British Sea Kayak Exploration

of

North West Spitsbergen 1977
FOREWORD
By Sir Vivian Fuchs F.R.S.

The youth of every generation requires the opportunity and the means to satisfy its quest for adventure. Mountaineering, sailing, diving, and in recent years canoeing, have increasingly provided such opportunities. In every sport growing expertise demands a goal at which to aim and this is often provided by the successes of those who have gone before. White water canoeing has its competitions, open sea canoeing needs achievements to set an example and a standard at which to aim. The British Sea Kayak Exploration of North West Spitsbergen has, in this sense, made a great contribution to the sport.

Its four members, John Anderson, Sam Cook, Glyn Edwards and Keith McDowell, organized and carried out a remarkable kayak expedition around the northern coasts of Spitsbergen, paddling as far as 79° 53' north. To achieve their object they had, at an early stage, to make a portage of fourteen miles over snow and glacier where crevasses provided hazards for canoeists. Then on through Arctic seas weaving their way in true Eskimo fashion, through narrow leads in pack ice where prevailing mists made navigation a problem. Fortunately they were spared any serious encounters with the many polar bears which inhabit the region, one of which had attacked and killed an Austrian mountaineer only three weeks before.

At one point they met a vessel, halted from progress by the ice, while they in their frail craft were able to continue proudly on their way.

In all they travelled two hundred and fifteen miles in twenty-six days with heavily laden kayaks, finally reaching the small habitation of Ny-Alesund on the west coast. It was a well planned and well executed project which sets a high standard of adventure for the open sea canoeist.
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MAP OF NORTH WEST SPITSBERGEN (inside the back cover)
INTRODUCTION
By John Anderson

This is an account of an Arctic journey undertaken by four British sea kayakers during the summer months of July and August 1977. The four expedition members, John Anderson, Sam Cook, Owain Edwards and Keith McDowall travelled for two hundred and fifteen miles around the north west coast of Spitsbergen. The expedition was in a very remote part of the world which is seldom visited by man except for the occasional expedition. The four kayakers journeyed in an anti-clockwise direction round the north west coast of Spitsbergen, portaged over fourteen miles of glaciers reaching five hundred metres above sea level; attained a latitude of 79° 53' north and negotiated over thirty miles of loose pack-ice. The expedition spent a short time in Magdalene Fjorden in order to pursue some light mountaineering. Throughout the journey all camping equipment and food, sufficient for thirty two days, was carried in the kayaks. Specific equipment was designed and developed for the various aspects of the expedition and at all times the party was totally self-sufficient.

The idea of the expedition grew as result of the 1975 British Kayak Expedition to Nordkapp, Arctic Norway. Two members of this earlier expedition, John Anderson and Sam Cook worked out the possibilities of a more committing journey than the Norwegian coast, using the same type of kayaks. The concept was one of remoteness and isolation: to be cut off from human habitation. The journey was planned so as to include travelling amongst mountains, and below glacier snouts, passing icebergs and possibly visiting the edge of the polar pack-ice. The expedition of 1977 experienced all of these aspects as well as an unusual portage across two large glaciers; a section which was aided by the use of Hanssen-type sledges. The Spitsbergen journey lasted for a period of twenty six days. Most of this time was spent kayaking, some of the time was spent sledge and mountain training and the short period was spent resting and maintaining equipment.

Spitsbergen has often been regarded as a Norwegian outpost with a ‘cold coast’ somewhere high in the Arctic Ocean. Svalbard, the collective name for the islands of this Norwegian archipelago, is an entity in itself, although politically it is part of Norway; the country came under Norwegian sovereignty in 1925. Svalbard is situated over four hundred miles north of the Norwegian mainland, between latitudes 74°-81° north and longitude 10°-35° east. The history of the region is both interesting and fascinating, commencing when the land was discovered in 1194 to the present day.

Spitsbergen’s early history is associated with the growth of global travel and the expansion in world trade circa the sixteenth and seventeenth centuries. Many nations including Great Britain stumbled across the region known as Svalbard during their attempts to discover a north-east trade route to China and the East. During the seventeenth century Spitsbergen was of particular interest to those nations searching for new areas in which to hunt whale and walrus. Svalbard was reported as being rich in these two commodities and a race ensued with numerous nations clamouring to establish permanent bases. The whale and walrus were both rapidly over-exploited leaving the species seriously reduced, to the point of near extinction. The dark winters and pack-ice were responsible for bringing about a decline in whale and walrus hunting; a decline which came too late to prevent the country from being left empty of these species. This region had once been one of the richest in the world. It was not until the nineteenth century that serious scientific work ventured to Svalbard, and during the twentieth century the region has been extensively featured as a result of a growing interest in Polar travel. Many pioneers used the country as a starting point for attempts to reach and cross the North Pole, including Roald Amundsen’s journey by airship from Ny-Alesund, Spitsbergen to Alaska in 1925. Svalbard’s landscape in determined very much by the type of rock found in the various areas. Along the north west of the region the land is heavily metamorphosed and folded, producing
mountains and ridges with jagged tooth-like edges, which have been sculptured by the extreme temperatures of the area, experienced during the winter. In the east the mountains take the form of plateaux with horizontal sedimentary rocks which are gently folded. The coastline is deeply incised by fjords, extending as far inland as one hundred and twenty kilometres (Wíddefjord), and much of the land mass is covered with permanent ice. The rivers are numerous, and although short in length they are very brown with silt deposits and fast flowing in the summer due to the partial thawing of the glacier ice. The west coast, in the summer, is usually free of pack-ice which extends from the North Pole: this is largely due to the influence of the Gulf Stream current. Much of the coast of Svalbard, however, is likely to be 'ice locked' throughout the year. Glacier ice, in the form of icebergs is very much in evidence around the coastline of Svalbard during the summer, and can be seen moving gently but steadily with the tide. The pack-ice, during the summer, recedes north and eastwards and is likely to be encountered at about one hundred miles north of Spitsbergen: i.e. at 82° north. During the winter the sea is frozen, up to a metre thick, and the whole of the country is encased by this white blanket. The region experiences darkness in the winter, but during the summer the sun stays above the horizon from May to August. The annual temperature range is between -35° centigrade and +15° centigrade and during the summer the temperature is likely to be above 0° centigrade. The sea temperature, however, may well remain at about 0° centigrade and sea water will usually freeze cold at about -2° centigrade: this figure being dependent on the salinity of the sea.

There are 3 indigenous species of land animals in Spitsbergen, the artic fox, polar bear and reindeer. In the past, all three of these species have been threatened with extinction as a result of hunting and trapping: a similar tale to that of the whale and the walrus. However, in recent years, due to protection acts, evidence has indicated that there is a slight increase in all three species, and Spitsbergen has taken an active part in protecting and observing these animals. The polar bear, in particular, has shown some promising signs in the last few years. This creature, capable of killing a seal with a single blow from the paw, when fully grown, is in excess of a thousand pounds in weight. Its diet consists of seal through the summer months. When the pack-ice retreats northwards, the occasional bear is stranded on the islands and has to forage around as best as it can. Often he is unable to meet his dietary requirements and becomes indiscriminate about what he eats. Horatio Nelson was attacked by a polar bear in this region during his days as a midshipman. With the aid of a companion he managed to escape death by running the bulk of a rifle between the jaws of the bear. A week prior to our arrival in Spitsbergen, an Austrian research doctor, who was camping in Magdalenefjorden, was killed and dragged on to an ice floe by a polar bear. This was the first recorded death of a human as a result of a bear attack in Spitsbergen for over thirty years.

The inhabitants of Svalbard are either Russian or Norwegian and are actively engaged in either coal mining or the administration services. The economy of the region centres around coal mining, as it is rich in high grade coal, anthracite.

Here then, is a region of outstanding natural beauty which will no doubt appeal to the kayaker and mountaineer. The area is demanding in that settlements are few, the weather is extremely fickle (much more so than in the U.K.) and the harsh climate is likely, even in the summer months. The terrain is very rugged and vast areas of the country are remote and inhospitable. Activities undertaken by expeditions to the region need to be of a nature that does not disturb the delicate balance between wild life and man. Moreover it is also worth every expedition aiming to be totally self-sufficient and independent for the duration of time in the region, since self-sufficiency certainly was the key to the success of the 1977 kayak expedition.

