withdraw from the expedition, but who remained committed to the planning long after he had pulled-out.