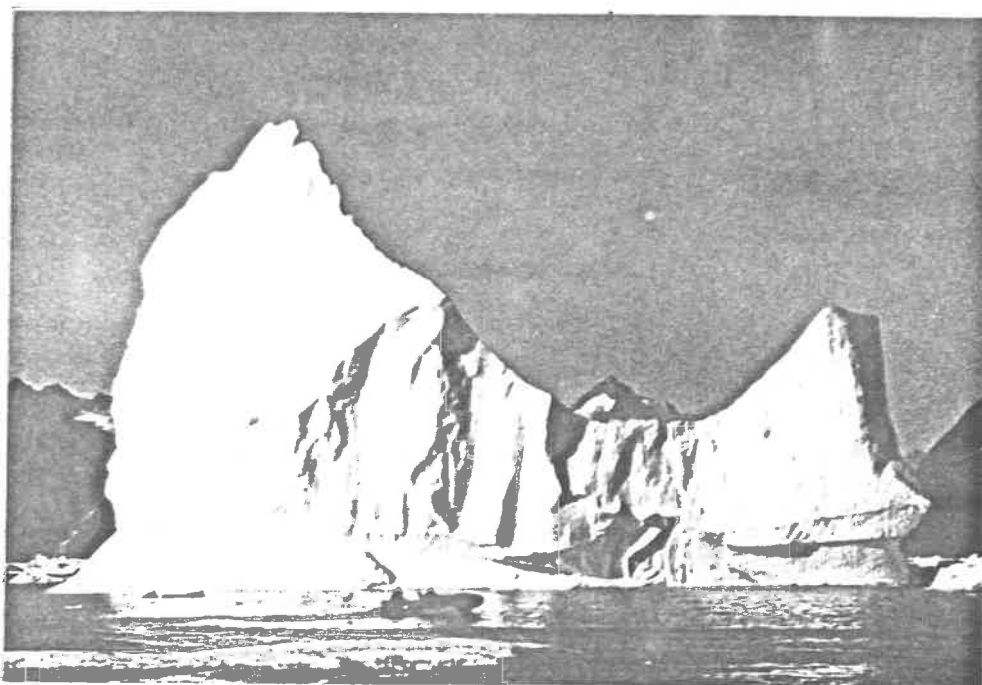




# **BRITISH EAST GREENLAND EXPEDITION 1982**



"Leaving harbour in front of us.....the 'Sven Larsen'"  
See Page 4.



Iceberg dwarfing the Zodiac. Sermiligaaq Fjord.  
See Page 12.

REPORT ON BRITISH EAST GREENLAND EXPEDITION 1982.

CONTENTS.

	<u>Page No.</u>
Introduction.....	1
The Expedition.....	3
Diary of Events.....	16
<u>Appendices.</u>	
1. Expedition Members.....	19
2. Scientific Work:	
a. Geology.....	20
b. Botany.....	20
c. Meteorology.....	21
3. Equipment:	
a. Boat and Engines.....	25
b. Personal and Climbing.....	28
c. Camping.....	28
d. Radio and Survival.....	29
4. Transport:	
a. Expedition Members.....	31
b. Freight.....	32
c. Greenland Local.....	33
5. Food.....	34
6. Medical.....	37
7. Photography.....	40
8. Finance.....	42
9. Acknowledgements.....	44

COVER PICTURE: The summit of the "Turtle's Back".  
(See page 9).



**MAP 1**

GRØNLAND

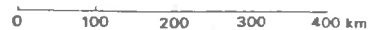
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--- Landsdelsgrænse

Trykt ved Geodætisk Institut, København 1977.

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## INTRODUCTION.

"Sir, I have discovered the highest mountain in the world!"

Thus, it is rumoured, was the discovery of Everest announced by an awed junior officer to his senior in the Military Survey of India. It was in such a manner that Geoff Monaghan introduced the subject of Point 3060 to Mac Higgs, his climbing companion of many years standing. It was, he said, one of the highest unclimbed peaks in the Arctic; it was located in an inaccessible area of East Greenland; it had been seen from afar by Derek Fordham at the furthest inland point reached by his expedition in 1970; he had read everything he could find about the area at the Royal Geographical Society and in the Journals of Alpine Clubs; it seemed that no-one had climbed it; it was, in short, a worthy objective.

They discussed ways of reaching it. Helicopter? Not ethical. Hire a local boat to take the expedition up the coast? Too expensive for 'ordinary' climbers without money or good connections. Borrow a boat in England and take it out? Too bulky for economical freight. What about an inflatable? Mac was sceptical and protested that they didn't know anything about inflatables or, for that matter, any other kind of boat.

"We've got two years in which to learn", said Geoff.

And so the idea was born - a small, compact expedition, within the budgets of 'everyday' climbers, determined to do everything for themselves.

Main objective: to climb Point 3060 (10,000 feet) at Latitude 67 degrees north in Kong Christian IX's Land on the East Coast of Greenland. (See Map 1).

Secondary objective: to carry out a limited amount of scientific research.

Method of travel: sea freight of boat, engines and equipment to Angmagssalik, the main port on the East Coast. Expedition members to fly out in mid-July. Sail north through the pack ice in the loaded inflatable for some 120 miles to establish a base camp at the head of Kangeritativatsiaq Fjord. (See Map 2). Sledge inland for 60 miles to establish an advance camp. Climb the mountain and possibly others in the area. Return by the same route, finally leaving Angmagssalik in mid-September.

Method of finance: own savings, fund raising, sponsorship, grants.

The two original members soon decided that a further man was required but were determined to limit the numbers to three. The need for photographs for potential sponsors led them to approach Colin Wootton, who also happened to be a surveyor and might therefore be expected to know something about navigation. He had been climbing and taking photographs, on and off, for about twenty years. He too knew nothing about boats.

Initially, he was as sceptical as Mac had been. There seemed to be little margin for error. Assurances that "good inflatables were virt-

ually unsinkable" allayed his fears to some extent and a decision to take a spare outboard motor finally convinced him that being marooned on an ice-floe was an acceptable risk.

Two years of frenzied activity followed. White and Bishop, the Northampton Climbing Shop, donated a substantial amount of climbing gear. Scores of major companies were approached for sponsorship, without success. Money became a constant headache. Grant applications were made well in advance and the outcome awaited with trepidation. Zodiac inflatables were identified as being the best in the world and the big breakthrough came when the company loaned a Mark IV for a whole year to allow time for training. The main Evinrude engine was acquired from Outboard Marine Ltd., at a considerable discount. A second engine, somewhat elderly, was most generously loaned by a well-wisher. Sledges were designed and made by Delapre Developments Ltd., of Northampton.

The three members attended a Royal Yachting Association power boat handling course and constantly appalled the instructors by confusing port and starboard and leeward and windward! Such niceties were soon left behind when the Zodiac arrived and the would-be mariners put to sea under the watchful eyes of helpful Norfolk coastguards. Several propellers and groundings later and it was time for the big 'proving' trip to Lundy Island in the Bristol Channel, where the sea cliffs had rock routes to remind the members of the real objective of their expedition.

The announcement of grant aid by the Mount Everest Foundation and the Gino Watkins Memorial Fund reduced the expedition debt a little and was immensely welcome as an indication that the expedition was judged to be well planned and worthy of support.

In the course of negotiations in respect of grant aid, it transpired that Point 3060 had perhaps already been climbed by the ubiquitous Japanese. The members consoled themselves with the thought of a second ascent by a new route and the seemingly limitless possibilities offered by other mountains in the group, as identified from fine photographs kindly loaned by Derek Fordham.

April and May of 1982 were hectic months indeed, as three quarters of a ton of equipment was finally assembled and packed into specially made crates. Fortunately, the British Schools Exploring Society's 50th Anniversary Expedition was to Angmagssalik and this organisation very kindly included the crates in their sea freight at cheaper rates than would otherwise have been possible.

The six weeks between shipping the freight and flying out to join it seemed unreal to the expedition members, with nothing left to do except pray that those ever-present uncertainties - the weather and sea-ice conditions - would at least allow them a sporting chance in the field. Soon it was time to join the Scandinavian Air Service flights to Angmagssalik via Copenhagen to see if it would all work out.

Topographic map of a mountainous region in Greenland, showing contour lines, peaks, and geographical features. A red line traces a path through the terrain. Key locations include 'POINT 3060' at the top, 'MONT FORED 3360' in the upper center, and 'ANGMASSALIK' at the bottom left. A red line is labeled 'PROPOSED BASE CAMP' and another red line is labeled 'ACTUAL BASE CAMP'. The map also shows 'KAP JAPETUS STEENSTRUP' and 'Moræneø'. The map is overlaid with a grid showing latitude and longitude coordinates.







THE EXPEDITION.

"It is better to travel hopefully than to arrive".

(Old proverb).

Final goodbyes were said to families and friends on July 18th as the expedition left for Heathrow. We had expected instant arrest upon arrival at the airport carrying an 8mm rifle and 100 rounds of ammunition. In the event, no-one took the slightest notice! If the two hour flight to Denmark was uneventful, the evening spent in Copenhagen was not. With hazy recollections of Tivoli Gardens, ice-cold lager and helpful taxi-drivers, we claimed our 'overnight accommodation' on the unyielding floor of Kastrup Airport departure lounge.

Next morning, the Danish authorities were courteous and helpful, as always, carefully stamping our firearm certificate and wishing us a "pleasant stay in beautiful Greenland". Safely aboard the DC8, we settled down for the four and a half hour flight, which would take us over the mountains of the East Coast and the central ice-sheet before touching down at Sondre Stromfjord in the west. We were routed north of Iceland to avoid bad weather to the south. Our excitement mounted as we neared the coast of Greenland. We glued our eyes to the one remaining unshuttered window in a cabin darkened for the usual boring in-flight film. Would it be clear? Would we see our ultimate destination? What would the pack ice be like?

It was clear - unbelievably, breathtakingly clear - we did see our mountain area far away to the south - but we also saw unbroken pack ice lining the coast, perhaps 60 miles wide, stretching to the distant horizon. We were appalled. The plane flew on and the mountains were replaced by the endless white of the inland ice.

The 24 hour wait at Sondre Stromfjord for the next leg of our journey seemed a complete irrelevance. We were consumed with impatience for a closer look at the East Coast. The four-engined, propellor driven DHC7 which was to take us to Angmagssalik duly arrived and we climbed aboard, still clutching the gun and our personal luggage. Ten minutes later we were on the runway again as mechanics struggled with a faulty engine. Not a good omen. A second aircraft appeared and we were soon back over the ice, flying eastwards into steadily worsening visibility. Ten-tenths cloud over Kulusuk, island airport for Angmagssalik. We flew in circles for an hour before the pilot decided to risk a landing. An age of ear-popping descent through the clouds followed before we suddenly levelled out, seemingly only a few hundred feet above bergs, floes and still, black water. Several violent alterations of course later we were on the gravelled runway, joining in the heartfelt clapping of the local passengers. We got an even closer look at the pack ice during the 15 minute helicopter trip to Angmagssalik. It was not re-assuring; indeed, the entrance to Kong Oscar's Havn, through which we had to sail, looked completely impassable.



Ice in Kong Oscar's Havn. See Page 3.



".....we eventually squeezed through....." Mac at the Helm. Angmagssalik Fjord. See Page 4.

Our worst fears were confirmed when we reached the settlement.

"The supply boat took five days to get in and had to dynamite the floes".

"It's the worst ice for twenty years".

"You won't even get out of the harbour".

It was a disconsolate trio who set up camp and began to unpack the crates. The one optimistic note was struck by the friendly and helpful local police chief, Hr. Preben.

"It's clear higher up Angmagssalik Fjord", he said, "if you can get out of Kong Oscar's Havn, you should be able to get at least as far as Kungmiut".

But he doubted if anyone would reach Kangertitivatsiaq by boat this season. He said that the helicopter pilot who had recently overflown it had reported that it was still locked in winter ice.

Friday 23rd July dawned misty, but still. The Zodiac floated peacefully at her moorings. We had mended a small hole in the hull, caused during the sea-freight; petrol and paraffin had been bought; the engines had been tested; 60 numbered one-day food packs had been stowed in the three rubber dustbins; everything we could possibly need for the next two months was aboard. We donned our bright orange one-piece waterproof 'Multifabs' survival suits (which were of great interest to the local Greenlanders) and climbed aboard.

Leaving harbour in front of us was the "Sven Larsen", a three-masted Danish schooner on charter to a BBC film unit making a programme about Shackleton and the "Endurance". We were much cheered by the sight of this beautiful old ship steering majestically amongst the floes, albeit that she was not going beyond the fjord-mouth. With Mac at the helm, Geoff standing on the dustbin containers to spy out the leads and Colin surrounded by his maps and cameras, we soon left her far behind as we picked our way through the ice and out of the fjord.

Visibility worsened, with mist all but obscuring our coastal landmarks. We had cause to bless the quick manoeuvrability of the Zodiac and the acceleration of the Evinrude as we reached the ends of ice culs-de-sac, turned 'on a sixpence' and sped out before the gaps could close. We finally lost sight of land but worked our way steadily north-eastwards by compass. Many times the way ahead seemed impassable but always a lead appeared at the last moment. We kept our fingers crossed. Surely things would get better eventually. Suddenly, towards midday, the mist lifted, coinciding with clearer stretches of water. We gunned the engine, which had been in some danger of oiling up. The spray flew; our wake shimmered in the newly emergent sun. With uplifted spirits we sped on up Angmagssalik Fjord. A further thick belt of floes and bergs almost defeated us near Qernertivartivit Island, but we eventually squeezed through, near to the shore, and broke out into completely open water. We went ashore at the deserted Eskimo settlement of Qernortoq to change petrol tanks and make a much needed brew. An idyllic spot. The primus purred in the completely still





".....we picked our way through the ice and out of the fjord". See Page 4.