The travel facilities to Spitsbergen are confined to flying or sailing by coastal steamer from the mainland of Norway. The latter involves about six days of travel and for our purposes this was too long, in view of the time we had available. We therefore flew to Longyearbyen, the capital of Spitsbergen, arriving fifteen hours after departure from Newcastle, on the 22nd July. The kayaks and three tea-chests of food had been sent three weeks in advance by ship; hopefully these were standing on the quayside waiting for us:

There is a considerable transition between the warmth and comfort of a DC9 jet when stepping out at 2.30 a.m. and walking towards the air terminal in Longyearbyen. The airport is two years old and consists of a runway, a control tower and a large hangar. We arrived, somewhat tired and hungry (we had not eaten for twelve hours), to be greeted by a gloomy climate, just like an overcast October day back in the U.K.; the temperature felt cool. An official representative from the Governor of Spitsbergen (called the Sisysteman) met all the passengers. He was attempting to establish what plans the new arrivals had for their stay in the country. Longyearbyen has no hotel or facilities for accommodating tourists and visitors must have the means to provide accommodation over their heads or have a destination, i.e. a contact who will house them. His news was rather distressing.

A coastal steamer which was expected in two weeks prior to our arrival had been grounded off the Norwegian coast. The official felt sure that all our equipment was on this vessel and that we would have to step back on to the plane and return home, or at least to the Norwegian mainland. Suddenly two years planning seemed to be in jeopardy. Keith's response was certainly different: he burst out into hysterical laughter. The next steamer was not due for two weeks and even then our equipment might not necessarily be on this vessel! However, the official face lit up when we mentioned the kayaks, as he had seen them down by the pier. The tea-chests were sent out as the same consignment and so hopefully they were down by the water's edge somewhere; we clambered on to what appeared to be a workers' bus and travelled down the bumpy coal track to the quayside, three kilometres away. The journey towards Longyearbyen was rather depressing: it was a grim looking town, surrounded by large pylons carrying coal buckets to and from the mines.

The kayaks were indeed a welcome sight, although they were plastered with a black oily mud from passing trucks on route to the harbour. Within three minutes we had found the tent and Gwyn had fortunately packed a spare packed-lunch into the pressure cooker and slipped it behind the seat in his kayak, during the packing stage back in England. This was really good news as we had not located the tea-chests, as yet! We ferreted around for a suitable piece of ground to pitch the tent; the shore was littered with timber, stone and old sheds. We abandoned the idea of camping in favour of spending the night in a shed. The three-walled hut was convenient. Gwyn was busy trying to go to the toilet; he looked a funny sight squatting down and at the same time trying to fend off hundreds of arctic terns that were bombarding his head in an extremely fierce manner. Food had been quite inadequate en route to Longyearbyen and the packed-lunch was rapidly devoured, prior to settling down to sleep at 4.00 a.m. ! It could have been mid-afternoon as far as we were concerned; it was very light indeed.

The night was short and by 10.00 a.m. we had finished the remainder of the packed-lunch and visited the Sisysteman to relay our plans. He already had a fair idea as we had made contact from the U.K., but small details were important, and he had some interesting information for us. He informed us that the pack-ice was below 80° north and was well south into Wíddefjord; this could halt us, but at the same time the Governor mentioned that with a strong southerly wind it would be very mobile and could shift northwards covering over ten miles a day. He was
encouraged to learn that we had brought a shotgun with us and after presenting him with a haggis we parted on good terms, feeling that our plans were not impracticable and that, should anything go wrong, at least the Governor, who had a helicopter, was well informed of our plans and the proposed schedule.

It was a tremendous relief to find the tea-chests and we proceeded to pack the kayaks. Each man put eight days food into his kayak and we sent another eight days food off with some members of the Cambridge Spitsbergen Expedition who were travelling with their own boat to Ny-Alesund the same day. Our plan was to have this standby food available after completion of the north-west coast journey. Eight days food does not sound much now but at the time it seemed incredible. Each day-pack consisted of two bags of food; the evening meal/breakfast and a separate bag for the packed-lunch. Each food pack had to pass through a seven inch hatch into the water-tight compartments fore and aft and the whole packing process took us from 11.00 a.m. until 6.00 p.m. Apart from the pack-ice problem and the roasting polar bears we now had a third worry; the carrying capacity of the kayaks. There had to be a limit to buoyancy and as we slipped the kayaks into the water it looked as though we had exceeded it! The sea was slopping about and water was washing across the spray decks. The centre sections of the kayaks were virtually awash and our kayaks looked like submarines! Ahead lay about thirty-six miles of fjord kayaking; hopefully the fjords would offer us some protection from wind. We left the shelter of the harbour and once out in the fjord paddled north east with a force four wind blowing on our port beam as we headed for Adventdalen. We felt very unstable and the sea felt cold. We all felt the seriousness of our situation. The kayaks were so unstable and sluggish, in a light wind it might be the shock of the cold water on the deck that survival chances would be very slim indeed, despite our neoprene hats. As a result of a capsise we intended to perform an eskimo roll, thus righting the kayak by sweeping the paddle along the surface from an upsidedown position. We felt that with a kayak weighing nearly two hundred and seventy-five pounds plus rucksacks on stern deck and BBC cameras strapped to the front decks our ability to perform a roll would be seriously impaired!

It was good to leave Longyearbyen and be on our way northwards although the transition was a serious one. If we had to concentrate very hard throughout the journey with these sharp cold winds then we would certainly have to take things steadily.

Our arrival at the north west tip of Adventdalen took about two and a half hours in which time we had covered about five and a half miles. Dragging the kayaks up the beach was a formidable task and required the co-operation of all four of us in order to lift one craft at a time. It would have been foolhardy to attempt to lift a kayak between two persons, as to incur a back injury at this stage could spell disaster for the expedition, let alone the pain and discomfort that this could bring about.

Eventually the tent was pitched and we all settled down to a nourishing stew supplemented with haggis, one of Scotland’s contributions towards the expedition. The light was difficult to adjust to even at 10.00 p.m.: it felt like mid morning. However, we did manage to get a good nights sleep.

During the next two days, we journeyed northwards towards the head of Billefjord some thirty miles away. It took nearly four hours from waking to departure time for us to pack the kayaks and leave from camp. No doubt we would improve! The journey northwards was fairly uneventful apart from one or two instances which stuck in the mind and struck serious notes.

It was at the end of the second day’s paddle, on the 23rd July, at the southern tip of Billefjord. We had paddled for about thirteen miles, including a choppy eight mile open crossing and decided to call a halt to the paddling at a point called Anservika. It was Keith’s turn to remove a food pack from his kayak. After opening his back-hatch lid he discovered that water had entered the food compartment. The compartment, which was carrying eight days food was

full of salt water. A quarter of the expedition’s food was floating in the back compartment; there was no extra food until we reached Ny-Alesund, over two hundred miles away! Fortunately Keith had done a very thorough job with packing the food, using a heat seal and then reinforcing the packing with a vacuum pack to double the layers protecting the food. The polythene had prevented the salt water from polluting the food. To ensure a water tight seal round the hatch, the only access to the watertight compartment, a seal in the form of a thin ring of rubber is compressed between the lid and the rim of the hatch opening. The lid is then kept in place under tension by a lever. It appeared that some grit had been trapped under the rubber seal forming a channel, that allowed water to enter the compartment. At least we hoped that this was the cause of the trouble and the next day’s canoeing confirmed it: it was quite a relief as only one pack had been ruined.

Our third day was to be the last canoeing day for some time. The head of Billefjord is landlocked and our journey to the sea on the north coast was via two large glaciers which had to be crossed. This had been anticipated and two Hansen-type sledges had been left in readiness in a hut the previous year by the Leys School Spitsbergen Expedition (Cambridge). Whilst approaching the head of this fjord in a very flat sea we spotted some white topped waves ahead which were preceded by an oily two-foot swell. It was a strange phenomenon which Sam and John had experienced this type of wind, known as katabatic, two years previously during the 1975 Nordkapp Expedition. It was a very strong and sudden wind which sapped our strength and slowed us down, reducing our speed of about three knots to below two knots. The wind was annoying in that it was throwing the sea up at us and we tended to get very wet, especially as we were so low in the water. We tended to paddle wearing the minimum of clothing in order to avoid the build-up of perspiration and any restriction to bodily movement. There was no question of paddling in this wind without our waterproof clothing on; we had to try and keep our waollen jumpers dry! Rafting together is never easy in a choppy sea, but fortunately, on this occasion, we had some warming and managed to don suitable clothing before the whitecaps reached us. After about three hours in this wind, which was a cold head wind, we reached land just south of our intended destination. Everyone was experiencing discomfort of one type or another, ranging from cold sore feet to an aching backside, plus hunger. Sam fished a rather fine fruit cake which Lynn Cook had made, from his kayak, and half of it was devoured in no time at all. Sam just managed to save half for another time, although we could have consumed all there and then. We had covered thirty-three miles and the hut, where the sledges were stored, was in view. This spurred us to paddle the remaining distance of three miles so as to finish with canoeing and hopefully enjoy the benefits of being out of a kayak for a few days, prior to the north coast section.

The hut, called Skottkenhytta, was a spacious shack with ample foreign food plus a good wood fireplace. It was suitably situated at the mouth of Ebbadalen, surrounded by some magnificent scenery, to include Mount Pyramiden in the south (below which is the Russian coal-mining settlement which takes its name from the mountain), and the impressive ridges to the north that blocked our view of the glaciers and Hildefjorden. The sledges were inside the hut although their condition seemed very suspect: it is just conceivable that they had been badly treated and misused by visitors to the hut during the previous long winter. The solid bunks and benches were real luxuries by comparison with the kayaks and camping and we relished in the delights of our temporary home. It was a great psychological moment; we had reached the start of the portage area; the canoeing had been interesting; the scenery was good and we had escaped injury; so far things looked encouraging.

Despite our intentions to call every fourth day a rest day, the fourth day was a change although hardly a rest! In fact, the old saying of ‘a change is as good as a rest’ certainly applied throughout the expedition. We always had the nagging thought that we should take full advantage of any good weather that came along so as to complete the portage in as best a time as
possible, just in case the weather turned foul whilst we were dragging the sledges across
the ice.

The weather on the fourth day was glorious. Before leaving the hut with the sledges
strapped to the stern decks of the kayaks, Gwyn 'Cool-Hand Luke' demonstrated the assembly
of the pump-action shot gun and encouraged us to familiarise ourselves with the weapon. After
a run through with the blank cartridges we all fired the real stuff, subjecting a bottle to
the hard lead. We felt reassured by our successes; smashing the target at twenty-five feet
(how can you miss at such a range?). We were not quite sure about our ability to cope with
a twelve-foot polar bear that might descend upon us, but at least we all had a rough idea
of how to assemble the gun and load it in case we should need to grab it in a hurry! It would
have been foolhardy if only Gwyn could operate the gun, especially if he was busy shovelling
a polar bear pay us a visit!

We loaded the kayaks with about half of the equipment and food plus the two Hansen-type
sledges strapped to the stern decks of two kayaks. The intention was to paddle up the melt-
stream to the snout of the glacier which we intended to cross. Hopefully we would return
by kayak down the river back to the hut and repeat this procedure the following day, with
the remainder of the equipment and food. The glacier, called the Ragndalen, was situated
four miles away from the hut. Judging from the maps and the aerial photographs that we used,
the approach to the glacier appeared reasonable, and we looked forward to paddling Merrily
back down the four miles after the work of this particular day was over. What a surprise we
got!

After a very short distance of paddling the kayaks up the bay, called Petunabakta, the
water became too shallow; although we managed to line the kayaks up the river, crossing from
one outwash stream to another. Our visible horizon was very limited and ideally we needed a
thirty-foot crow's nest so that we could look down on the vast delta and select the best
stream that would eventually lead to the main river that was gushing out of the glacier in
Ragndalen. An additional hazard was the sill; this alluvium acted like quicksand under foot.

On many occasions the only means of escape from getting trapped up to the crutch was to
turn around and haul the kayak up close and then heave the body over the deck so as to
transfer the weight from the feet to the kayak, which floated anyway! This was quite an
unnerving experience. The water was rather cold and we did not want to disappear in quicksand;
that is no way for a kayaker to go! Our navigation in this vast bay was a tough job and
eventually we realised that we were a mile off course. We needed to travel east with the
kayaks, across the outwash streams, instead of trying to go any further up then. Numerous
trips were made carrying the sledges, rucksacks and kayaks until we finally hit the Ragndalen
river. Despite the cold water running from the glacier, the wetsuit trousers and socks that we
wore were glued and sewn together making a watertight seal as high as the crutch; this
really protected the legs and feet from the cold just as long as we did not wade through water
that was more than hip deep! The final two miles of our journey to the glacier snout were
quite an experience; each man hauled, shoved and dragged his kayak up the meltstream which
became an exhausting battle as the depth and speed of the river increased. As we approached
the terminal moraine the river became a raging torrent and this final barrier forced us to
haul the kayaks up rapids that we would certainly be hesitant about paddling down! It was
more of a relief when we arrived in the still lagoon at the snout of the glacier; we were all
in a serious state of fatigue, which was partially offset by a sip at a miniature bottle of Cognac.
We had left the sledges at the start to the main river and these would be collected the next day. All that mattered now, after twelve hours labour, was to return to the hut and sleep. We decided to leave the kayaks at the glacier; there was no way that we
wanted to repeat today's performance, tomorrow: the dry pile clothing was hastily donned and

as midnight approached we tramped off over the hillside back towards the hut, four miles away.
All we wanted to do was to curl up and sleep, as walking seemed a great effort. However,
the day was not yet over. The Ebbadalen meltstream had to be crossed. A knee-deep made in icy
cold water was the last straw. The hut was a welcome sight and at three o'clock in the morning
we crawled into our sleeping bags. The light played a very small part in interfering with our
sleep patterns on this occasion. All that now remained was for each member to carry a full ruck-
sack up to the snout of the glacier and for the two sledges to be collected; then the expedition
would be established at a hundred metres above sea level, poised for the fourteen mile portage
to the north coast and the sea.

The following day started at about four o'clock in the afternoon and the weather was glori-
ous. Even the mosquitoes were out in force, causing minor irritation. The rucksacks were packed
for the final tramp up to the glacier. Prior to setting out we noticed that the perspex water-
proof housing, courtesy of the B.S.C., had salt water inside. Gently tapping the case revealed
that the glued seams had disintegrated; the box just fell apart! This was a tragic blow to our
plans, as we were hoping to shoot alot of film from the deck of the kayak during our travels.
It looked as though this put an end to that idea, although we did have a second waterproof housing
for the other camera, in the form of a flexible limb. Our rucksacks were extremely heavy,
probably in excess of eighty pounds each! Putting these unwieldy items on the back was a two-
man affair and it put considerable strain on the spine as well as on the straps. We repeated
the river crossing, although this time, Sam and John wrapped polythene bags over their feet in
an attempt to keep the toes warmer; it seemed a better idea than bare feet!

The approach to the glacier was deliberately slow and the river crossings were more than
frequent. On reaching the terminal moraine Sam and John deposited their sacks and descended
the valley to search for the sledges. On returning they found that Keith and Gayn had carried
their gear across to the kayaks on the far side of the glacier snout, running a shuttle service
with sacks half-way across the ice. Sam and John collected the sledges and had a practice-run
with the sacks on the ice, to see how difficult it was to use the sledges; they seemed to slide
better than was expected. Hopefully we would achieve the high point of the expedition tomorrow
with the kayaks, rucksacks and sledges at the top of the Ragndalen glacier five hundred metres
above sea level and about two miles away; hopefully the good weather would persist.

The 27th July was a magnificent day again; we had a good twelve hours sleep and after a
short session of filming we proceeded to load the sledges with as much equipment and food as
possible inside the rucksacks. The intention was to haul the sacks on the sledges for two miles
up the ice to the highpoint (col) and establish a campsite. Then, after a few minutes rest, we
planned to return and pick up the kayaks and drag them to the top of the col. Hopefully this
would be achievable all in one day, namely today!

We had no experience of sledging/hauling and there certainly is nothing romantic about it;
at least not without some dogs to help! We had designed a body-harness for the hauling and the
team split into two units in order to drag the sledges; Keith and Gayn hauling one sledge and
Sam and John hauling the other unit. Each pair was linked to the sledge on two different rope
lengths and with the aid of ski-sticks and crampons (sharp spikes strapped to the soles of
the boots) we managed to haul the sledges up the two miles in just under four hours. It was a
strenuous activity and the pace was very steady. After pitching the tent we felt fit enough to
descend the glacier again to the snout, which took a mere forty-five minutes, in order to pull
the kayaks up to the campsite. Sam and John decided to attempt the kayak haul without the aid
of the sledge although Keith and Gayn opted for taking their sledges down the glacier in
order to transport the kayaks. Their caution was understandable as their kayaks were brand new
and they had no way of knowing, in advance, just what effect the ice would have on the hull.
Sam and John had old kayaks and decided that, seeing as they had reinforced their kayaks, the
risk was calculated. Keith and Gwyn did find that the kayaks were a problem to haul on the sled and eventually opted to haul the kayaks on the bare ice with the sledge strapped on the stern deck. Sam and John found that the kayaks were a lot easier to haul than the sledge, and they even separated and hauled their own kayaks as they slid so easily. Keith, however, found great discomfort as a result of wearing the hauling harness, especially in the hip region, during this second ascent.