"An idyllic spot". Qernortoq, Angmagssalik Fjord. See Page 4.

air; the calm blue waters stretched before us towards Kungmiut, perfectly reflecting range upon range of majestic peaks; only the mosquitoes tempered our elation at having got this far. We began to dare to hope that we might make it at least as far as Sermiligaq, an Eskimo village - the last outpost of civilisation before the hostile stretch of coast north to Kangertitivatsiaq and beyond.

On again, past Kungmiut and along the narrow fjords of Ikasak and Ikateq. The character of the ice gradually changed. Gone were most of the older bergs and floes of the sea ice. In their place were monstrous and grotesque unstable bergs, newly calved from the glacier snouts hereabouts. The thundrous roars of these new bergs stabilising themselves were now a feature of our petrol stops.

A fierce cold wind sprang up as we crossed Sermiligaq Fjord, causing spray to fly inboard for the first time. Finally, 15 hours after leaving Angmagssalik, we went ashore at the deserted Eskimo settlement of Ilivtiartik, finding a sheltered mooring for the Zodiac and a fine camp site. We had achieved 60 miles of our projected 120 mile coastal journey, against all the odds, we felt.

Next day, July 24th, we visited Sermiligaq to buy petrol, exciting considerable attention. The villagers were most helpful, much interest being shown in our collapsible fuel tanks (by the elders) and our Mars bars (by the children). In a mixture of Danish and sign language (and Geoff's few words of West Coast Eskimo) we asked about sea ice conditions. Could we get through to Kangertitivatsiaq? They shrugged their shoulders:

"Perhaps - perhaps not".

Oh well, perhaps we should have known better than to ask! We returned to Ilivtiartik little wiser and spent many hours discussing what course of action we should now take. Whilst crossing Sermiligaq Fjord we had seen clear water up to the snout of the Knud Rasmussen Glacier. We knew that we could establish a base camp there and attempt to reach Point 3060 by a route pioneered by Derek Fordham in 1969 (see map 2). However, we calculated that this would require 40 days inland, against the 28 allowed for in our original plans. 40 days food instead of 28. The prospect was daunting, especially if much back-packing were to precede the sledge journey. We felt that we had less than a 50:50 chance of reaching Point 3060 by this route. There would be too little margin for error; too few 'spare' days for bad weather or difficult climbing. However, the prospect of reaching the head of Kangertitivatsiaq Fjord seemed even more remote. What if we spent many fruitless days trying to get through and were finally left with insufficient time for any route inland to our destination? We decided to climb a nearby vantage point on the morrow, to assess sea conditions to the northward.

Friday 25th July brought bad weather; rain, and more importantly, a brisk easterly wind. This was likely to cause any coastal leads in the ice to close up. We climbed our hill. The pack ice was an unbroken white plain as far as the eye could see, dotted here and there with huge bergs. It seemed that the die was cast. It was to be the Knud Rasmussen route or nothing.

We lost no further time in debate. Pausing only to leave a letter at Sermiligaq, in the hope that it would eventually reach the police in Angmagssalik informing them of our change of plan (we had failed to

make radio contact), we set about establishing a base camp at the head of Sermiligaaq Fjord. By Wednesday 28th July we were ready to move inland. To give the expedition at least a fighting chance of spending the necessary 40 days inland we reduced our food rations to the minimum by caching all but the bare essentials. We also left behind the main radio equipment, taking only 2 small emergency beacons and cut down the climbing and safety equipment to absolute basics.

Geological and botanical work was reluctantly abandoned until our return to base camp, enabling us to leave flower presses and sample bags behind. Despite all these measures, it was evident that triple ferries would be necessary until we were able to sledge.

Thus, on the morning of the 28th July, we set off with our rucksacs containing approximately 80 lbs of food each (see Map 3). We found a way onto the glacier from the side moraine one mile from base camp and negotiated the crevasses of the initial icefall. Two miles of hard work on the 'dry' ice of the glacier brought us to a point where we could see the way ahead. There was no snow in prospect; the hummocky crevassed ice stretched on to the distant horizon. We had hoped to start sledging from our first glacier camp. Clearly this would be impossible. We dumped the food in our large 'sledging' sacks, took a round of bearings and returned to base camp. The afternoon of the 28th saw us repeating the journey, this time with 60 lbs each of assorted equipment, including our individual sledges, made of fibre-glass and designed to fit on the backs of our packs. These were left at the food dump.

Most of Thursday 29th was spent in caching the boat and equipment not being taken inland. We finally decamped and left base camp for the last time during the late evening. Our intention was gradually to 'shift' our work periods so as to prepare for glacial travel at night when the surface was more likely to be frozen. We located the food and equipment dump and then pressed on to prospect a route with the tent and personal gear. By morning we had made no more than one further mile, having negotiated several more chaotic crevassed areas. We set up camp.

The night of Friday 30th was spent in making two carries of the food and equipment to a point one mile past Camp 1. (See Map 3). There was no sign of any improvement in the surface; no possibility of sledging. However, the weather was perfect.

On Saturday 31st, frustrated with our slow progress, we attempted to sledge on the rough surface of the still dry glacier. We persevered for over a mile but succeeded only in proving the impossibility of this method of travel until we had snow underfoot. One of the sledges was damaged; thankfully we did not know until later how costly this damage would prove. We unpacked the sledges, divided the loads again and made three carries for a further mile to set up Camp 2. Perfect weather continued, with breathtaking sunrise/sunsets to compensate for the backbreaking load carrying.

On the evening of Sunday 1st August we pressed on with a medium load each, determined to reach better travelling conditions. It was not to be. The night was mild and a large 'basin' of meltwater lakes and streams was encountered, causing more than one icy drenching. Dawn saw





Arrival at Base Camp. See Page 6.



".....we attempted to sledge on the rough surface of the still dry glacier." See Page 6.

us enmeshed in one of the worst crevasse areas yet encountered, with still no sign of snow cover. We dumped our loads and returned to Camp 2 having made 3 miles progress.

Monday 2nd August; we found a better way through the crevasses and made two long carries (12 hours) to establish Camp 3.

The 3rd and 4th of August brought continuous rain and sleet. Conditions underfoot became impossible and we remained in camp. New crevasses opening up under the tent forced a hasty move to set up Camp 3a on a side moraine half a mile away.

Warm conditions and rain continued throughout the 5th and 6th. The glacial surface in this area was knee to waist deep in icy slush and no progress was possible with such heavy loads. We remained in camp. Our frustration at this inactivity was alleviated by recourse to our single luxury - Coleridge's wonderful poem "The Ancient Mariner", carefully copied into Geoff's log in tiny handwriting. This we took in turns to read aloud!

On Saturday 7th August the weather began to improve and a colder night enabled us to make one carry a further two miles up the glacier. There was still no sign of snow cover; we were becoming resigned to this pack-horse existence but time was already running out.

The night of Sunday 8th was the best yet. Cold weather and a full moon enabled us to make the most progress to date, carrying the tent and personal gear 'around the corner' from the Knud Rasmussen Glacier on to the Haabets Glacier (5 miles). This was arctic travel at its best, despite the heavy loads. With the moon at our backs, the ice crystals flickered and danced before us; the meltwater streams were stilled by frost. A further heavily crevassed area had to be crossed, though, before we could set up camp at the edge of the continuous snow cover. Daylight revealed that this snow was but a thin layer over the ice; it was not the smooth surface we had hoped for; hummocks and bare patches were everywhere. However, before we could even attempt to sledge, two more nights of hard carrying were necessary to bring up the rest of the food and equipment. The nights were already becoming distinctly darker and we had occasional difficulties in finding our food and equipment dumps despite careful compass 'fixes'.

It had taken 14 days of backbreaking effort to establish Camp 4 complete with our sledges and equipment, a mere 15 miles from base. (See Map 3). We estimated that we had covered in excess of 100 miles during that period. Time was now definitely not on our side. We had to be able to sledge at least nine miles every night from now on to have any chance of reaching and climbing Point 3060.

The night of 11th August saw the end of any remaining hopes of reaching our objective. Sledging proved to be only just possible on the hummocky surface with numerous stops for crevasses or fallen over sledges. We were prepared to go on, even at this snail's pace, but the number of miles which we could cover each night would evidently not be enough while these conditions lasted. Dawn brought the 'last straw' when the broken sledge finally collapsed, thus putting paid to thoughts of sledging anywhere, at any speed. There had been too much ice at sea, now there was too little snow inland! It seemed unfair, but we came to accept that these are the uncertainties of arctic travel.

Bad weather on the 12th confined us to camp. In any case, we felt that we needed a break from our endeavours and, above all, we had to formulate an alternative plan. We still had 25 days worth of food and paraffin; with the exception of the broken sledge our equipment was intact; we were fit and well, though beginning to wonder about the adequacies of our reduced diet; we were surrounded by magnificent mountains. However, all further travel would be by back-packing, still involving triple ferries i.e. covering at least five miles for each mile gained. We therefore chose as our new objective a fine group of mountains, some 12 miles distant along the Haabets Glacier. Determined to salvage something from the wreck of our hopes, we turned in.

Friday 13th August. Not a day for the superstitious and it certainly lived up to its reputation. Far from being able to set out for our new objective, we were totally occupied in surviving a fierce blizzard. The wind blew with unabated fury for 24 hours, reaching 110 knots.\* With so little snow cover we were, at first, unable to build any protection for our tent in its totally unsheltered position in the middle of the glacier. We hammered all our ice screws into the bare ice surface and attached many extra guy ropes; the heavy food bags were distributed along the snow valance. We reinforced the ridge with a surveyor's ranging pole and dismantled sledge tubes. Despite our continual efforts to hold the A-frames steady, these were bent to a right angle and finally broke. Deprived of its rigid framework the tent material billowed and shook dangerously. We had no second tent. The need for further measures became imperative. The snow was being driven horizontally along the glacier surface; more than a foot had fallen by dawn on the 14th. We struggled outside, each in turn, and managed to build a crude but effective sheltering wall. We had anticipated blizzards, but this seemed to be exceptional. Indeed, the first question asked by all on our return to Angmagssalik was:

"Where were you on Friday the 13th?!"

Calm returned on the evening of 14th August. We emerged into the now silent world outside. Avalanches rumbled from the surrounding peaks. Ironically, the glacier surface was now perfect for sledging, or would be after a couple of days of consolidation. The blizzard had not caused our defeat but had most certainly confirmed it.

We now had a badly damaged tent to add to our broken sledge. A further revision of plans became necessary. Despite our worries about the ability of the tent to stand any further battering, we were reluctant simply to retreat straight to base camp, losing all that we had gained with such effort. We therefore decided upon a measured and orderly retreat down the glacier, climbing some of the fine peaks we had seen on the way in. This would allow us to alternate 'carrying' days with 'climbing' days.

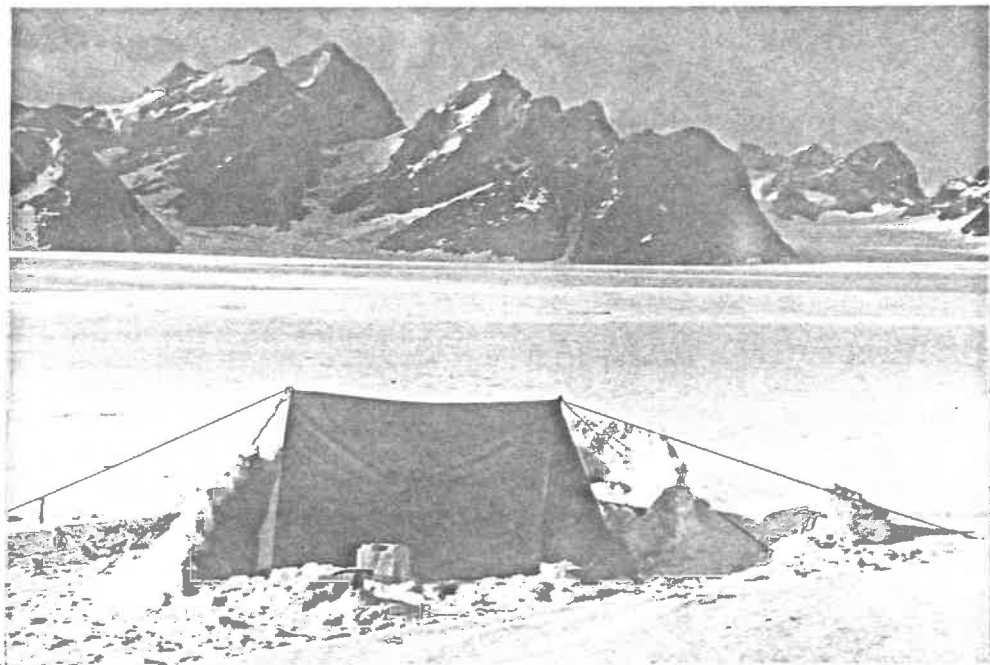
We spent Sunday 15th August digging out our supplies and equipment and mending the tent as best we could. Monday and Tuesday 16th and 17th saw us establishing Camp 5 at the foot of an un-named mountain we had viewed with interest on our inward journey. This had a feasible looking north-west ridge of mixed snow and rock, with a fine rock buttress as its summit. The buttress was topped by an overhanging prow of rock which looked for all the world like the beak of a turtle. The new camp was in

\* Police records, Angmagssalik.





".....mending the tent as best we could". See Page 8.



"Ironically, the glacier surface was now perfect for sledging....." After the blizzard at Camp 4. See Page 8.