We all arrived at the col at a beautiful time of the day and the view looking northwards was memorable. It was midnight and the sun was in the north. Kjeldsfjorden glistened in the midnight sun. The glacier fell away gently northwards and, assuming the weather held, the journey the following day could be quite enjoyable. The faint white line which extended across the fjord was rather ominous; the pack-ice certainly was a long way south into the fjord. However, we calculated that it would be four days before we reached the edge of the pack-ice and hopefully by then the wind would have blown the ice northwards. The glacier running northwards, the Mittag-Lefflerfjøen, looked very attractive and we busily engaged ourselves in shooting film from all angles. We celebrated the single high-point with some Vat 69 and settled down in the tent for a good night's sleep. Our tent was perched at the edge of the glacier and was pinned down by rocks, as the fresh snow was barely two inches thick; the pegs would not penetrate the glacier ice. Every major muscle in the legs ached with the strain from hauling and the arms had also played their part with using ski-sticks. What lay ahead could not possibly be as strenuous as what we had experienced so far, or could it? The barometer had fallen four millimetres but everything seemed quite still and we thought nothing of this sudden change in pressure; it certainly was not going to interfere with sleep. Six o'clock in the morning on 28th July was and will always be the most disappointing day of the whole journey; the satisfaction of the previous night was very short lived. An extract from John's diary:

"I had been awakened by the sudden violent gusts of wind that seemed to appear from nowhere. They battered and shook the outer tent. The fly-sheet, in such a way that it seemed it would take off at any moment! I couldn't understand why the others weren't stirring! I suddenly caught a glimpse as the fly-sheet started to lift from underneath the rocks at the valance; something needed to be done immediately. I leapt forward and seized the rocks outside and fought to pin the sheet down. After a few frantic moments of swearing at the situation, although I dare say I was venting my anger at the others who weren't bothering to shift, there were shuffles from inside the tent. Soon I was joined by the others and the tent was temporarily subdued. I had forgotten, in my haste, to put something on my feet prior to dashing out onto the snow and ice and my toes were beginning to let me know it (my memories of frostbite from the previous year's Alpine season were still fresh). I was encouraged by the response made to my shouts, 'I think the fly-sheet's going to beat us to the end of the glacier, lads!'; and the sleepy companions were rudely awakened by the situation."

Sam struggled with the porridge whilst we all forced our camping clothing into the rucksacks. There was very little said; we were determined to get the 'hell out' of this location and escape the clutches of the glacier as soon as possible! It was starting to rain as we hurriedly packed the tent onto the sledge. The sledges were attached behind the kayaks and we made strides towards our destination, twelve miles away. The wind had abated but was this the tail before the storm? Everything seemed very wet. If nothing else we had been forced to make an early start for a change. It was very cold and suddenly our journey started to develop into a nightmare; perhaps we had selected the wrong country for a holiday after all! At 8.45 a.m. we set off in our pairs trying to pull two kayaks and a sledge between two men. The glacier was falling away to our left as we headed northwards; the sledges kept slowing down! As we tried to traverse the slope, it was important to maintain our height so that we would have a favourable descent once across the short section of the traverse. Sam and John were not making very good headway, so they settled for double shuffles; first taking the kayaks a few hundred metres and then returning for the sledge. This troubled the ground they had to cover although they felt
tearing at our abdomens and hips; rest were more and more frequent, and Sam and John walked miles doing 'double shuffles'. Keith and Gwyn managed to find sufficient energy to assist with the other unit's sledges, which was carrying extra weight so as to relieve the other sledge; the former sledge was now in a very sad state. Eventually, the ice surface, near the cliff, became so hobbled that we settled, after some strained discussion, for lining the kayaks down a melt stream and abandoning the sledges on the ice. After about twenty-two hours of hauling we reached the main melt stream. There were large chunks of ice tumbling down this river towards the sea. We floundered around searching for a place to launch the kayaks. Our minds and bodies were in a pitiful state. Had we decided to paddle down that river then no doubt we would have had serious problems in the event of a capsize, which seemed very likely!

Fortunately the group was still able to avoid this course of action and crawled towards the ice cliff, dragging the kayaks over a gently dipping slope towards the sea. The glacier had one last surprise; we dropped off the ice to the water's edge only to stumble into alluvial siltsand. Lifting the kayak with all the gear inside out of this quagmire was desperate. We looked like black miners. We bit hard at an iceberg that was stranded on the shore; the thirst was immense. Eventually we managed to launch the kayaks into the sea, some distance from the raging torrent, and within a few minutes reached a small hut by the side of the glacier. The fatigue was such that we could not find the energy nor muster up sufficient interest to cook a proper meal. We spent over twenty-four hours hauling in an attempt to avoid being caught camping up on the glacier for a second night and we had reached a state of fatigue that allowed us to lose interest in ourselves; it had been an expensive experience in terms of effort. We collapsed into the sleeping bags at about 7 a.m.

Our little hut was not spacious; there were two bunks and about five sq. ft. of floor space. However, we all managed twelve hours solid sleep and it was not until early evening that we surfaced to greet the day. Our first thoughts were about the little hut and the thought of having to reverse the last two days should be we prevented from escaping from the clutches of Wijdeveld, due to pack ice! At this point we felt that we would do all that was possible to avoid making such a decision, should the ice present us with a problem!

The 29th July was meant to be a rest day although everyone had things to do. Sam and Keith busied themselves with trying to repair the hole in Keith's kayak, while Gwyn spent a little time practising with the gun. It was a good opportunity to clean up the food containers, some of which had become so dented during the sledge-hauling that a fair amount of bulk food, i.e. jam, syrup and flour had leaked and merged into each other to produce a nice glue-like mess in the rucksacks and kayaks. Sam eventually lit a fire and was trying to dry out the BBC cameras. Both had taken a lot of water during the trip down the melt stream at the end of the portage. Fortunately he managed to save one but the smaller camera refused to respond to any form of treatment. The tape recorder, meanwhile was being its usual self and refusing to record and play back any sound whatsoever! It looked as though any film we managed to shoot would have to be 'nuke' and we were very doubtful of the sounds we had experienced being 'dubbed' back in the U.K. The cliff, near the hut, was constantly caving icebergs into the fjord; the terrors were shrieking at us and the wind was whistling over the top of the hut chimney. Even the most colourful ciconiophaela could not describe the atmosphere at this spot. Sam, the skilful pyramidac, managed to get the hut temperature up in the fifty degrees centigrade, and much of the wet equipment was quickly dried, and the team members lolled around inside what can only be described as the 'most northerly sauna-shed in the world'. Our morale was amazingly high again, especially after the rest day, and we looked forward to being back on the water again. The warmth and security gained from the shed had enormously beneficial effects. We now fully appreciated the value and efficiency of water transport; sad, in a way, that the canals did not last with the coming of the railways, as it is, after all an effortless way of transporting heavy weights - much more so than sledging and carrying.
We finally left the hut during the late evening of the following day and managed to shoot some film at the ice cliff, with kayaks bobbing around in the pool below. Our journey north was initially aided by another katabatic wind that was flowing down off the ice and pushing us northwards. The first stop in the fjord, at Austfjordbutten, was most welcome. The fifteen miles was just the right distance and we paddled up to a very welcome hut that proved to be a very comfortable abode for the night. The hut even had reindeer fur on the floor and a considerable amount of tinned food on the shelves. The hut was surrounded by wire which was staked just above the ground. At first we thought that it was for the huskies used during the winter, but we later discovered that it was a trip-wire system used to herald the arrival of a polar bear, so that those inside the hut could take appropriate action.

The second day in Wijdefjord was a very cold one; probably the coldest day so far. We had to cross the fjord to the west shore and the strong wind, probably force four to five, pushed us all over the place. We chilled very quickly at lunch time and there was a great incentive to seek the warmth and security of the kayak rather than sit on the shore shivering. The wind persisted that night and the campsite that afforded good protection for the tent was hard to find. The expedition finished off the last of the Val 69; a serious moment. On the 1st August we ran into our first pack-ice. At first it was like paddling amongst numerous lollipops that were jostling about alongside the kayak, but gradually the ice became more tabular and extensive. The flat sheets of ice grew bigger and bigger until there was more ice than water. We were still a day short of the northern end of the fjord; at last the ice had started to slow us down. The air temperature took a dramatic plunge every time we entered the ice area, and within a few minutes we found that our neoprene mitts and silk undergloves provided minimal protection against the cold. Wijdefjord seemed endless; it was a very cold place and the general sea temperature seemed to be much lower than the sea on the south side of the glaciers towards Longyearbyen. There was very little shoreline vegetation, seaweed was conspicuous by its absence.

It was on the third day travelling north in Wijdefjord that the packice stumped us. Our horizon consisted of a vast white plain. The only way of searching for a narrow channel (or lead) through the ice was to get up high. The shore line consisted of steep mountains and short planes that stretched towards the water's edge. A shingle peninsula nearby had attracted the ice and it had been piled up and pressured on to the point so that the peninsula looked like the inside of a collapsed ice box, only magnified, with great ice rectangles everywhere. After a short while of peering into the sun it looked as though the packice was 'fast' right across the width of the fjord, a distance of over six miles. However, there was a lead which ran alongside the shore. It was about three feet wide and the tide seemed to be flowing through this gap. Hopefully we could sneak through before the water shifted more ice across our path.

Our journey on this day was extended by the presence of the ice; the pack had collected close to the shore and this prevented access to the land. There was no alternative but to paddle until we saw a lead in the ice that we could paddle through to the shore. In fact, this last campsite in Wijdefjord was very impressive (see photo opp.). We were about seven miles from the northern end of the fjord and the ice was all around: the shapes and sizes were varied and the whole mass of ice was surprisingly mobile. There was a constant noise as small ripples lapped at the edge of the pack; the pressured blocks of ice, contorted and turned to incredible angles, seemed to be waiting for us to pass by and then tumble down and roll on top of us. We finally dashed for an opening towards the shore and erected the tent about six feet above what we thought was the high water mark. The tidal range seemed to be much less than that of other parts of the coast, and the whole region of our journey seemed to have little tidal range by comparison with the shores of the U.K. The sun was shining brilliantly to the north at about midnight and we spent a memorable night savouring the sights of this vast fjord. It was quite a picture: to be sitting snug inside the sleeping bag cooking the stew and at the same time to have such a remarkable view.
out of the door, with masses of pack ice, icebergs and mountains in full view. John’s diary:

“I was awakened the next morning by whispers from the south and an arctic fox that was about six feet away. It was a small creature, although I didn’t like the way he was tucking into a pack lunch that I had put out to dry. He was reluctant to shift despite the fact that I was ten times his size and armed with a few large rocks.”

It was a relief to see much of the ice along the shore had dispersed the next morning and it left the way north relatively open. Our journey was but a short one of about eleven miles round the northern end of Wijdefjord to Grauhunen on the west side of the peninsula, tucked inside Woodfjord. We quickly searched for the hut which was featured in Christianne Ritter’s book, ‘A Woman in the Polar North’, which tells of her experiences during a winter with her husband, hunting and trapping. The hut was well situated with a magnificent view across Woodfjord and was stocked with all kinds of treasures, ranging from Norwegian salmon in tins to seal meat that was ‘hanging’ and, judging from the colour, had been in the hut for many months! It was a spacious hut … well, there was room for two to sleep in the bunk, and sufficient space on the floor for two more!

We spent a good day resting, cooking and eating at Grauhunen. We had covered an important section of the expedition and had escaped the clutches of Wijdefjord and the packice. In the process we had managed to cross over fourteen miles of glacier with all our equipment and from here on we hoped that the ice would not hinder us, as we headed towards the west coast. Hopefully within a few days, we could be in Magdalenefjord. The thought of meeting the seals in Magdalenefjord was most appealing as the wintertime became unpleasant to put on each morning and the skin was feeling very clammy. The hut at Grauhunen was a great joy in this respect and it was a magnificent spot for a wash; to stand in a bowl of hot water and wash from top to bottom with the whole of Woodfjord in view. This luxurious experience was, however, slightly marred by the over-enthusiastic cameraman who wanted to record team members ‘starkers’, with a mountainous backdrop for the photographs!

Sam spent time making some bread which was a great change from dried biscuits. Another arctic fox visited us whilst at the hut. He looked very thin and quite small, and kept his distance although managing to find something to eat from our scraps!

It was depressing to leave Grauhunen; it was so warm and comfortable in the hut and we had to revert back and adjust to camping again. To add to the situation, the weather had deteriorated and it was overcast and cold. The packice had not finished with us yet and had swooped down into the fjord during the night. Our way west along the north coast looked blocked again. In fact, although the ice was extensive, it reduced the effect of the wind and flattened the sea to reduce it to a millpond. Again, the air temperature dropped dramatically as we entered the ice. We were not feeling very jubilant when we passed Velkompenten, the most northerly part of north-west Spitsbergen, at 79°53’. Now Sam encouraged us to celebrate with a quick sip of whisky. We hurriedly left this point and paddled west along the north coast of Reinsdalsflya. The packice became quite a problem and we opted for waiting until it dispersed. The coast along this coast, on the Raudstranda, was a very lonely place. The ground was flat and there were numerous still fresh water lagoons for obtaining drinking water. There were a few eiderducks and geese, possibly Brent or Polar geese, but apart from these the area was empty and eerie. Visibility was deteriorating rapidly and the packice was crumbling and growing out in the bay. If a bear was wandering around then we felt that this was the area where he was most likely to be. In fact, during the day, as we approached an iceflow, we saw a carcass lying on the top of the ice. There were a number of loose bones and a set of ribs and a spine still intact. We did not think it was human but felt sure that it was the work of a bear. It was agreed to sleep with the gun assembled and cartridge already placed in the repeater chamber. It was a good weapon to have alongside. This was also a memorable night on the expedition as it was the first night that we all felt cold at bedtime, despite the fact that we had two sleeping bags each!

Our departure was a bleak experience; the packice did not seem to be visible, but then we had only about thirty metres visibility. We had not been too pleased when navigating around mobile icefloes was even more trying. A lead would open for a few minutes and if one was a little slow or distant from the group then it was quite possible to get cut-off. It was quite encouraging when the mist lifted to find that we were on course towards Biscayponenten. Eventually the ice cleared and we felt sure that we had finally escaped the ice for good. It could not possibly last alongside us as we approached the west coast, as the Gulfstream current must influence the sea temperature; that is what we hoped!

Once round Biscayponenten the weather brightened considerably and we could see the whole extent of the northwest tip of Spitsbergen ahead. It was during this day that we first met contact with people, after over two weeks; and by some strange coincidence the people were English!

A small boat pulled out from Biscayponenten after we had gone past the point. At first we thought that it was heading towards Flathukken which was also our destination for the night; we did not want to share the hut with anyone else! The boat motored steadily parallel with us about three quarters of a mile away. Suddenly it turned and headed for us. At least we were going to meet whoever it was piloting the vessel. As the craft approached we were able to see that it was about twenty feet long and had two crew members on board. It looked as though we could out paddle it although when it turned towards us we decided to wait and greet it. We were a little disturbed by the craft as we had been alone for some time now and felt that we did not want to be bothered by man; after all, we had come on this trip to get away from it all! The boat belonged to the Cambridge Spitsbergen Expedition, and Brian Harland, the leader of all the work that was being undertaken by Cambridge University, was on board. John had made contact with Brian back in 1976 and they had been in contact with each other over the plans for the summer. He lifted his hat and bowed to us, offering us his hearty congratulations. Our progress so far had clearly impressed him and he felt proud that he had thought we had done well. We were invited aboard and made to feel most welcome with numerous brews of tea and bowls of porridge. The packice was a problem this year. Brian had spent many summers in Spitsbergen, starting way before any of us were twinkle’s in our mothers’ eyes, and he said that he had never known the ice to be so far south. In fact, they could not proceed eastwards any further and they were trying to make contact with a sister ship that had travelled much further east a few days previously, towards Ny-Friesland. This latter crew had made an entry in the log at the Grauhunen hut and we relayed this information to Brian. It looked as though his plans for the summer had been well and truly thwarted by the ice this time and we felt a quiet sense of achievement in that we had managed to manoeuvre our small kayaks where larger ships were reluctant to venture. However, we had had a number of anxious moments as well; not being quite sure whether or not the sea would be totally blocked off by the ice each morning when we woke! Being so close to the ice in a kayak made us feel very vulnerable; if a thousand pound polar bear came bounding across the floes towards us our chances of escape would be restricted, and we were not able to paddle with the gun assembled and loaded as this would expose it to the salty environment which would certainly increase its chances of jamming! We finally said farewell to Brian and his crew, having offered as much information about the extent of the ice to the east, that we had available, and made for the final point on the north coast, Flathukken. The hut was certainly ‘flat’, and as such as of little use for an overnight rest, so we finally turned the corner on the north coast and headed for Kapp William, three miles to the south-west.

Kapp William was a very isolated yet friendly site, well sheltered from the winds off the sea. It was tucked neatly behind a peninsula and the hut looked reasonable, although we had certainly seen better looking huts!

Sam quickly surveyed the hut and thought that it would do; after all, it had the bare necessities, a roof, a fire and some benches under a table. Unfortunately, the fire lighting
got a little out of control. The chimney started to glow bright orange and a few items of clothing suffered a severe scorching. The fire would not stop roaring, so the only escape, before the hut caught light, was to shovel some of the hot coals out into the fjord. It was something different; a one-armed backless canoeing sweater, and a coal fire next to icebergs on the beach!

Our journey down to Magdalenefjord took two days from Kapp William and was one of the most impressive experiences of the whole journey. The weather was crisp and cool yet the skies remained very clear. The views down Smeerenburgfjorden were fantastic; massive glaciers, many of which, like the Kennedebreen, were hanging over the sea, made one feel very humble and fortunate to view this remarkable country in such a light. One glacier, the Frambreen, had been named after Hansen’s ship, and stretched like a large tentacle from the ice field down to the fjord.