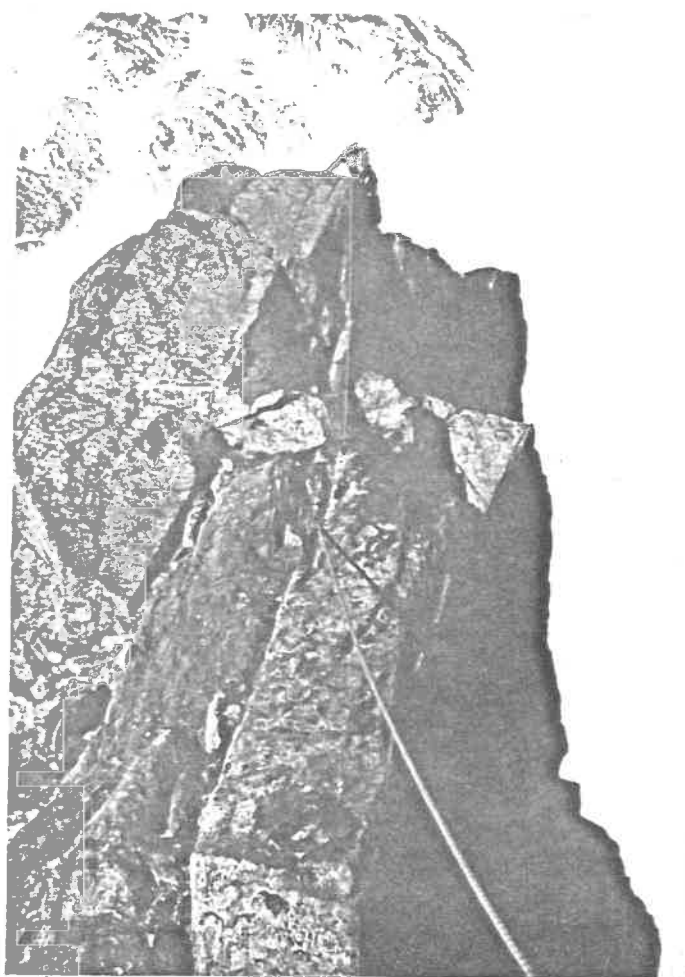
a more sheltered location than had previously been possible, near to a fine meltwater lake dammed in by the rock walls and the side of the glacier.

We arose before dawn on the 18th. A climbing day at last. The sky was absolutely clear. A few stars glittered, somehow closer and brighter than at home; the summits of the peaks on the other side of the glacier flamed red in the rays of the still-hidden sun. The nearby meltwater stream was frozen into icy stillness. We melted hacked up ice fragments for the morning brew and porridge. Geoff sorted the climbing gear; karabiners and chocks clinking with unnatural loudness in the great silence.

We set off to climb the turtle's beak. The early stages of the ridge comprised rock scrambles interspersed with snow fields. The lower sections of rock were decorated with dwarf willows, mosses and wild flowers; the snow was perfect for step kicking. Released at last from the constraining influence of the rope and with rucksacs containing only climbing gear and a little food, we felt like schoolboys let out on a treat. Three hours of freedom saw us to the foot of a steep ice slope leading to the rock buttress. We donned crampons, rope and helmets. A hundred feet of front pointing and we were at the foot of the rock. After a few false starts and a long traverse, Mac found a fine slab forming a kind of 'rake' across the rock wall. Beyond the slab, a moderate scramble ended in - nothing! The two thousand feet we had just climbed fell in one, clean, awesome, unbroken sweep right back to the glacier. We threw a stone into space. It hung for long seconds before crashing onto the rocks below. Words were superfluous. A rightward traverse lead us to the top of a tower from which we had our first close view of the turtle's beak. It soared into space above the self-same void like one half of the vaulting to some monumental natural cathedral. We continued to the top. The simplicity of the climbing was more than compensated for by the unique situation and the breathtaking sense of exposure. The perfect weather continued; warm and sunny, still and clear. Our glacial 'playground' lay at our feet. We could see base camp and the fjord and beyond to the sea, still flecked with bergs and floes, but obviously improving. Inland, our familiar horizon had expanded to embrace range upon range of peaks, blue and mauve with the distance. To the west, our attention was claimed by two pairs of incredibly slender spires, probably Trillingerne, to the north of Tasilaq Fjord. To the east, a fearsome drop led to a long, tortuous ridge leading to the highest summit in the group - not a practical proposition from this point.

We spent a couple of hours on the summit, sunbathing and 'unwinding'. Before descending, we deposited the traditional tin containing our names and a new 1982 20p piece which had been intended for Point 3060. Back at camp we rejoiced in the wonderful day which Greenland had granted to us. Not the highest or hardest mountain in the world; just one of the countless thousands of peaks on the East Coast but for us, it had been quite simply, the best ever. Geoff's cryptic log comment: "A halcyon day indeed".

From the "turtle's beak", we had a grandstand view across the glacier to a fine range of peaks above our old Camp 3a. Geoff had made a detailed sketch showing possible routes onto a rock ridge, with many gendarmes and pinnacles, connecting several graceful spires. We decided to return to our former camp site for an attempt on the ridge.



Approaching the  
"Turtle's Beak".

See Page 9.



After the climb. Colin at Camp 5. See Page 9.



Thursday 19th having been declared a holiday, we had to buckle down to 10 hours of load carrying on the 20th to return to Camp 3a. First we moved everything from Camp 5 to Camp 3a and then it was back up the glacier to bring down the remaining food and paraffin from a dump made on the 16th. 12 miles in all, 8 of them carrying grotesque and heavy loads including the 'unfoldable' tent poles stuck together with plastic tape. The nights now being too dark for travel, these carries were completed during the heat of the day and caused us considerable pain on the soft glacial surface. The inadequacies of our reduced rations were by now becoming increasingly evident and we had become so thin that even the narrowest of crevasses were becoming a danger! It seemed that two days food produced sufficient calories for only one day's real work. A further rest day was necessary on the 21st, put to good use by Colin in close up flower photography.

The fine weather continued during the 22nd. Using a route identified from the "turtle's beak" we ascended a series of interconnected snowfields to the foot of a steep ice slope leading to the rock ridge. We crossed a wide bergschrund via an unstable snow bridge before tackling the ice. One fine pitch brought us to the ridge. Much to our disappointment, the rock was rotten and unstable in the extreme, quite unlike that of the "turtle's beak". Many of the fine gendarmes and pinnacles seen from afar were no more than loose piles of boulders, often undercut at their bases. The sounds of frequent rockfalls confirmed our fears. We felt that there was no possible justification in our continuing. We therefore descended to a wide snowfield in order to attempt a secondary peak - an 'outlier' of this fine group of mountains with a striking resemblance to the Welsh mountain, Tryfan. An hours pleasant rock scrambling brought us to the summit from where we had wonderful views northwards over our inland route. There being no cairn or other evidence of previous visits, we named the peak 'Tryfan St. Jane'.

Back at camp, Colin, older and perhaps more easily satisfied, felt that it had been a grand day's climbing. Mac and Geoff were desperately frustrated and spent the evening discussing other ways of 'cracking' the ridge. Complacency and frustration alike were submerged by a sudden and brilliant manifestation of the Northern Lights. None of us had seen this phenomenon before. No words here can describe our feelings; suffice it to say that we were all considerably moved by the experience and felt somehow changed thereby.

Rain and sleet were the order of the day on the 23rd. This, together with the lethargy inspired by yesterday's activities and, perhaps, the diet, kept us in our sleeping bags. After considerable discussion we decided that the time had come for a return to base. We were convinced that the better food to be had there would re-invigorate us. Since we could no longer achieve our original objective it also seemed sensible to make the best use of the freedom of movement conferred by the Zodiac. We had seen many fine fjordside and island mountains on the way up the coast and were also keen to see if it would be possible to prospect part of our original sea journey in improved sea ice conditions. We resolved to attempt to carry out our equipment and the remaining food and paraffin in one load each. We estimated that this would involve approximately 12 miles of glacier travel, not allowing for detours around crevasses.

Tuesday 24th August was overcast but dry - probably ideal for the task ahead of us. We struck camp and divided everything into three piles.

Secondary sacks were filled and tied to the tops of already bulging main sacks. Sundry other items were attached to every buckle and strap. We estimated that each load weighed in the region of 120 lbs. We set off, or rather lurched and staggered off, at about 7 a.m. Ten hours later we were still negotiating the final ice-fall, every muscle and joint aching as never before. The side moraine and soft green hillside were tantalisingly close but another two hours of frustrating route finding were necessary before we finally escaped from the crevasses and seracs. Back at base camp in the arctic twilight we dug out the cached food supplies and cooked a tinned meat casserole meant for eight people together with two tins of potatoes and two tins of beans. Ten minutes later not a morsel of this feast remained! 12 hours of oblivion followed.

The 25th and 26th were given over to our long postponed scientific work, mainly the collection of geological samples by Geoff. There were frequent pauses for somewhat decayed ginger cake and biscuits spread liberally with cheese and honey. Colin, our very amateur botanist, was disappointed to find that the flowers of summer had withered and died with the early onset of the Greenland autumn frosts. The weather was by now distinctly chilly and we were glad to be able to make evening fires out of scrub. During this time Mac set up his radio station on the hillside behind the camp and managed to contact Angmagssalik to report our safe return from the inland journey. On the 26th, we were visited by a lone Eskimo out berry collecting from Sermiligaaq - the first 'outsider' we had seen for 30 days.

By midday on the 27th we had serviced the Evinrude engine and re-inflated the Zodiac. Soon everything was shipshape again and we were ready to depart. We left this fine base camp site and its sheltered 'harbour' with genuine regret. The glacier snout had been amazingly active during our recent residence and the first mile or so from base was filled with newly calved brash ice. However, with Mac sitting on the bow, trapping suitable 'mini-bergs' with his feet to use as battering rams, we made steady progress and managed to protect the 'soft under-belly' of our craft. After about two miles, we broke free into almost totally clear water. How different from our outward journey! With the Evinrude throttle wide open, the Zodiac rose and levelled into something approaching its 'planing' attitude and we fairly flew down Sermiligaaq Fjord, our wake curving between the bergs. The sensation of speed seemed novel and exciting. After so long totally out of contact we were anxious for news of our families and hence determined to reach Sermiligaaq in time to use the KGH store telephone. In the event, the store was closed, but we were able to make a call to England from the home of the village headman, one Anas. Having assured ourselves that all was well, we set up camp for the night at a fine site about two miles north of Sermiligaaq.

Saturday 28th was spent in replacing some of our lost protein with excellent seal meat bought at the village and in climbing a hill to prospect a possible route 'round the corner' and out into the open sea. There was far less ice than earlier in the summer and some progress along our originally planned route looked feasible if the prevailing weather conditions held. We discussed setting up camp on one of the islands, possibly Tikivipik, on which we had seen a fine peak.

We left early on the 29th with everything shipshape and battened down for a day-long voyage. The weather was fair although the wind appeared to be backing towards the south - not a good sign with the remnants of the heavy pack ice lingering in that direction. South of Sermiligaaq,



"...grotesque and  
heavy loads....".  
See Page 10.



Sermiligaa Fjord. "....filled with newly calved brash ice".  
See Page 11.

we turned eastwards into the Ikasak straits but progress was halted by a maze of bergs and floes, often moving swiftly together in the freshening wind. Frustrated and disappointed once again, we put the Zodiac about and headed south towards Eric the Red's Island. (See Map 3). The wind strength increased still further and we encountered a considerable swell, causing some entertainment and not a little concern during two attempted landings. We retired to the comparative safety of an isolated floe, well away from the rocky shore, to have a break and consider matters. It seemed futile to attempt to continue in the present conditions. We could, therefore, either camp (given a safe mooring) and wait for an improvement, or we could return at once towards Angmagssalik with a view to climbing in the beautiful fjordside mountains we had seen on our outward journey.

Democracy is simple when three people choose between two options and, as a result of a majority decision, we were soon heading north up Sermiligaaq Fjord. Back in more sheltered waters, we made good progress until the junction of the Ikateq and Ilivinga straits where further wind and swell made it prudent to seek a sheltered mooring for the night. We chose a small bay near to Igterajak Kiateq - a deserted settlement - beached the Zodiac and set up camp.

Monday 30th August. Bank holiday at home, we recalled and, as often at home, it rained all day. Snow was falling at 500 feet plus and the wind gusted to Force 5 or 6. Around each high tide, much time and effort was spent protecting the Zodiac at her unsatisfactory mooring.

Dawn on the 31st revealed heavy concentrations of ice being driven into the straits by a freshening south-westerly wind. We decamped and put to sea in some haste, well before 5 a.m. The powerful Evinrude engine was again a blessing as we sped out in a wide arc to avoid the vanguard of the advancing ice and along the narrow remaining channel on the northern side of the straits. Ice was also concentrated around the Fugleholmene Islands in Ikasak sound but we picked our way through and out into the clear waters of Angmagssalik Fjord. This was the coldest boating day yet but perhaps also the most beautiful. The mountains sparkled in their new white coats. Fresh sea ice had formed overnight (several weeks early according to the locals) and the fjords seemed a deeper and more intense blue than on our outward journey. That had indeed been a summer's day to remember. Equally, it now seemed that winter had come to Greenland. With spray flying in the brilliantly clear sunshine we turned north past Kungmiut and made a landfall on the west side of the fjord just north of Upernivik, in a bay sheltered from the southerly wind. (See Map 3). The choice of landing site was partly dictated by our desire to climb Nanerersarpik, a fine rocky peak guarding the entrance to the narrow Ikaaulaq Fjord. However, before we could become landlubbers and turn our thoughts to the mountains, a new problem arose. The wind suddenly veered to the north and began to blow strongly. We learned later that there had been a fierce 'piterak' wind at Angmagssalik on this day. Towards high tide the Zodiac began to surge uncomfortably at her hitherto sheltered mooring. Despite our efforts with the ropes she began to crash against the steep rocky walls. An interesting hour followed as we unloaded our half a ton of petrol and equipment (and a dustbin full of rock samples) onto narrow rock ledges. The engine was even more tricky, but all was accomplished safely and we were able to drag the lightened craft up a rocky ramp. Well above high water mark we secured her to boulders and rock outcrops with many lines and set up camp. With every-

thing safely ashore we were able to devote the rest of the day to prospecting a route up Nanerersarpiik and making an unsuccessful hunting trip (still hungry for protein!).