The last night before entry into Magdalenefjord was spent at Tyroldkammen, which was an old whaling station. It had also been used as a radio station by the Germans during the last war. This hut, situated on the south side of Sorgaetet, opposite Danskaoya, was surrounded by fascinating items from the past. There were numerous whale vertebrae, measuring over twelve inches in width, and old hides where whales and seal were hauled onto the shore and cut up before being sent for processing in the mother country. In fact, we found a wooden barrel that was lying smashed open on the ground with long strips of what was probably seal meat inside. It looked in reasonable condition although we could not guess how long it had been there, as it seems as though the rate of decomposition in arctic regions is much slower than in temperate zones. We were not so hungry as to try it!

Magdalenefjord was everything we had been led to believe. A remote fjord of outstanding natural beauty; unspoilt by man and full of jagged mountain peaks and ridges with many glaciers calving into the sea. It was a beautiful day too, which made the whole place stand out. We spent nearly an hour on its northern shore, eating lunch while trying to take in the vast panorama. It was the first time that we had sat down for more than ten minutes for a lunch break, and the sun was so warm that everyone stripped to the waist, for the first time, including Keith! At the eastern end of the fjord, which was about five miles away from the coast, we met a party of six French skiers who had successfully skied from the northern side of Isfjord (across the water from Longyearbyen) to the most northerly tip in the north west, called Flathukken; they had been at the tip two days before us. Our French is not so hot; neither was their English! From what we could make out, they were waiting for a boat to arrive and take them back to Longyearbyen. It was strange how we did not really want to spend time with them, nor they with us. It was not like man meeting man after a long period of isolation. We probably felt that this was ‘ours’ in an odd way and that other people in the area made the idea of total isolation seem lost. However, they were cheerful folks; we did not envy them camped right below the end of the Weggomaybreen glacier, as it seemed a very active ice cliff. For posterity’s sake we visited this formidable cliff and shot some of the BBC’s film. From John’s diary:

"I remember looking at the three kayaks through the view finder and suddenly there was a crash like thunder as a large section of the cliff collapsed into the fjord. From my position it looked as though my three companions were going to have quite a ride. The advancing swell looked enormous but fortunately it was a gentle wave, probably about seven feet high, and not breaking."

The French skiers had seen no trace of the alleged polar bear so we opted for camping in the fjord, about half way in from the sea, on the south side at Trinityhamna. The journey was going very well; we had managed one hundred and sixty five miles to the Magdalenefjord area, and we all felt well. It was agreed to spend two full rest days here and hopefully try and include some mountaineering.

On our second day we paddled north across to the far side of the fjord for a couple of miles and disembarked below a rather impressive mountain that had caught our eyes a couple of days previously. The kayaks were left on the shore, and we tramped off up the glacier towards
Alkekonen, the summit. We decided to include what appeared to be a short ridge as part of the approach to our summit and we traversed the glacier towards the western end of the ridge. It was grand to be walking instead of sitting upright in a kayak. After six hours of some very tiring scrambling and climbing of heavily shattered pinacles, often referred to as ‘grendines’ we reached the col below our mountain. The way ahead looked torturous and extremely rugged. The descent section looked harder than the past ridge. We had been deceived by the terrain. After some food it was thought prudent to descend to the glacier and return to the tent. The descent was interesting; cramponing down the glacier ice (thirty degrees gradient) without an ice-axe!

Keith had brought his axe and at this point we would have all liked one! However, there was nothing for it but to just sit back on the heels and trust that the crampons bit into the crusty surface. There were one or two small bergshrund crevasses to cross but these were no problem. We did run into a series of interesting footprints in the snow during our descent which could have been either reindeer or from a bear, as there was unlikely to be any other creatures wandering around. After a hasty glance over the shoulder we descended smartly to the shore and quickly paddled towards the tent.

It was our last night in Magdelenefjord. We had paddled well so far and we discussed reaching Ny-Alesund earlier than expected and possibly finishing our journey there, if it meant that we could arrange shipment of equipment back to the U.K. and an earlier flight for ourselves. In our initial plans, we had included Ny-Alesund as an early finishing site, instead of paddling another 90 miles down the coast to Longyerbyen. We had a dilemma; the last steamship leaving Spitsbergen was on 20th August. Our flight was reserved for 30th August but we would have to leave the kayaks and equipment out in Spitsbergen for a year until the sailings commenced again in 1978!! We wanted our kayaks and gear back this year; the discussion was left open and we decided to chew things over during our paddle down to Ny-Alesund, which was about three days or so away (forty-six miles).

The weather was deteriorating and by the time we came to leave Magdelenefjord the weather, although initially bright, was rather cold. In fact, once out of the fjord we only managed to travel for five miles in a southerly direction before the wind forced us to halt. This section of coast down to Ny-Alesund, and to some extent beyond, was a very exposed section of the journey, with very few places to land. It would involve sections of twelve miles or more before there would be a landing suitable for the kayaks. If we had strong winds and a swell then the landings could be quite tricky.

We spent the remainder of the day in Harburgbukta, five miles south of Magdelenefjord. It was a very sheltered bay with only two interesting things to see. We discovered a very dilapidated hut, which badly needed a roof. It had once belonged to an old British mining company, the Northern Exploration Co. Ltd. This company had attempted to excavate for minerals and had found marble in the area. However, the venture only lasted a few years and ceased its activities by 1930. Gwyn found some old shallow graves similar in fact to the three we found back at our campsite in Magdelene fjord; called Tryndhamna. The frost had partially exhumed the coffins along with a skull or two! There were also a number of what appeared to be valves skulled kicking around the hut.

The next day, 11th August, was quite a day. The strong force five wind from the previous day had died and there was now very little wind, apart from a slight breeze. We could head south at a very reasonable pace as the light breeze was from the north. The previous day it had been howling from the south.

Whilst out at sea on this lonely section across Sjübre Renken, we had a visit from two Norwegian salmon fishermen who were motoring south from Danskaja, towards Longyearbyen. They chatted for a few moments and then departed. We had decided that this section could mean that we would not be able to land for over twelve miles, and should the wind pick up it could be much longer (about four hours). As a precaution two pack lunches were at the ready for a long day on the s-•. As the journey progressed, we experienced an awkward southerly wind; despite this we managed to travel for about twenty-one miles to Lyseren. The sea had become very choppy during the day and water was splashing deep into our clothing. Even the wetsuits had pools of water in the boots! The hands and fingers were looking quite grim with paddling and getting so wet, day after day; our backs were aching non-stop and one or two neck and shoulder muscles were demanding a rest.

Lyseren was an exposed site situated some twenty-seven miles from Ny-Alesund. The foreshore was covered with shale and slate. The tent pegs would not hold in the ground so the tent was pinned down with rocks. The wind became quite gusty and we feared for the tent. The next day Keith tried really hard to show us what fun putting on freezing wetsuits was, but he was too quiet after a few minutes when the damp cold had been given time to numb his senses. The weather was certainly grim and by the time we reached Kapp Mitre, we were more than ready for lunch. The food was in a bad state as a result of the vacuum packing. The Mars bars had shrunk, forcing the paper in close against the toffee on the top layer. It did not seem to matter any more, as the paddling was taking so much energy, and a fully wrapped Mars bar went down surprisingly well!! We huddled like shivering fugitives at Kapp Mitre, the beach afforded little shelter from the driving westerly wind. The twelve mile crossing to Kongsfjordneset seemed unending and the kayaks shewed 'all over the shop', both with and without the skegs (a detachable fin designed to add to the directional stability of the kayaks). A high water camspite was our only sheltered spot on the shore below a ten foot cliff. It was Keith's birthday after midnight. Gwyn, our first-aid man, thought that we were sufficiently close to Ny-Alesund (seven miles east) that a frostbite case or a major surgery victim could be treated there quite adequately. He fumbled around in the first-aid box and removed the anti-exposure surgery medicine, a silver hip bottle of malt whisky and for a few moments everything seemed fine. Whilst sitting in the tent at Kongsfjordneset we watched a couple of fishing boats steam up the fjord towards Ny-Alesund; they made our expedition seem a bit of an anticlimax, especially after what we had experienced. We were no longer quite so isolated and dependent on ourselves. Was it going to be like this all the way to Longyearbyen? Our thoughts quickly reverted to the discussion we had had back in Magdelenefjord about considering the possibility of finishing at Ny-Alesund. Our bodies were certainly feeling tired and beginning to show signs of injury that needed healing - whose would not? Was it worth risking a disappointing end to our otherwise successful "holiday" by pushing on south regardless of the deteriorating weather conditions? There were also other factors to consider, namely that the scenery on the map did seem a little supplementary to what we had seen up to this point. If we halted at Ny-Alesund there was a good possibility that we could ensure a safe return of our kayaks and equipment and the extra time would be welcome prior to starting employment again for the autumn term. We all agreed that it was possible to ship our equipment from Ny-Alesund this year, and if it was possible for us to secure some form of transport to Longyearbyen from Ny-Alesund, so as to catch an earlier plane home, then we would terminate the expedition at Ny-Alesund. We had quite a few "iefs" on arrival at Ny-Alesund, but circumstances eventually were more helpful than we could have imagined.