September 1st. The end of our expedition almost in sight. As we set off for Nanerersarpiik we wondered if this would be our last chance to distinguish ourselves and in some way make up for our failure to reach Point 3060. The day certainly promised fair. Cold, still and clear before dawn; a pleasant warmth with the coming of the sun. On the previous day, Geoff had reached the top of a scree slope leading to the north-east ridge. He had announced that the rock above was steep but looked reasonably sound. We followed in his footsteps, looking forward to a day's rock climbing. "Only 3500 feet", we thought, "back to camp before nightfall". Whilst we were roping up at the foot of the ridge, Geoff glanced upwards:

"Good God", he said, "it's a gorilla".

We looked up. He was right. The topmost rocks were formed in such a way as to resemble a huge gorilla's head, with shadows precisely located for eyes that seemed to stare silently and serenely out to sea. We joked about our apparent penchant for seeing animal rock formations; surely no-one would believe us at home. Inwardly, we perhaps wondered what it foreboded.

All this was soon forgotten, however, as we embarked on a wonderful succession of slabs and walls, traverses and cracks. The rock varied from an excellent gritstone-like yellow band, through mediocre to downright dangerous, with sections where columns of loose blocks balanced precariously on top of one another. The technical standard was not high; we considered the route to be about Grade IV, but serious because of its length and varied rock quality. Midday saw us standing on the gorilla's head, from where we had expected a short climb to the summit. It was not to be. A long narrow ridge stretched before us, followed by a succession of very steep looking towers. Surely we could not be frustrated again. We pressed on, moving together along the fine ridge, to the foot of the first tower. Here we encountered the worst rock so far and much time was lost in finding even a moderately safe route. Further steep sections followed; the afternoon wore on. Eventually, and unexpectedly, we surmounted a simple rocky scramble and stood on the summit. There was no cairn. Four o'clock. Four hours to darkness. We had left camp eight hours previously. The implications were obvious; we must find an easy way down or we were on the mountain for the night. After a quick round of photographs, we set off along the north-west ridge, hoping to find the entrance to a gulley the foot of which Mac had seen on the previous day. We chose the most likely looking opening and plunged downwards through deep powder snow. After four or five hundred feet, ice was suddenly encountered under the loose snow; a potentially fatal slip was checked just in time; the resultant avalanche disappeared over a vertical ice wall in the gulley. No way off the mountain here! We extricated ourselves using a peg and several dubious flake belays and climbed laboriously back onto the ridge. Less than two hours to darkness. Further progress along the ridge was halted by more incredibly loose rock and we paused to consider. A well-organised bivouac was now obviously more sensible than further ill-conceived attempts to descend. We returned to a relatively flat area of snow just below the summit. The sun slowly sank over the inland ice, followed by the instant onset of intense cold. Our efforts to dig a snow cave were frustrated by the powder snow and we built a primitive 'wall' of rocks to shelter us from possible northern



winds. We donned our duvets and spare clothing, shared out the limited emergency food and sat down to await developments. We felt reasonably confident of combatting the cold; bad weather would be a different matter. In the event, we were granted a night to remember. The weather remained still, clear and calm. The full moon rose, huge and silent, over the freezing sea, bergs and floes starkly silhouetted in its silver track. We watched its three hour flight across the eastern sky, huddled together in our little shelter. It grew colder yet. Overhead, the Northern Lights swayed and rolled, receded and advanced; now fingers of light darting earthwards, now shimmering curtains of colour, now arcs of ethereal fire. Surely we had been summoned to this place to witness these wonders. The remaining hours of darkness slowly passed. Dawn came with streaks of red upon the north-eastern sky. We arose stiffly and sorted the ropes and harnesses, frozen into grotesque shapes.

Returning to the nearby summit, we retrieved a packet of glucose tablets left as an 'offering' to the gorilla in our new summit cairn, and ate them gratefully. Then it was back down the towers, back along the ridge, back down yesterday's rock pitches. In our tired condition, we felt that certainty was preferable to the unknown and therefore rejected the outwardly easy option of a series of abseils. We slowly and carefully retraced each step of our upward route, finally reaching the scree in the glorious warmth of the midday sun. We coiled the ropes and hurled ourselves downwards, oblivious of sharp stones and torn gaiters. We paused at a tiny stream to enjoy our first drinks for thirty hours, rejoicing in the softness of the green hillside.

"This is what it's all about!", said Geoff. .

By mid-afternoon we were back to the ultimate comforts of tent and sleeping bags and unlimited brews. We soon slept. The feast we had planned could wait until tomorrow.

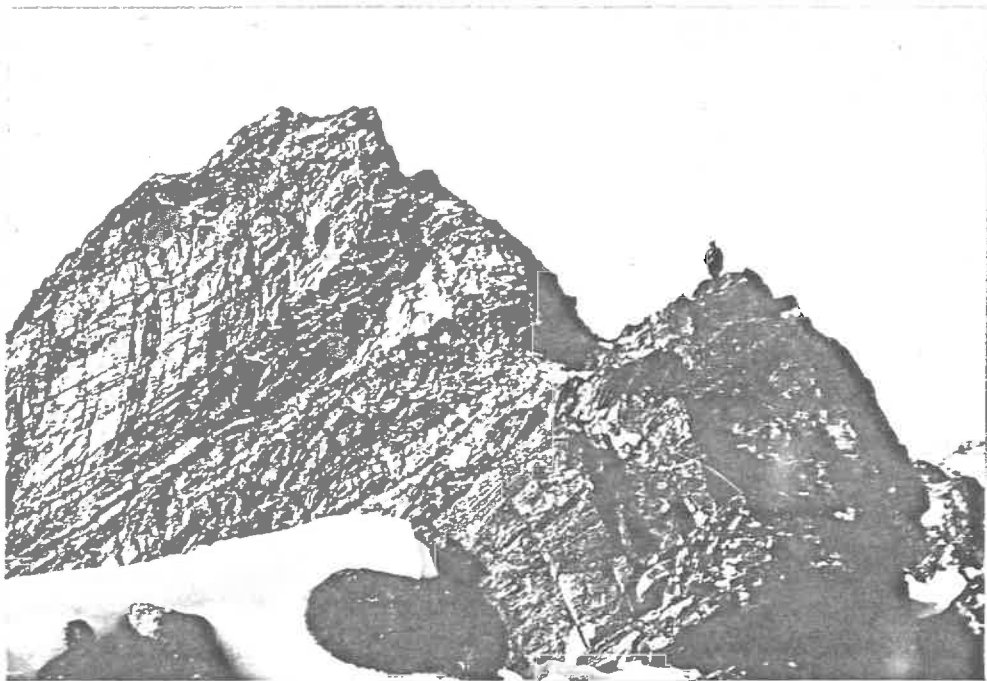
We awoke well into the afternoon of Friday 3rd September. Fine weather continued but we were disinclined to further activity, other than to check the Zodiac and cook an enormous meal. We wrote up our logs, now reaching mammoth proportions, and discussed the previous two days. Had Nanerersarpiik been Point 3060, or even stood at the limit of our inland journey, its ascent would have perhaps seemed more appropriate. However, Greenland was beginning to teach us patience, forbearance and not a little humility. It had been a fine climb and we were content.

Further evidence of considerable new sea-ice on the 4th confirmed our suspicion of an early winter, possibly attributable to the summer's continuous heavy pack ice concentrations. A return to Angmagssalik now seemed prudent. We refloated the Zodiac, fitted the engine, loaded our stores and motored out into the fjord. Above our wake, Nanerersarpiik dominated the scene and our thoughts, as we made the crossing to Kungmiut. Here we stopped for an hour to visit the unexpectedly large and modern supermarket, to buy provisions. Sinister purple clouds were boiling up to the east as we continued down Angmagssalik Fjord, but the rest of the journey to Kong Oscar's Havn was uneventful, though bitterly cold. At this stage of the season, the pack ice had been replaced by a long swell, which the Zodiac took gracefully in her stride.

At Kong Oscar's Havn, we were reunited with the leaders of the British Schools Exploring Society Expedition at their base camp on the eastern side of the fjord. We were royally received by Peter Steer, Roger Chapman and their companions and entertained to bread, butter,

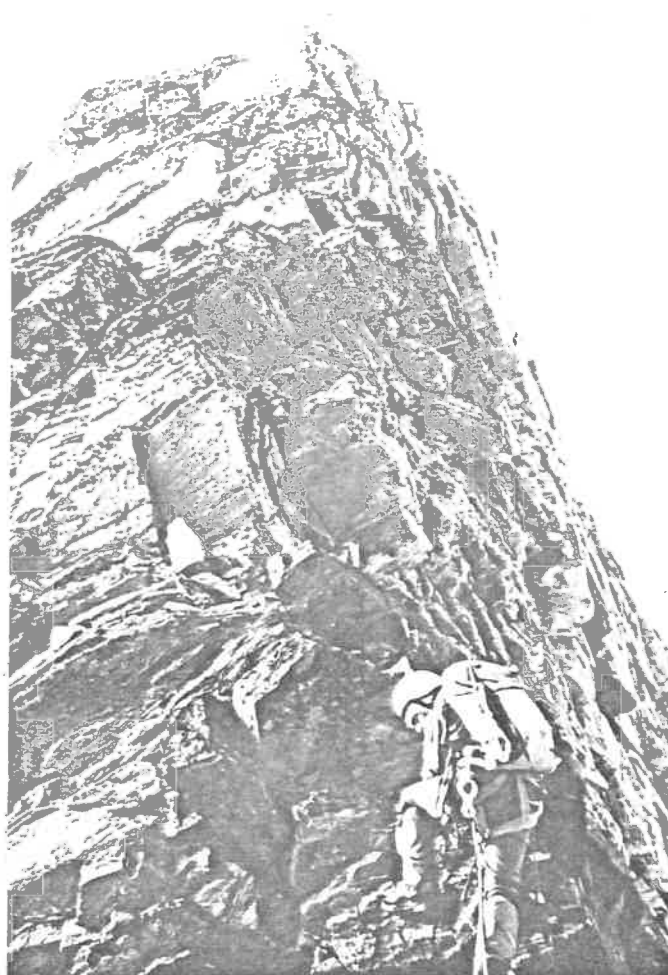
"Good God!", he said,  
"it's a gorilla".

See Page 13.



"A long narrow ridge stretched before us....."

Nanerersarpik. See Page 13.



"...we encountered  
the worst rock so  
far".

See Page 13



"....moving....along the fine ridge". Nanerersarpik.  
See Page 13.

tinned fish and other half-forgotten delicacies. These were devoured with little pretence at manners, much to the amazement of assembled young expeditioners with cameras clicking!

The next four days were spent in completing the collection of a representative selection of geological samples, writing up logs and checking equipment ready for packing. The Zodiac proved an invaluable workboat as we ferried goods across the fjord for BSES, who had most helpfully shipped our freight out with theirs. During this period, Peter Steer kindly invited us to a film show at Angmagssalik; he had obtained Iliffe Cozen's film of the 1930/31 Gino Watkins Expedition to East Greenland. This was well received by the locals, the oldest of whom had personal memories re-awakened. Emerging afterwards into the cold night air was quite an experience, seeing the self-same fjords, ice and northern lights.

On Thursday 9th, we enjoyed a final day's climbing, choosing the most Easterly peak of the Sofias Fjeld group, about four miles north-east of our campsite. The day was cold, but sunny and very beautiful. A long, easy, rock and snow ridge brought us to the foot of a final spire of warm brown rock. This was surmounted partly via a steep ice gully and partly direct on the rock. The remnants of an old cairn were found on the summit, from whence we enjoyed our final views back towards our coastal and inland journey. We sat for a long time in the now wintry sunshine, enjoying the solitude and reflecting on our 52 days in the region spread out before us. Good days and bad days, frustration and achievement, intense activity and repose and, above all, comradeship. Greenland, the land of contrasts, had provided them all. We returned slowly to camp.

On Friday 10th September we decamped for the last time and moved to a little hut in Angmagssalik, loaned to us by Jørgen Andersen, a most friendly and helpful Dane. Saturday, Sunday and Monday were spent in deflating and washing the Zodiac, cleaning and greasing the engine and finally packing everything in the crates for shipment back to England. In the evenings, we were grateful for the hospitality shown by Jørge and Aage, a local Greenlander, with whom we traded surplus petrol and jerrycans for seal-skins and bone tools and carvings.

Tuesday 11th September was, theoretically, our day of departure. However, the plane was cancelled due to bad weather at Sondre Stromfjord. On the following day the weather cleared at Sondre but heavy snow fell at Angmagssalik! Three days of frustration followed as, surrounded by fine peaks but with all our equipment crated on the dockside, we waited for fine weather at both ends of our flight.

We finally caught the helicopter to Kulusuk on Sunday 19th, almost a week late. The island airport and its surrounding mountains were completely covered in new snow. Truly, winter had come to Greenland. The runway had been cleared, courtesy of the United States Air Force, and the DH Dash had no problems in landing and taking off for Sondre.

Ironically, the plane from Sondre Stromfjord to Copenhagen flew right over Point 3060, in absolutely clear conditions. We could only gaze downwards as the rock buttresses and snow aretes slid slowly away from under our wings and wonder what might have been.

We were finally re-united with our families at Heathrow on Tuesday 21st September, 66 days after leaving.



".....Aage, with  
whom we traded..."  
See Page 15.