Could 13th August be the last time we would be donning these desperately cold wetsuits? We hugged the cliffs for protection as we paddled towards Ny-Alesund. The small town looked very still. Ny-Alesund has a very small summer population of about fifty people. The two fishing steamers that we had seen the previous day were tied up alongside the pier. The pier was undergoing major structural repair as the previous winter's pacific had destroyed the central section completely.

We were greeted by members of the Cambridge Spitsbergen Expedition; they had a hut in the town. They invited us to their accommodation and this was more than welcome for it was good to make contact again and to hear that all was well with their boats. Everyone had returned safely.
from the north east since we last met off the north coast. After a brief discussion the following morning with a pilot of a six-seater plane who was flying back to Longyearbyen at 13.00, we hurriedly packed the rucksacks with camping equipment for two days' camping in Longyearbyen. The kayaks were left on the quayside at Ny-Alesund for a coastal steamer destined to call in before returning south, in a few days' time, and we clambered aboard this tiny plane and headed south for Longyearbyen. The Cambridge crew kindly offered to ensure that the kayaks were put on board the coastal steamer in our absence, and we left Ny-Alesund on a spectacular flight over many glaciers and mountains that made textbook shots of such features seem very inadequate. It took just forty-five minutes to fly the fifty miles across to Longyearbyen. It would have taken us over eight days by kayak.

The two-day stay in Longyearbyen was long enough; we managed to secure the kayaks a safe voyage to the U.K. after a somewhat difficult phone call to Bergen, and we had seats booked to fly out two days after our arrival from Ny-Alesund. We left Spitsbergen on 16th August and touched down in the U.K. on 17th August.

APPENDIX 1

METEOROLOGY REPORT

By Keith McDowell

Information sources concerning details of the north west Spitsbergen area were at first sparse but with further research, relevant statistics started to appear. Peter Deeks of the London Weather Centre gave us an enormous amount of assistance by supplying copies of published averages (means) of temperature, pressure, sunshine, precipitation, relative humidity, and frequency tables for wind speed and direction. In a later communication he sent us information regarding daily weather forecasts issued locally and suggested we contacted the Norwegian Meteorological Office in Oslo for further details. This was done with special reference to visibility and fog frequency, day and night variations and tidal information. As regards the local forecasts a radio receiver was necessary and so this was of no use to us.

From the information gained we started to build up an idea of the conditions we were likely to encounter and hence could think about the types of clothing and equipment that would be required throughout the expedition. The picture was one of mild but damp conditions. Statistics showed we could expect large amounts of low stratus cloud with a high humidity rate giving light but continuous drizzle. Winds would be of moderate strength, force three on the Beaufort Scale for July, and increasing slightly in August; the predominant directions would be from the north-east and south. On the brighter side we could expect twenty-four hours of daylight until late August, with temperatures of five degrees Centigrade although on average only one day per month with clear skies and temperatures reaching a possible maximum of fifteen degrees Centigrade.

The statistics were based on information from two weather stations; Isfjord Radio and Longyearbyen which are less than twenty-five miles distant and on almost the same latitude, 78'04' North and 78'13' North respectively. The expedition planned to travel around part of the north coast of Spitsbergen reaching almost 80' North and hence how relevant the research would be was in doubt. General climatic conditions gave us some insight, for example, the higher the latitude the greater the range of cloud cover, so we could only presume that general conditions would be similar, although some details, i.e. wind strength and direction, would be influenced by local factors, such as fjords and the glaciers which could have a 'katabatic' effect.

A further consideration of the north coast was the pack-ice. Due to the influence of the North Atlantic Drift and the West Spitsbergen Current, the extent of Arctic Ice is pushed northwards throughout the summer, giving free water access. However, the ice front is very mobile and can drift up to ten miles a day under the effect of wind. The Sea Ice Unit of the Meteorological Office in Bracknell, Berkshire was very helpful, supplying us with Sea Ice charts of the North Atlantic showing the recession of the ice front. Spitsbergen suffered a severe winter during 1976-77 and consequently the north coast was ice bound well into the summer period, although the rate of recession, once started, was more rapid than usual, and it was hoped that conditions would be normal by late July.

Throughout the venture a weather fog of twice-daily observations was kept and on return to the U.K. the Norwegian Meteorological Office was contacted for the weather statistics for Longyearbyen, to be used to compare with our own findings. We intended to take readings of pressure, temperature, wind strength and direction, precipitation, cloud cover, visibility and sea temperature. Readings were basically by observation only and hence cannot be considered as absolute. We set out with two measurement instruments: the first was a barometer altimeter obtained from the Survey and General Instruments Company Ltd., Kent, at a reduced price and also a thermometer. The former was taken not only to give a pressure reading for use as an indicator of changes in weather patterns, but also to give readings during the portage and mountaineering to assist navigation, should poor
visibility prevailed. Readings were consistently on the high side when compared with those issued by the Longyearbyen office, with a maximum pressure of 1040 millibars at sea level! However, the pressure-graph correlates extremely well although our readings are, on average, five millibars higher (Fig. 1). The maximum-minimum thermometer was to be used to take air and sea temperatures, readings for the latter to be taken at the surface and at a depth of three metres, but unfortunately Keith sat on the instrument on the second day of the expedition, and it was laid to rest in the middle of Isfjord.

The weather we experienced was generally better than expected, with two long spells of good weather. The first began on the third day of the journey and lasted for four days, to coincide fortunately with the portage across the glaciers. The second spell again lasted for four days with a short relapse on the morning of the third day, and coincided with the time spent in Magdalenefjorden. For the rest of the time, cloud cover was almost entirely seven-eighths or eight-eights of low lying stratus; at times as low as 150 metres. The two spells of good weather were also indicated by the temperature statistics recorded at Longyearbyen with maximum temperatures of 13.2°C in each case. It is also interesting to note that the daily maximum temperature on almost 80% of days was given at 1800 hours and correlates with a reduction in cloud cover throughout the day, as one would expect with twenty-four hours of daylight (Fig. 3). Relative humidity, as given by Longyearbyen, varied from a minimum of 42% to saturation, averaging 78% overall and resulted in fourteen separate days with precipitation, some of which, however, accounted for a small percentage of the total recorded rainfall of 27.1 millimetres in Longyearbyen; 50% of the rainfall fell on three days.

As expected the correlation for wind speed and direction shows little significance between our readings and those at Longyearbyen, and this, presumably, is entirely due to local features and situation. On a number of occasions the winds we experienced could be attributed to either tunneling down valleys or katabatic winds blowing down glaciers, or even a combination of the two. From the highest point on the portage, for a spell of five days which took us well north in Hjødefjord, we had southerly winds throughout, at times up to force five whereas Longyearbyen, for the same period, was subjected to both easterly and south westerly winds, but nothing from the south. In Magdalenefjorden we appear to have been very sheltered with force two winds from the south east whereas Longyearbyen experienced winds of up to force six from the same direction (Figs. 4 and 5).

The greatest concentration of wind observations we recorded was from the south and south east which agreed with information sent from the Sea-Ice Unit for the same period: the latter information was gained from satellite photographs. During early August we spent five days paddling through ice floes and this is confirmed by the sea-ice chart. The rapid recession of ice following the winter is due to the West Spitsbergen Current which was about one degree centigrade above the normal during the summer of 1977. Ice was completely cleared west of 12° E. Satellite evidence suggests surface winds were light southeast during the period with air temperatures about two degrees Centigrade above the normal. This maintained the edge of the close pack-ice slightly north of its usual position with open pack-ice between 87° N and 87° 10' east of 12° E.
The Kayak

Nordkapp Sea Kayaks were chosen as the most suitable craft available at the time of the expedition. John and Sam had already paddled Nordkapp's on their expedition to Nordkapp, Norway in 1975. Keith and Ossy purchased new boats from Valley Canoe Products of Nottingham. All four kayaks had the now standard 7" alloy hinges fitted in bow and stern decks. All the other adaptations were made by each individual to suit their own needs and the needs of the expedition. Certain basic fittings (many as a consequence of the Nordkapp expedition) have now become recognised as standard for sea-going expedition kayaks. These were as follows: bulkheads; making sealed stowage compartments in the bow and stern, entered through the watertight deck hatches; a bilge pump fitted just aft of the cockpit to enable quick and efficient emptying of a waterlogged cockpit area; deck lines from bow to stern on either side of the deck, fixed securely through tubing fibreglassed onto the underside of the deck at four-foot intervals; a towing line and quick release jamming cleat; and a recess for a gimbaled navigating compass fixed to the foredeck near the bow of the kayak. Elastic fittings for maps, spare paddles and other deck equipment; strong lifting toggles at bow and stern and a feature, not so common but very desirable, a recessed deck container just aft of the cockpit and flush with the deck. The containers to fit the recesses were made up professionally for the expedition by Hunter Plastics Industries Ltd. from six inch water piping with screw top lids. These were used to carry food and other 'on the water necessities'.