"....we enjoyed a final day's climbing, choosing the most  
easterly peak of the Sofias Fjeld Group..." See Page 15.



DIARY OF EVENTS.

- 18.7 Heathrow to Copenhagen. (S.A.S.). Overnight Copenhagen.
- 19.7 Copenhagen to Sondre Stromfjord. Overnight Sondre.
- 20.7 Sondre to Kulusuk to Angmagssalik. Camp S of Angmagssalik.
- 21.7 Unpack freight. Launch boat. Admin jobs. "
- 22.7 Ferrying for BSES across Kong Oscar's Havn. Mend boat. Camp at Angmagssalik.
- 23.7 Boat journey to camp at Ilivtiartik (N of Sermiligaq).
- 24.7 Boat to Sermiligaq. Buy fuel. Camp at Ilivtiartik.
- 25.7 Bad weather from E. Change plans. "
- 26.7 Bad weather. Sort gear for inland journey. "
- 27.7 Boat to Sermiligaq to send letters. Boat to head of Sermiligaq Fjord. Base Camp.
- 28.7 Ferry 2 loads each for 3 miles - 2 miles onto Knud Rasmussen Glacier. Camp at Base Camp.
- 29.7 Pack up Base Camp. Carry up to dump. Sledging fails. Camp 1.
- 30.7 Move dump up 2 miles (2 carries). Camp at Camp 1.
- 31.7 Move camp up to dump. Sledge for 1 mile (sledge damage). Triple ferry for 1 more mile. Camp 2.
- 1.8 Carry one load each up 3 miles. Poor conditions. Camp at Camp 2.
- 2.8 Two carries up to dump. Camp 3.
- 3.8 Warm. Rain. No progress possible.
- 4.8 Weather worse. No progress possible. Unstable ice under tent. Move to side moraine -  $\frac{1}{2}$  mile. Camp 3a.
- 5.8 Bad weather. Climb hill for view ahead. Frost needed for progress over next 2 miles.
- 6.8 Wet, windy night. No progress.
- 7.8 Colder but threatening weather. Make a dump 2 miles on.
- 8.8 Move camp onto Haabets Glacier. 5 miles. Edge of continuous snow cover (uneven). Camp 4.
- 9.8 Fetch dump up to Camp 4.
- 10.8 Fetch dump up to Camp 4 from Site 3a.

Diary of Events (Continued).

- 11.8 Sledging fails. Little progress. Sledge broken. Logistically impossible to succeed. Return to site of Camp 4.
- 12.8 Mild. Rain. Make new plans.
- 13.8 Storm. Blizzard.
- 14.8 Blizzard continues till early evening. Tent damaged.
- 15.8 Mend tent. Dig out supplies etc.
- 16.8 Carry load down 2 miles. Climb local subsidiary summit.
- 17.8 Move camp down 4 miles to base of "Turtle's Beak". Camp 5.
- 18.8 Climb "Turtle's Beak".
- 19.8 Rest day at Camp 5.
- 20.8 Move 4 miles to site of Camp 3a. Collect dump from 4 miles up glacier.
- 21.8 "Bouldering". Flower photography. Resting. Camp 3a.
- 22.8 Attempt on fine ridge to W. Fail due to loose rock. Climb subsidiary peak "Tryfan St. Jane". First Aurora Borealis.
- 23.8 Rain. Sleet. Camp 3a.
- 24.8 Single very heavy carry to Base. 10 - 12 miles.
- 25.8 Geology. Sort gear etc. Base Camp.
- 26.8 " " "
- 27.8 Escape in boat through thick ice, to Sermiligaaq. Camp below "Kigte".
- 28.8 To Sermiligaaq visiting etc. Climbed local high points. Geology.
- 29.8 Attempt to boat to Sangnilik Fjord. Ice too thick. Boat to Igterajik Kiateq at W end of Ikateq.
- 30.8 Rain. Sleet. Snow at 500 feet. Wind 5-6. Attempt to boat fails (thick ice and wind).
- 31.8 Cold boating to Upernivik (N.W. of Kungmiut) Prepare to climb Nanerersarpik.
- 1.9 Climb Nanerersarpik via S.E. Buttress (the "Gorilla") then ridge to summit. Bivouac - 8 hours darkness.
- 2.9 Descend by same route. Reach tent at 3.00 p.m.

Diary of Events (Continued).

- 3.9 Rest. "Hunting". New sea ice forming at nights.
- 4.9 Visit Kungmiut and boat to Angmagssalik. Camp at BSES Base.
- 5.9 Socialising with BSES (leaving today).
- 6.9 Ferry across fjord for BSES.
- 7.9 Contact UK from Angmagssalik. Visit bakery!
- 8.9 Geology. Local hills.
- 9.9 Climb "Brentor". (E peak of Sofias Fjeld Group).
- 10.9 Move into hut in Angmagssalik.
- 11.9 Pack freight. Visit local friends.
- 12.9 Geology (Valley of Flowers).
- 13.9 Angmagssalik. Snow.
- 14.9 Flight cancelled. Snow. Poor visibility.
- 15.9 " " "
- 16.9 Flight cancelled. Aircraft stranded at Godthaab.
- 17.9 Aircraft turned back from Kulusuk. Snow. Poor visibility.
- 18.9 Flight cancelled.
- 19.9 Flew to Sondre Stromfjord. Overnight Sondre.
- 20.9 Sondre Stromfjord to Copenhagen. Overnight Copenhagen.
- 21.9 Copenhagen to Heathrow.

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SCIENTIFIC WORK.a. Geology.

The essential geology of the area is relatively simple. Gneissic rocks of the Nagssugloqidian orogenic complex dominate the area between Sermilik and the Sorgenfri Gletscher on the east side of Kangerdlugssuaq. Apart from the vicinity of Angmagssalik, the only exceptions to this are small Tertiary intrusions of gabbro, chiefly the Skaergaard intrusion on the east side of Kangerdlugssuaq, and of syenite, on the west side of Kangerdlugssuaq and the Lilloise Bjerger. Northwards from the Sorgenfri Gletscher to Scoresby Sund is the large Tertiary basalt province which includes Watkins Bjerger and extends westwards across the Øvre Frederiksborg Gletscher to include the Prinsen av Wales Bjerger, inland from the head of Kangerdlugssuaq. Between the gneiss and the basalt, in the middle and upper parts of the Sorgenfri Gletscher but especially on its east, are sedimentary rocks of Cretaceous - Lower Tertiary age and from which plant fossils and coal have been reported (Courtauld, 1936).

The resulting scenery is essentially of two contrasting types: the readily weathered, horizontally-layered basalts, steep-sided, dark, usually flat-topped, ice-covered, and the alpine topography of the gneissic mountains to the south, with their steep polished sides rising abruptly above the glaciers and often culminating in impressive aretes and aiguilles.

The geological work of the expedition consisted of making collections of:-

1. Glacial sands and gravels.
2. Beach sands.
3. Shells.
4. Geological specimens (hand specimens).
5. Photographs, sketch maps, etc., of glacial terrains.
6. Colour slides of glacial terrains for use in lectures.

These were supplied to Leicester University and specimens totalled 80 kgs. The actual interpretation and study of the specimens etc., is the responsibility of Leicester University (Nene College, Northampton).

Geoffrey Monaghan

b. Botany.

I append this note with some embarrassment and many apologies to Dr. Halliday of the Department of Biological Sciences, University of Lancaster.



Botany (Continued).

My brief was to collect samples of particular nunatak flora from the area around Point 3060, for which purpose actual examples and a flower press had been supplied.

Those who have persevered with the report to this point will, hopefully, appreciate the difficulties with which we were faced and our consequent inability to explore the area around Point 3060.

However, my interest in wild flowers and photography led me to take many close-ups of specimens around base camp and at the point of our furthest advance inland.

These are being submitted to Dr. Halliday for identification and his possible use.

Colin Wootton

c. Meteorology.

The coast between the Blosseville Kyst and Angmagssalik has a low arctic climate characterised by a relatively small annual range of monthly mean temperatures and a high precipitation. The February and July means for Angmagssalik are -8 degrees C and 7 degrees C, respectively. It is not uncommon in the winter for the temperature to rise briefly above zero: during the period 1954-1958, for example, 10% of the January temperature readings were positive. The annual precipitation at Angmagssalik is about 800mm and here and at Kangerdlugssuaq precipitation is heaviest in October and November with a secondary peak in the spring. Of the Greenland weather stations, only Prins Christian Sund has more frequent precipitation. Fog is frequent on the outer coast, especially in the north, and cold winds off the ice can dramatically lower the summer temperature. The cloudiness of the outer coast means that the snow line is low: Böcher estimates this to be only 250-500m in the outer parts of Kangerdlugssuaq and he considers this to be about the lowest in Greenland. Perennating snow-drifts are common down to sea-level. The summer weather is notoriously changeable and varies greatly from year to year, being particularly cold and unsettled in bad ice years.

Most visitors to the interior agree that the summers are warmer, sunnier and windier than on the coast, although the weather is still rather unsettled and certainly not as good as in the interior of central east Greenland. Summer shade temperatures are usually below freezing but sun temperatures may reach 20 degrees C and presumably higher temperatures can occur on the generally south-facing scree, gullies, rock-ledges and fissures where plant life occurs. Even in summer there may be periods of heavy snowfall: the 1966 Royal Navy expedition, for example, reported 1.4m of snow in three days, but the amount of snow accumulating on the above habitats is likely to be slight and to persist for only a short while. The interior is usually windier than on the coast and several expeditions have commented on the extremely strong winds with drift encountered on sledging journeys. In Manley's opinion these winds are usually katabatic, only rarely being true föhn winds.

Meteorology (Continued).

The weather as described below is all estimated without instruments. Our thermometer mal-functioned. We didn't trust the barometer as its readings didn't match the weather at all.

However, the estimates may give a useful indication of one summer's weather conditions.

Using confirmed screen temperatures supplied by others (e.g. -13 degrees C at Sondre Stromfjord on 22.9) we can only estimate that the coldest temperatures we experienced were about -17 degrees C and perhaps a little lower on 10th August. The summit bivouac temperature on 1.9 was very low but estimates would be biased by psychological factors. Daytime temperatures in direct sunlight probably reached 20 degrees C. New sea ice was formed on most nights from 27.8.

20.7	Low cloud. Rain. 3 deg. C at midday. Light air.
21.7	Fine weather. Patchy sea fog. Light air.
22.7	Early mist. Fine later. Calm.
23.7	Sea fog. Cleared midday. Fine weather. Light air.
24.7	Fine weather. Patchy sea fog. Light breeze.
25.7	Rain. Low cloud. Strong breeze/near gale from E.
26.7	As yesterday. Clearing in evening.
27.7	Early mist. Fine. Light breeze.
28.7	Fine weather. Light air.
29.7	" "
30.7	" "
31.7	" "
1.8	" "
2.8	Fine weather. Threatening clouds to E. Light air.
3.8	Warm. Rain/sleet. Moderate breeze.
4.8	" " "
5.8	" " "
6.8	" " Fresh breeze.
7.8	Cold. High cloud. Threatening to E. Light air.
8.8	Cold. Fine weather. Light air/calm.

Meteorology (Continued).

- 9.8 Cold (very cold at night). Metal burns. Low patchy fog. Light air, fresh at times.
- 10.8 Cold (very cold at night). Fine weather. Light air, fresh at times.
- 11.8 Overcast. Light air.
- 12.8 Mild. Rain. Light breeze. Poor visibility.
- 13.8 Blizzard from N.E. (110 knots in Angmagssalik). Violent storm +.
- 14.8 As yesterday, improving early evening to Gale (N.E.). Overcast. Clearing.
- 15.8 Clouds evening. Light breeze.
- 16.8 Fine weather. Light air.
- 17.8 Fine weather. Light breeze, fresh at times. Near gale for one hour.
- 18.8 Fine weather. Light air.
- 19.8 Fine weather. Light air.
- 20.8 Fine weather. Light air.
- 21.8 Threatening/overcast. Clearing later. Gentle breeze.
- 22.8 Fine weather. Light air.
- 23.8 Rain. Sleet later. Low cloud from E. Moderate breeze.
- 24.8 Overcast. Light air.
- 25.8 Overcast. Occasional light rain. Light air, gusting to moderate breeze.
- 26.8 Fine weather. Light breeze.
- 27.8 Fine weather. Light breeze.
- 28.8 Sea fog, clearing later. Fine weather. Light air increasing to light breeze.
- 29.8 Fine weather. Moderate breeze (S.E.)
- 30.8 Rain. Sleet. Snow at 500 feet. Low cloud. Strong breeze, gusting to near gale.
- 31.8 Fine weather. Cold. Fresh/strong breeze. Near gale later.
- 1.9 Fine weather. Light air.

Meteorology (Continued).

- 2.9 Fine weather. Light air.
- 3.9 Fine weather. Moderate breeze.
- 4.9 Threatening clouds to E. Moderate breeze. Isolated squalls to S.E.
- 5.9 Fine weather. Light breeze.
- 6.9 Fine weather. Light breeze.
- 7.9 No precipitation. Light breeze.
- 8.9 " "
- 9.9 Fine weather. Light air.
- 10.9 Fine weather. Light air.
- 11.9 Fine weather. Light breeze.
- 12.9 Fine weather. Light breeze.
- 13.9 Fine weather, overcast later. Snow. Moderate/fresh breeze.
- 14.9 Low cloud. Moderate breeze. Occasional snow.
- 15.9 Low cloud. Snow. Moderate breeze.
- 16.9 Overcast. Clear patches. Gentle/moderate breeze.
- 17.9 Snow. Low cloud. Moderate breeze.
- 18.9 Overcast. Clear patches. Gentle/moderate breeze.
- 19.9 Fine weather. Light breeze.

Geoffrey Monaghan

APPENDIX 3.EQUIPMENT.a. Boat and Engines.

"These Zodiacs are unsinkable". Geoff.

"So was the Titanic.....". Mac.

From the outset it appeared obvious to me that, as a non swimmer, if I was to stand any chance of coming home alive that we had better get the best boating equipment available. Also, as none of us knew the first thing about boating, we needed to 'pick' as many expert's brains as possible. I'm glad to say that we succeeded in both these aims.

With the entire outcome of the expedition so dependent on success in completing the boat journey it was with great relief that we, eventually, took charge of a Mark IV G.R. Zodiac inflatable. Without the load capacity of a boat this size the logistics of the journey were unworkable. Its reputation also did much to quieten my misgivings! With this under our belts and much advice from Outboard Marine with respect to engine size, we finally settled on a 35 HP Evinrude motor, this giving ample power and good economy during testing.

Trial and a lot of errors later and we had finally sorted out the necessary paraphernalia which would be needed to make the voyage possible. Besides the Zodiac and the 35 HP Evinrude the list reads:-

10 HP Evinrude back-up engine.

Various spares for both engines.

Zodiac collapsible fuel tanks. }

5 gallon jerry cans. }

Total capacity of 52 gallons.

Fire extinguisher.

Assorted flares.

Compass and relevant sea charts.

Tool kit.

Boathooks.

Cordage; mooring, anchoring, stowage, etc.

3 rubber dustbins; storage of food and other perishables.

Various waterproof stuffsacs.

Lifejackets.

Multifabs survival suits; One piece 'Gortex' suits.

Pulley.

Technical and Performance Data.

The Zodiac Mark IV Grand Raid: Inflated measurements; length 17' 6", width 7' 2", giving an effective internal floor space of; length 5' 4", width 3' 6" and height (to pontoon level) 1' 10". Maximum load capacity...



### Boat and Engines (Continued).

.....Maximum load capacity; 12 people or 1,300 kgs. Our maximum load was approximately 800 kgs, but even with careful stowage this volume filled the craft well above pontoon height. When inflated and empty, three men can carry (stumble) for short distances. When packed into its 2 bags (one of 5' 0" by 2' 8" by 1' 3" and one of 4' 6" by 2' 6" by 10", weighing 160 kgs) movement is simple. The boat can be assembled in about 30 minutes.

Performance.....suffice it to say that the only time the repair kit saw daylight was to mend a small tear in the hull caused in freighting.

The Evinrude 35 HP longshaft manual start: This engine, though a compromise between speed and economy, proved its pedigree by bettering our consumption estimates and producing a good turn of speed when it was needed. It was light enough for two men to carry, weighing 52 kgs. Though a comprehensive selection of spares were taken, the only maintenance carried out was plug changing and these were never a cause of breakdown. The back-up motor was never needed. On trial with a laden boat this 10 HP Evinrude had just sufficient power to make a couple of knots. However, I would still recommend inclusion in any similar venture - rowing a loaded inflatable on a course with any kind of sea running is impossible!

Performance; with the boat fully laden planing was found to be impossible and hence economy obviously suffered. The average consumption, laden, was 5 miles per gallon or 2 gallons per hour. We estimated our maximum speed at about 12 knots; with an empty boat, nearer 30 knots.

Petrol and two stroke oil were available from Angmagssalik, Kungmiut and Sermiligaa at U.K. prices.

### Some observations on boat handling.

"We were a ghastly crew". The Ancient Mariner.

There can obviously be no substitute for experience but the following may be useful. In operation in Greenland with the Zodiac fully loaded a very careful stowage routine had to be adhered to, in order to leave room for the crew and to ensure that no chafing of the inflatable's pontoons occurred! We had learned this lesson the hard way, on a rough crossing to Lundy Island. However, once a system was worked out, the task of loading and unloading became automatic and, with a lot of the gear stowed in the dustbins and waterproof stuffsacs, not very time consuming. On long trips with a boat this heavily laden, the crew's stamina can be greatly enhanced by careful attention to these details.

For a general procedure on trips lasting several hours or more, we adopted a routine of regular petrol halts, also called 'fag breaks'. A stuffsac was secured close at hand, containing all the necessities for brewing up, so saving much time at lunch halts and at the end of the day. Storing the camping gear on top also saves a lot of cursing at the end of a long day.

### Boat and Engines (Continued).

We found that the concentration required by the driver whilst negotiating bad ice patches was such that an hour and a half at the helm was more than enough and it was usually best to coincide a change of driver with a petrol halt, etc.

#### Handling amongst the ice.

"Ice is for pouring whiskey on". Tom Patey.

The first lesson was learnt almost immediately upon putting to sea in Greenland. Pack ice when viewed from a low craft always appears as an unbroken line extending to the horizon. The extra height gained by standing up is often enough to show this to be false and enables a course to be chosen which connects the stretches of open water. We used a man standing atop a dustbin signalling directions to the driver.

Close manoeuvres amongst the pack are problematical, as an inherent trait of any inflatable is to loose steerage at low speeds. Slow speed collisions were at first alarming, but it soon became evident that no great harm resulted. To counter this habit, a quick burst of power soon brings the craft back on course and becomes necessary to prevent the plugs from oiling up. Fending off large floes with a boathook, though an automatic reaction, appears useless and is likely to result in a man overboard or a broken pole. Nudging smaller floes and bergs with the bows achieves results and, once in motion, a small floe can be used as a battering ram to clear the way ahead and, at the same time, protecting the bows from further collisions.

It is not until one is moored up to a floe, or attempting to clear two converging floes, that their own wind or tidal movement is appreciated. This movement can often be used to advantage, with the passage of time making otherwise impenetrable areas navigable. On the other hand, when the time comes to moor up to a floe, if only for curiosity's sake, it is wise to choose a large floe with plenty of open water around to prevent being trapped. When mooring up beware the ice under the water, as this often extends well beyond the limits of the visible surface ice and a grounded prop can result. This is also something to watch for when dashing to squeeze through two converging floes.

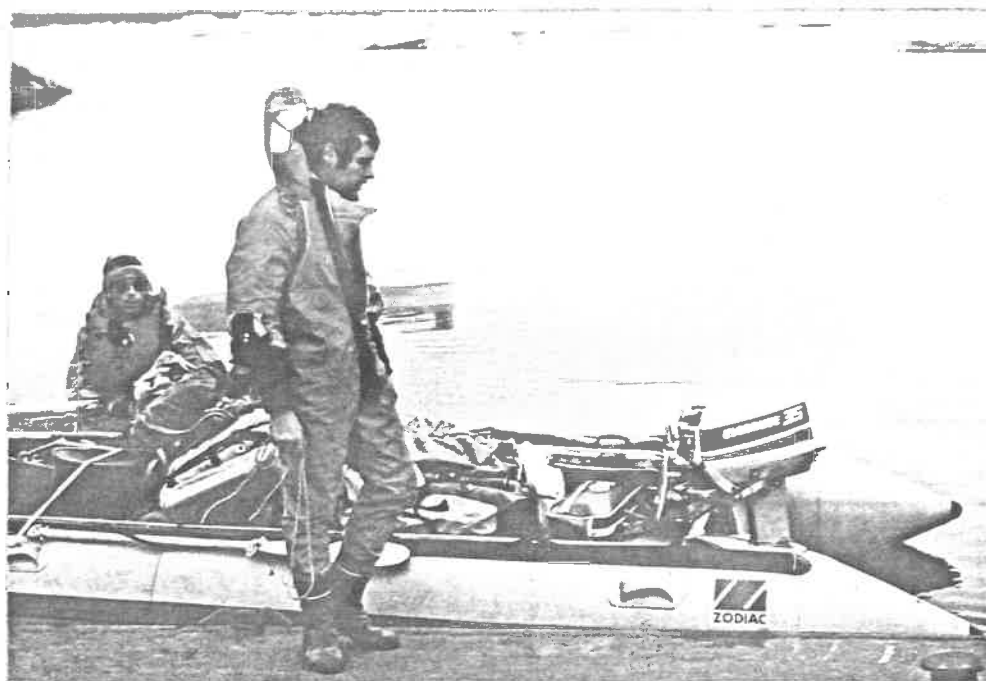
Encounters, at speed, with small lumps of black ice seem common; invariably these prove impossible to spot until it is too late but, though causing a heart flutter, on impact seem harmless. On our return to Angmagssalik in September much new winter ice was forming, especially in sheltered and sunless areas. This, when viewed early in the morning, still covered in frost, appears as a daunting sight of impenetrable ice. On closer inspection, at slow speed, it is possible to break one's way carefully through. The ice battering ram trick works well here too. However, new ice greater than half an inch thick tended to damage the rubber keel.

Mac Higgs.



The ideal combination. Zodiac and Evinrude.

See Page 25.



"Multifabs survival suits.....proved invaluable during the boat journeys". See Page 28.

EQUIPMENT (Continued).b. Personal and Climbing.

Normal Alpine/Scottish winter gear was taken, with a few items of specialised clothing for the inflatable journey. This all proved adequate for the conditions encountered, although the weather, with its sudden changes, sometimes caught us over-clad or under-equipped. When caught load carrying on the glacier during midday heatwaves, shorts and pumps would have been more suitable than big boots and duvets. The bivouac on Nanerersarpik, in early September, proved the opposite and a new use for triangular bandages was soon invented.

Topping the list of successes came Berghaus Super Yeti Gaiters and A.B. System rucksacs, which both proved immensely reliable and robust. Colin declared his Berghaus gortex 'Kielder' jacket to be ideal for all conditions.

Undoubted failure of the trip were the mosquito buzzers, which had been reported to be the ultimate in deterrents but seemed only to enrage the little devils and, whenever used, added to the onslaughts of the wee beasties by their high pitched demented whine, far worse than any mossie could emit. It wasn't long before I shot mine!

Of the specialised boating equipment taken, the 'Multifabs' survival suits deserve especial mention. These one piece 'Gortex' suits, designed for use on North Sea oil rigs, proved invaluable during the boat journeys, where they were tested in all conditions. It is inevitable when using a small open craft that exposure to soakings and wind should take its toll. These suits did much to lessen this debilitating problem.

Mac Higgs.

c. Camping.

Unlike the boating equipment, this was an area where we had the combined knowledge of almost 50 years experience. This led in a very short time to problems! From the early stages of planning the logistics of the sledge journey had decreed that only one tent could be taken inland. This, when viewed with the experiences of 2 and 3 day blizzards encountered by our predecessors, was an area where the right choice would be vital for our own well being and the success of the expedition. We were torn between the old choice of cotton versus nylon, both with their inherent strengths and weaknesses. After much thought we hedged our bets and took along a Saunders Mountain and a Mark 5 Vango, both with snow valances, the final decision as to which was to go inland with us being postponed until we had spied out the land.

Primus stoves, with the usual array of spares and an assortment of paraffin containers were decided upon for cooking. Paraffin was found to be readily available at Angmagssalik.

Once in Greenland, camping at the numerous deserted Eskimo settlements dotted along the coast proved no problem, since they usually provided level grassy sites and plentiful fresh water. In fact, these sites gave us the most pleasant camping that any of us had experienced. The decision on which tent to take inland was finally settled, as with many other



"Topping the list of successes came Berghaus Super Yeti Gaiters and AB System rucsacs".

Geoff on Sofias Fjeld.



"Colin declared his Berghaus gortex 'Kielder' jacket to be ideal for all conditions".

Summit of Nanerersarpik.

### Camping (Continued).

decisions, by the forced change of plans. The weight penalty of using the Vango was deemed better than the prospect of up to 40 days cramped in the Saunders and so the die was cast.

Once on the glacier, the unfamiliar ritual of pitching on ice was soon mastered, the lack of snow cover rendering all but ice axes and ice screws useless as tent pegs. Even these, when subjected to the heat of the day, soon worked loose and left the tent gently flapping. Guying out to food bags etc., proved the only reliable anchorage. The addition of piles of ice chips to the valance served only as a ready made water supply for brewing up. This lack of tent security was initially worrying as, when returning from a 'nights' load carrying, the prospect of finding a collapsed tent or no tent at all, seemed more than likely. However, the absence of any wind during the first two weeks soon alleviated this fear.

"And now the stormblast came and he was tyrannous and strong".  
(The Ancient Mariner)

Following the blizzard, with ample snow cover available, tent erection became text book, with the snow valances and the snow saw proving their value. Under these conditions tent pegs were soon rendered superfluous and in general camp life became much easier.

Though subjected to the usual abuse, the two primus stoves proved their worth and an over estimate on paraffin requirements soon became apparent. Originally we had envisaged having to melt snow for each meal; the lack of snow cover and the high daily temperatures saw us relying on meltwater streams and our paraffin consumption was almost halved to three quarters of a pint per day.

We discovered that visits outside for water collection and dispersal were made easier by donning waterproof overmitts, on our feet, thus ensuring that struggling into frozen boots became a thing of the past.

Mac Higgs.

### d. Radio and Survival Equipment.

Being totally ignorant on this subject prior to the expedition and very little the wiser now, the following can only be taken as a very sketchy resume.

#### Equipment.

- B.C.C. 32 radio receiver/transmitter with dry cell batteries.
- Telephone handset.
- Morse key.
- B.C.C. 501 charger and leads.
- AC/DC adaptor for outboard engine. (To facilitate battery charging).



Radio and Survival Equipment. (Continued).

Various wire aerals.

Aerial pole.

BE 375 Sabre 5 Beacon.

Sabre Mark 3 beacon.

In operation in Greenland, the first thing that came to light was that the frequencies allocated by the Danish Authorities (2090 khz, 1638 khz and 2182 khz) were too low in the band to be of much use. Fortunately the set had been crystallised up to operate on 3350 khz, the frequency allocated to the BSES and this proved usable. More useful was a chat with their radio officer and some advice from the Danish radio officer at Angmagssalik.

In the field, I was able to raise the station at Angmagssalik from the base of the Knud Rasmussen Glacier on our return from inland, a distance of some 60 mountainous miles. However, I doubt that, given the terrain and this equipment, that any safeguard could have been achieved by carrying it inland with us. For the inland journey we relied on the two Sabre distress beacons being heard by overflying aircraft should the need arise. These being light and compact at least gave an air of security. Set off accidentally, whilst buried deep in a rucksack, one caused a great deal of alarm by emitting its high pitched bleeping. Fortunately, the expected U.S.A.F. rescue operation, which we had been assured would be mounted from Keflavik on setting off a beacon, never materialised.

In addition to the Sabres we carried a selection of flares and some red dye for marking our whereabouts on the snow. Given the weight restrictions imposed whilst sledging, the choice between the security offered by heavy emergency equipment and remaining isolated, seems imponderable.

The Gronlands Tekniske Organisation Direktorat, .  
Hauser Plads 20,  
D.K. 1127,  
Copenhagen K.,

should be contacted with reference to all matters relating to radio use whilst in Greenland.

Mac Higgs.

TRANSPORT.1. Expedition Members.

Being a small expedition, the transportation of personnel had to be restricted to the scheduled air routes, as charter fees for the many small airlines that operate services between Keflavik (Iceland) and Kulusuk are prohibitive.

Two routes were investigated: a. via Keflavik, on a scheduled flight from Heathrow, changing to Icelandair day sightseeing excursion to Kulusuk and thence by helicopter to Angmagssalik, or, b. the route taken, via Copenhagen, with a night's stopover, on to Sondre Stromfjord, with almost a day's wait before flying back over the icecap to Kulusuk and the helicopter to Angmagssalik. Though a longer route, the latter proved to be the least expensive and, with all the paperwork and bookings being made by Regent Travel, worked very well. This route also gives the opportunity to see something of the west coast and the 'Inland Ice'. Cost for the return journey including the two helicopter flights was £330 per man.

Camping is allowed at Sondre Stromfjord, though at the runway edge. For those with the wherewithal the airport terminal has a hotel and a restaurant serving hot food, either very expensive or inedible.

To reinforce the warnings of possible delays due to the weather etc., the expedition was delayed in Angmagssalik for five days, with heavy snowfall and bad visibility. The record is 28 days!

Addresses: Regent Travel U.K. Ltd.,  
Regent House,  
Regent Street,  
Shanklin,  
Isle of Wight. Tel: Shanklin 4212/4225

Scandinavian Air Aervices,  
Head Office,  
S.A.S. House,  
52/53 Conduit Street,  
London W1R 0AY. Tel; 01 734 4020

Icelandair,  
73 Grosvenor Street,  
London W1X 9DD. Tel: 01 499 9971

Further information on travel in Greenland can be obtained from:

The Royal Greenland Trade Department,  
Passagerkontoret,  
Strangade 100,  
P.O Box 100,  
DK 1004,  
Copenhagen K.

TRANSPORT (Continued).2. Freight.

From the outset, the weight and volume of the expedition's equipment ruled out any thought of air freight; with costs considerably higher than sea freight rates, its only advantage, that of speed, is heavily outweighed.

Contact was made with the various sea freight companies mentioned in Geoff Renner's resume on 'Arctic Expeditions'. However, it seems now that only the P and O Line offer a service as far as Iceland but with no onward service to Angmagssalik.

The freight, which amounted to in excess of 3 cubic metres, went via D.F.D.S. from Harwich to Esbjerg (Denmark), then by rail to Aalborg and on to Angmagssalik with the K.G.H. Shipping Company. This was a somewhat worrying route as, with several loadings and unloadings, we expected it either to arrive in a damaged condition or not to arrive at all! It is useful to get a confirmation telex of arrival from the K.G.H. depot in Angmagssalik, before you fly out!

Freight packaging was solved by using a mixture of homemade heavy timber crates for the boat and engines etc., and 'Triwall' cardboard boxes for food and other software. The 'Triwall' boxes were packed into steel containers, by the shipping companies, for the sea voyage and came to no harm.

The expedition's freight costs were lower than anticipated due to the assistance of the British Schools Exploring Society, who had mounted a large expedition to the Angmagssalik area and who had the advantage of a bulk deal with the shipping companies. We had originally been quoted approximately £150 per cubic metre for the round voyage. This was to have been part paid on collection in Angmagssalik and the balance on arrival back in the U.K.

Addresses: The Royal Greenland Trade Department,  
Trafikkontoret,  
Gronlandshavnen,  
P.O. Box 8100,  
DK 9220,  
Aalborg Ost,  
Denmark.

D.F.D.S.  
Freight Department,  
Mariner House,  
Pepys Street,  
London EC3N 4BX. Tel: 01 488 0755.

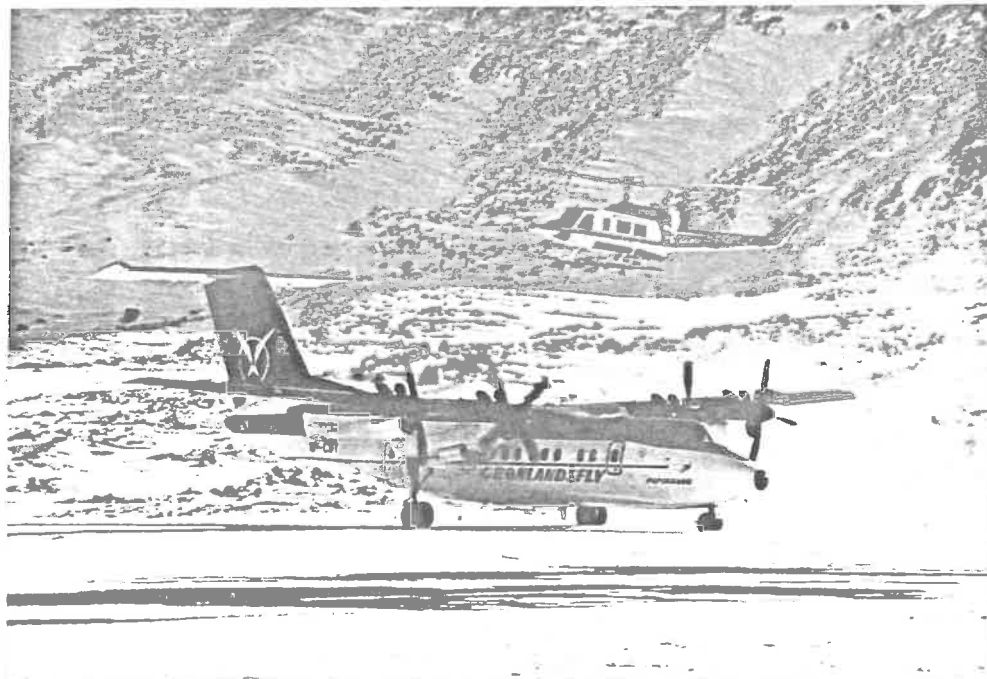
TRANSPORT (Continued).3. Greenland Local.

From Angmagssalik, local boats can be hired to transport men and equipment into coastal base camps, varying in size from small 'dories' to whalers. The hire rates on these vessels appear to be controlled by the K.G.H. Trading Company and it is doubtful, given the nature of the eskimos, that any arrangements could be made prior to departure from the U.K. However, once in Angmagssalik, given time and luck, some sort of a deal could be struck. It should be possible to get some indication of hire charges from the K.G.H. transport department in Aalborg. The whaler 'Timik' is available, at a price, for sightseeing trips and would be capable of moving an expedition to its base camp.

Contact: Ruth Nielsen,  
R.F. Electronic,  
Box 107,  
3913 Angmagssalik. Tel: 18444  
Telex: 91810 RF. ANG. GD.

The Gronlandsfly helicopter, based at Angmagssalik, can also be hired, either on the spot or through the K.G.H. in Copenhagen. We were quoted approximately £2000 for a one way trip to our original base camp.

Mac Higgs.



Gronlandsfly helicopter and DH Dash at Kulusuk.

FOOD.

Provisioning an expedition of this nature, where weight and volume are of prime importance, effectively cuts one's options and a diet of dehydrated foodstuffs soon appears as 'Hobson's Choice'. As Food Officer on this expedition, and having been similarly fed on previous ventures, I didn't rate my chances of filling my men's nosebags with various piles of powder for eight weeks and living to tell the tale and so a compromise was eventually reached. A menu was drawn up with a weekly rota system which comprised 5 days dehydrated and 2 days with assorted tinned 'goodies' to beef up the diet. This seemed to meet with approval, probably due to my illegible handwriting, and met, when averaged out, our required daily intake of about 5000 calories. With the average weight of the daypacks around 8 lbs and a volume packing trial passed, it seemed that the crucial 28 days of sledging provisions were 'under my belt'.

Typical dehydrated day.

Breakfast: Tea bags, coffee, sugar, powdered milk, 'Rise and Shine' orange, porridge, honey sachet.

Lunch: Mars bar, nuts and raisins, boiled sweets, glucose tablets.

Dinner: Savoury mince, peas and 'smash' potato.  
Apple flakes and custard.

Typical tinned supplement day.

Breakfast and lunch as above.

Dinner: Tinned chicken and veg, tinned potatoes.  
Steamed pudding and custard.

The purchasing of the expedition's foodstuffs, unlike a climbing weekend where the supermarket's bean shelf is emptied, seemed problematic at first, due to the unusual and diverse nature of the ingredients required. I was fortunate to have the help of Swel Foods and General Foods who supplied the majority of the dehydrated food, and access to a cash 'n' carry store who supplied almost everything else, thus saving much leg work.

The amassed heap of food was then, for convenience in the field, broken down into 60 self contained daypacks. These daypacks were strongly bagged, numbered and made as waterproof as possible; similarly the spares. This was vital if they were to withstand two months of rough handling. With this achieved and all packed into the 'Triwall' boxes for freighting, I looked forward to the event with some trepidation. My fears were soon justified!

"The best laid plans of mice and men.....".

The ice conditions and their effect on our plans soon saw me cursing my careful packing and that indestructable brown tape that sealed every bag, as I struggled to reduce the food weight to allow us to extend the proposed inland journey to 40 days. This could only be achieved by dis-

FOOD (Continued).

carding all the tinned 'goodies' and replacing them with further rations of dehydrated food. Fortunately the spares were sufficient to allow this, but at the end of the operation, all I could say with any certainty was that there were 40 daypacks and a lot of belt tightening ahead. With this achieved I estimated the weight at some 250 lbs, close to our original estimate for 28 days and the daily calorific value, at best, 3500 calories.

In the event, the shortcomings of 30 days on this diet were not as manifest as had been feared. With the daily supplement of a vitamin pill apiece no apparent dietary problems occurred. There was, at first, some apparent deterioration in stamina but this seemed eventually to be offset by an overall increase in fitness. However, it was apparent that, had the need to stay inland been for much longer, certain ingredients would soon have run out. These were the items that proved to be of the highest calorific value and the easiest to digest. At the time it was easy to convince oneself that a diet of porridge, rice pudding, custard and 'Yorkies' was all that was needed to sustain a long day's toil and perhaps, when liberal quantities of sugar are added, it is?

On our return to base camp with its cached hoards of 'goodies' it took a very few days before normality was restored. The most evident glee noticeably came from a very greasy stew!

Shopping in the K.G.H. Stores, at the settlements we visited, would reduce the need to freight out certain items, the extra cost being offset by the saving in freight charges. Certainly most everyday items were readily available and it should be possible to reduce freight to the basic dehydrated products. Perhaps a satisfactory diet could even be achieved by twice daily visits to the Angmagssalik bakery!

Food List.

Teabags.	1100
Milk.	To make 210 pints.
Sugar.	60 lbs.
Coffee.	2 lbs.
Orange powder.	3 lbs.
Porridge, alpen.	20 lbs.
Mars and Yorkie Bars.	210 bars.
Nuts and raisins.	20 lbs.
Salted nuts.	6 lbs.
Glucose tablets.	130 packs.
Boiled sweets.	210
Savoury Mince.	4 No. 10 meal boxes.
Bolognese.	4 No. 10 meal boxes.
Beef Soulashi.	4 No. 10 meal boxes.

FOOD (Continued).Food List (Continued).

Farmhouse Stew.	4 No. 10 meal boxes.
Beef Stroganoff.	4 No. 10 meal boxes.
Peas.	3 lbs.
Mixed vegetables.	3 lbs.
Cabbage.	3 lbs.
Runner beans.	3 lbs.
Swede.	3 lbs.
Mash.	12 lbs.
Savoury rice.	3 lbs.
Apple flakes.	6 lbs.
Pudding rice.	4 lbs.
Instant whip.	4 lbs.
Custard.	8 lbs.
Strawberry jam.	4 lbs.
Honey.	4 lbs.
Salt.	2 lbs.
Drinking Chocolate.	4 lbs.
McVities cakes.	20 lbs.
Salted biscuits.	10 lbs.
Cream biscuits.	10 lbs.

Tinned.

Various meats.	30 lbs.
Baked beans.	6 lbs.
Spam.	6 lbs.
Meat spreads.	2 lbs.
Cheese spreads.	1 lb.
Rice pudding.	7 lbs.
Steamed pudding.	10 lbs.
Fruit, various.	12 lbs.
Bovril.	2 lbs.

Mac Higgs.





"....cursing that indestructible brown tape that sealed every bag....." Food sort out at Base Camp. See Page 35.



"....base camp, with its cached hoards of 'goodies'." See Page 35.

MEDICAL.

The sum total of our pre-expedition medical experience was my attendance, some years previously, at an elementary first aid course. On the basis of this, I was promptly appointed expedition doctor! The Northampton St. John Ambulance Brigade were most helpful in giving us individual tuition, over a series of evenings, recognising that we might have to attempt to deal with serious problems with no hope of obtaining professional medical assistance. They also kindly loaned us bandages, dressings, inflatable splints and so on.

Thus re-assured, we visited our doctors for medical checks and were all declared reasonably fit and well. My own doctor was sympathetic to our needs and helpfully prescribed the simple drugs and medicines listed in the Brathay Exploration Group's booklet "Expedition Medicine - A Planning Guide". This book was our medical 'bible' and we found the advice contained therein to be most useful and practical. The medicines naturally had to be paid for in full, since they were not prescribed for our immediate use.

As advised in the above-booklet, the medical supplies were packed in two containers, i.e. "Drugs and Medicines Kit" and "Accident Kit". The latter was kept in an easily accessible position at all times. Lists of the contents of these kits are attached.

During the expedition we had no serious problems whatsoever - a fact which we put down to the wonderfully clear and germ free Greenland environment and not a little luck amongst the rock-falls and crevasses.

The continuous wearing of heavy mountain boots with crampons whilst carrying heavy loads caused many blistered heels and we used up the whole of our considerable stock of large sticking plasters.

Cracks and fissures in our hands were common, thumbs being particularly vulnerable. These were caused by the need to undertake tasks such as tightening crampon straps, tying sledge loads and washing up, in very cold conditions. We all had our thumbs taped up for much of the time. Zinc oxide plaster was ideal for this and we could have used the small roll at our disposal at least four times over.

'Dehydrated food induced' constipation occurred occasionally and was easily dealt with by the use of 'Senakot' tablets.

Headaches were infrequent; where they did occur, they mostly resulted from dehydration and/or the intense glare from the snow. Good quality variable density visors and mountaineering goggles usually prevented the latter. No more than a dozen paracetamol were used during the entire expedition.

Potential vitamin C deficiency was prevented by the use of 'Multi-vitamin' tablets and by eating the leaves of sorrel and arctic willow herb wherever these were found.

Until the first frosts, fjordside camps were invaded by myriads of

MEDICAL (Continued).

voracious mosquitos. We had been supplied with three small instruments which emitted a high pitched whine which was supposed to warn off the insects. These were completely useless and, indeed, seemed to attract mosquitos from miles around. They were eventually used as targets for rifle practice! "Repel 100", on the other hand, was totally effective for the ten hours specified, if carefully applied. This is manufactured by the Wisconsin Pharmacal Co., Jackson, USA.

Slight frostbite occurred on one occasion. This potentially dangerous condition was prevented by the excellent equipment supplied by White and Bishop Ltd., not least the Berghaus Super Yeti Gaiters, pure wool socks and Damart Double-force gloves.

Triangular bandages were put to a novel use during the bivouac on Nanerersarpik, where the first aid pack was plundered to provide a little more insulation against the intense cold. One expedition member swears that he avoided a frostbitten nose by wearing one like a bandit's mask!

Colin Wootton.

Contents of Medical Kits.1. Accident Kit.

- 1 Simple First Aid Instruction book.
- 1 8" x 8" sterile dressing.
- 3 Large wound dressings.
- 1  $\frac{1}{2}$  oz packet cotton wool.
- 1 Packet assorted sticking plasters.
- 1 Roll Tubegauze and applicator (finger bandage).
- 2 Small sterilised lint dressings.
- 5 7.5 cm x 7.5 cm filmated gauze squares.
- 1 Pack of 5 No. 3" x 3" gauze pads.
- 1 Short life triangular bandage.
- 2 Medium sterile absorbent gauzes (used as surgical dressings.)
- 6 Safety pins.
- 1 Pair scissors.
- 1 7.5 cm x 4.5m crepe bandage.
- 10 1 ml syringes and needles.
- 10 ampoules Fortral (strong analgesic) with instructions.
- 4 90 cm x 127 cm triangular bandages.

MEDICAL (Continued).Accident Kit Contents (Continued).

- 8 Antiseptic wipes.
- 1 roll zinc oxide sticking plaster.

2. Drugs and Medicines Kit.

- 1 Medical Record Book and instructions.
- 1 Bottle Septrin tablets (antibiotic)\*
- 1 Bottle Amethocaine eye-drops.\*
- 1 Otivine nasal spray.
- 1 Tin of 100 Senakot tablets.
- 1 Box of 50 Paracetamol tablets.
- 1 Tube Radian massage cream.
- 1 Packet of 11 Steristrips.
- 2 Tubes Caladryl (Calamine).
- 1 Tube Savlon.
- 1 Tube Vioform-Hydrocortisone. \*
- 1 Bottle 50mgm Fortral Tablets (analgesic) \*
- 2 Bottles Alcin antacid tablets.
- 1 Bottle Piriton. \*
- 1 Pair scissors.
- 1 Packet of 24 Bradosol tablets.
- 1 Packet of cotton wool buds.
- 1 Tin Paraffin gauze dressings.
- 1 Packet of 10 antiseptic wipes.
- 1 Tin vaseline.
- 1 Large roll of bandage.
- 1 Bottle Codeine Phosphate tablets. \*
- 1 Bottle Homatropine eye drops. \*
- 1 Packet of 12 Glycerine suppositories.
- 7 Safety pins.
- 1 Tube Chloramphenicol eye ointment. \*
- 1 Thermometer.
- 1 Roll 2½" Bandaid sticking plaster.
- 1 Bottle cough medicine.
- 1 Emergency dental kit.

\* Doctor's prescription needed.

PHOTOGRAPHY.

The photographic aims were:-

1. To make a complete photographic record of the expedition in the form of 35mm colour slides which would be suitable for advertising use by our suppliers and for illustrated lectures.
2. To bring back black and white negatives of significant views in the interior since these would be more suitable for enlargement than copied colour slides.
3. To make a black and white photographic record of the geological work.
4. To bring back close up colour slides of arctic flora.

The first three of these aims were completely achieved. There was only limited success with the fourth, since it had been our intention both to photograph and to collect certain plants around the Point 3060 area in the interior. Close up flower photography was undertaken, however, at our point of furthest advance and around base camp. Over 1500 colour slides and 500 black and white negatives were exposed.

A complete list of photographic equipment and film is given below.

The Pentax ME Super Cameras were superb in every respect, performing perfectly in temperatures ranging from -20C to 20C. Lens changes could be quickly and safely made despite cold hands. Their modern coating enabled many 'into the sun' pictures without the need for a lens hood. The light weight of the cameras and lenses was a godsend to our heavily laden expedition. The automatic exposure system dealt perfectly with a complete range of light conditions and contrasts; snow and ice were particularly well rendered. Despite pre-expedition worries, the batteries and electrical circuits were unaffected by prolonged exposure to cold.

The Olympus Trip also impressed by its lightness and easy handling.

The bulk of the colour film was Agfachrome CT18. This produced excellent results in all conditions, without the need for filters of any description. The individual cassette containers were tested beforehand and found to be completely waterproof. They were stored in square plastic 'ex-margarine' tubs, with silica gel sachets. These points were important for the sea voyage in an open boat. The Ektachrome film also gave acceptable results, though rendering high mountain landscapes with a somewhat blue cast, perhaps because of the absence of a suitable filter.

The Ilford FP4 film was used throughout with a medium yellow filter. This film coped well with the contrasts inherent in brilliantly lit rock, ice and snow landscapes. Enlargements have been very pleasing and relatively grain free.

PHOTOGRAPHY (Continued).

All film was stored for considerable periods in the glacial ice, without deterioration.

Photographic Equipment.

- 1 Pentax ME Super Camera with 50mm f1.7 lens.
- 1 Pentax ME Super Camera with 50mm f2.8 lens.
- 1 35mm f2.8 wide angle lens.
- 1 135mm f3.5 long focus lens.
- 1 Olympus Trip Camera.
- 1 Set of extension tubes for close up photography.
- Spare batteries.
- Silica gel sachets.
- Cleaning brush and lens cloth.
- 1 Medium yellow filter.
- 40 Agfacolour CT18 films for colour transparencies.
- 10 Kodak Ektachrome films for colour transparencies.
- 25 Ilford FP4 Black and White films.

Colin Wootton.

APPENDIX 8.FINANCE.1. Income.

a. <u>Grants.</u>	£	
Gino Watkins Memorial Fund	200	
Mount Everest Foundation	500	
British Mountaineering Council	<u>200</u>	£
		900
b. <u>Donations.</u>		
Alex Laurie Factors.		20
c. <u>Payments.</u>		
Leicester University (Nene College, Northampton), for geological samples.		<u>150</u>
Total Income.		<u>1070</u>

2. Expenditure.

a. <u>Travel.</u>	£	
Personal air fares	1035	
Sea freight of boat, engines, food and equipment.	300	
Boat fuel in Greenland.	<u>150</u>	£
		1485
b. <u>Food and Other Stores.</u>		
Food bought in the U.K.	160	
Food bought in Greenland	100	
Medical supplies.	35	
Film.	<u>143</u>	
		<u>438</u>
Carried forward		<u>1923</u>



FINANCE (Continued).Expenditure (Continued).

		£
	Brought forward	1923
c. <u>Equipment.</u>	£	
Main engine	576	
Engine and boating spares	126	
Other equipment (camping, climbing, etc.)	370	
Rifle hire, firearm certificate, and ammunition.	70	
Instrument hire (RGS)	<u>11</u>	
		1153
d. <u>Insurance.</u>	£	
Boat	266	
Personal/search/rescue	<u>375</u>	
		<u>641</u>
	Total expenditure	<u>3717</u>

3. Summary.

	£
Expenditure	3717
Income	<u>1070</u>
Balance, being members' personal contributions.	<u>2647</u>

Note: These accounts relate only to actual cash transactions. In addition, the expedition is indebted to many companies, organisations and individuals for the loan or donation of the numerous other items required for a combined boating/mountaineering expedition (see "acknowledgements").

ACKNOWLEDGEMENTS.

The expedition is indebted to the following people and organisations:-

1. Home Agent.

Ron Sangster, for his invaluable "behind-the-scenes" activities, ably supported by John Punter.

2. Grants.

British Mountaineering Council.

Mount Everest Foundation.

Gino Watkins Memorial Fund.

3. Main Equipment Suppliers and Sponsors.

General Foods Ltd. (Supply of a selection of their products).

Outboard Marine Ltd. (Discount on main engine, loan of spares and much advice).

Swel Foods Ltd. (Supply of dehydrated food).

White and Bishop Ltd. (Supply of personal and climbing equipment).

Zodiac U.K. Ltd. (Loan of boat and ancillaries and much advice).

4. Other Equipment Suppliers and Sponsors.

Argos Distributors Ltd. (Supply of colour film).

B. & E. Sports Ltd. (Discount on 'Vango' tent).

Chris Bean (Supply of boating equipment).

Delapre Developments Ltd. (Design and manufacture of sledges).

Geoffrey Creighton Ltd. (Supply of colour film).

Alan John (Driving freight to and from docks).

Alex Lawrie Factors (Donation).

Bill Lett (Loan of outboard motor).

Brian and Anthony Lonsdale (Loan of radio equipment).

Mojo Keencost (Mr. Brierly. Supply of foodstuffs).

Multifabs Ltd. (Supply of survival suits).

Norbar Torque Tools Ltd. (Personnel transport and 'Triwall' boxes).

Pains-Wessex Ltd. (Supply of flares).

Col. Reynell, of the Robert Horne Paper Group Ltd. (Transport of freight to and from the docks).

#### 4. Other Equipment Suppliers and Sponsors (Continued).

Saunders (Discount on tent).

Thermawear Ltd. (Discount on Damart Thermolactyl clothing).

#### 5. Help/Advice/Use of Facilities, etc.

British Antarctic Survey. (Advice from Geoff Renner).

British Museum of Natural History. (Research advice).

British Schools Exploring Society. (Help with sea freight).

Bob Bygraves. (Help and advice with food supplies).

Tom and Nikki Chapman. (Manufacture of kite radio aerial).

John Coleman. (Rifle shooting tuition).

George Forcey, Nene College Northampton. (Geological research advice).

Derek Fordham (Much help and advice).

Peter Friend (Help and advice).

Col. Gilliatt. (Help on training trip to Lundy Island).

John Hirst (Much help, advice and encouragement).

Dr. Geoffrey Halliday, Lancaster University. (Research advice and permission to reproduce geological and meteorological descriptions).

St. John Ambulance Brigade. (Much advice and the loan of medical equipment).

Dr. Kilpatrick. (Help with medical advice and prescriptions).

Hywel Lloyd. (Help and advice).

Chris Lockwood. (Loan of rifle and ammunition).

Bruce MacDonald and Nick Hopkinson. (Advice on boating in Greenland).

Dr. David Matthews. (Much advice on East Greenland).

Borough of Northampton. (Loan of Dustbins).

Northampton Sailing Club. ('Loan' of Pitsford Reservoir for training purposes).

Pentax U.K. Ltd. (Advice and discount on photographic equipment).

Simon Perry. (Whose house served as a warehouse and in whose garden the Zodiac first came to life).

Polytechnic Marine Ltd. (Loan of navigational equipment).

Ken Roberts. (Much advice on boating).

Royal Geographical Society. (Help and advice).

Steph Tilley. (Loan of boat compass).

Mike Tims. (Loan of fork lift truck and driver).

5. Help/Advice/Use of Facilities, etc. (Continued).

Mike Tuson. (Help and advice).

Sidney Wootton. (Manufacture of heavy equipment crates, radio  
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6. Our families and friends for their help, patience and understanding.

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Jørgen Andersen. (Loan of hut and an excellent dinner).

Aage Ikila. (Much hospitality and an insight into Greenland life).

.....and many others, too numerous to mention, without whose help our  
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Cormac Higgs.

Geoffrey Monaghan.

Colin Wootton.