One major adaptation of the kayaks was the use of the cockpit area for stowage of equipment. A half seven-inch round tube was fibreglassed to the underside of the deck in front of the cockpit and large enough for the team to carry between them; the tent, an emergency bivy tent, a twelve bore shot gun and first aid equipment all situated between the legs, but suspended from inside the kayak. The tubes also made superb knee grip for control of the kayaks. Beneath this tube was another tube to carry a vacuum flask. Entry and exit of the cockpit was restricted surprisingly little whilst adding considerable space for equipment.

Deck lines on the kayaks proved invaluable. Then fully loaded each kayak weighed over 275 lbs. and four of the team were involved in lifting each kayak up the beach at the end of a day. During this operation the deck lines took the full weight of the load. They were made of 8 mm. diameter multiplait pre-stretch terylene with a breaking strain of 1015 kilograms and thick enough not to leave a groove across the fingers when lifting. The deck line was also a backup rope for hauling on the portage, should this be necessary.

The two older kayaks (that is John's and Sam's) having endured one expedition and two years British sea canoeing were due for a 3,000 mile service. They were therefore duly strengthened down the keel line with an extra thickness of four ounces of fibreglass. This made them very durable paddling up onto shingle beaches and in particular dragging them over the portage.

Skeg Fittings

To design the ideal sea-going kayak to suit all conditions is an impossible task. All present kayaks, including the Nordkapp, have their faults. Turning to windward seems to be its major drawback. In an attempt to alleviate this problem the expedition experimented with a vertical dagger skeg, the theory being to give directional stability even in a choppy sea where the stern lifts free of the wave. The idea matured through Rick Abbott, author of The Science of Surfing, intended for surfers, on waveology and aerodynamics of the surf board. The skegs were reasonably successful but could only be used in water sufficiently deep for their seven inch length and were a nuisance to take on and off when going ashore. The skegs were made by sheathing a polyurethane plug with fibreglass and though aerodynamic they still caused drag due to the sheath fitting around the stern of the kayak. The foam allowed them to float should one be dropped into the sea.

Paddles

Breaking your paddle on an expedition is like losing your axe on an ice climb. They were of vital importance to our success and survival. Strength, durability and lightness were the criteria we sought. These qualities we found in paddles made by Lendal of Scotland who kindly donated four paddles. The blades were asymmetrical and of the new Lendal construction, the spine of the blade being moulded inside the laminate giving an extremely strong section for both forward and reverse paddling. The edges of the blades were additionally protected with cloth tape. The blades were inserted into a one-piece fibreglass loom with extra long oval handgrips to allow movement of the hands along the loom. The strength of these paddles was demonstrated on the portage when John's fully laden kayak overturned onto the paddle, the loom and blade flexed and then confidently sprang back into shape when the kayak was righted. Two sets of Lendal split paddles were carried as spares on the rear decks of two of the kayaks, fortunately remaining there for the duration of the expedition.

Nautical Equipment

Maps

A very limited range of sea charts and land maps were available to the expedition via the Admiralty and Norsk Polar Institutett, Oslo. All the area to be visited had been mapped and although the information was accurate the detail on the map was comparatively sketchy. A complete Spitsbergen chart was available with a scale of 1:823,000 and two maps covering the entire area with a scale of 1:500,000. Some of the area was covered by charts at 1:100,000 and all the area by maps produced by the Norsk Polar Institutett at 1:100,000. A map of the portage area was also available at a scale of 1:125,000 (courtesy of B. Hartland, Cambridge University). On the larger scale maps, which were of course the most useful, all the detail was in black and the legend included contours at 100 metre spacings, spot heights on major summits, major streams and main valleys. The extent of the ice and glaciers was marked with fine dots and ice-free deltas and mud flats were hatched with horizontal dashes. The only coastline detail was a continuous black line, with no details of deterioration from either water or temperature.

In addition to the maps a set of aerial photographs of the portage area were obtained from the Norsk Polar Institutett. These were mounted on card and sandwiched between Transpaseal and was supplied by Westwick Stationery Ltd. The maps were waterproof, very durable and showed no signs of deterioration from either water or temperature.

In conclusion it is reasonable to state that the equipment used functioned very well. The
major fittings to the kayak had been developed two years previous to this expedition. Although the kayak functioned well, the expedition kayak is still far from ideal: no doubt further developments will take place as a result of the numerous expeditions now using this craft for advanced journeys.

APPENDIX 3

CLOTHING

By Sam Cook

Considerable experimentation and thought went into the choice and design of clothing for the expedition. The environment was to be cold and wet, packing space would be limited and we had the additional problem of the portage requiring clothing suitable for mountaineering.

CANOEING CLOTHING

(a) Wetsuit

Neoprene rubber wetsuits were made to our specifications by Secondskin Wetsuits of Braunton, North Devon. Several special features are worthy of mention. They were a long trousered garment with elasticated nylon shoulder straps giving complete freedom for arm movements. Having experienced difficulties in the past with cold hands and zip fasteners, a horizontal Velcro flap at the crutch gave easy access in order to pass urine and was very successful, particularly when sitting in a kayak. Double lined neoprene socks were attached to the suit making a water-tight garment up to the crutch. This enabled us to stand in water up to our crutch without getting wet and to walk up the meltwater river on the portage without undue discomfort. A combination of single and double lined 4 millimetre neoprene was used, the seams of the garment being waterproofed by gluing and blindstitching them. The suit was double lined on the feet, the inside legs from the middle of the calf upwards and around the backside. Apart from the inevitable discomfort when dressing for canoeing, the wetsuits proved successful: far more comfortable than any previous neoprene garment members had used.

A variety of Damar, woollen and nylon-pile garments were worn underneath the wetsuit on the upper body, normally two being required to achieve adequate warmth.

(b) Spraydeck

Whilst the main function of this garment was to prevent water entering the cockpit area, it was also used as clothing for the upper body. Dissatisfaction with the quality of the professionally made spraydecks produced for the Nordkapp expedition (designed originally by team members) led us to make our own. We finished with a 3 millimetre neoprene rubber vest/cockpit cover, water-proof around the seams and made-to-measure round the chest where comfort was a matter. Proofed nylon spraydecks were taken as spares and as protective covers for the neoprene decks. To reduce the possibility of the neoprene tearing around the cockpit coaming, the latter was covered with a rubber sleeve, thus increasing the diameter of the curve and reducing the abrasiveness of the edge of the fibreglass.

(c) Buoyancy Aid

These were donated by the Wild Water Centre, Glasshouses, North Yorkshire. They were the new standard, post Nordkapp Expedition, sea canoeing jacket manufactured by the firm. A shortie jacket with front opening zip fastener, large pocket on the back to carry an easily inflated life-jacket and pockets on the front to carry flares and other bits and pieces. The pockets on the front were made to fit the flares we carried.

(d) Canoeing Anorak

These were custom-made for the expedition by The Atholl Asbestos and Rubber Co. Ltd., Stockport, Cheshire from a material called Brislene. The nylon backing on this material made the anoraks much warmer than the conventionally proofed nylon canoeing garments. Several other features were incorporated into the design which proved to be very successful. A front opening zip allowed easy donning of the garment whilst on the water. This combined with a press stud flap gave a reasonably effective watertight seal. The cut of the garment was purposefully large
to allow it to be worn over the buoyancy aid, making dressing on the water easy and allowing the warmth of the foam in the buoyancy aid to be used effectively. As the anorak was to be both a canoeing and a mountaineering jacket a hood was of vital importance. This head protection was in fact used on both land and water.

Protection of the hands was also of considerable importance on this expedition, yet years of experimenting had never found any positive or satisfactory solution. However, some ideas did materialise and the anorak sleeve was designed to combine with an overmitt, a long over-glove extending to the upper arm. These mittens were pushed up under an additional sleeve on the anorak and held in place with Velcro.

Other features of the anorak are normal for canoeing garments, namely, Velcro fastened mandarin collar and cuffs and the short length in the body fastened tightly at the bottom with a drawcord.

(c) Protecting the body's extremities

Whilst it was relatively easy to retain body warmth the extremities, head, feet and hands were a major problem with regard to equipment. Nothing on the market was suitable for the wet/cold conditions we expected to encounter. Once equipment became wet it would stay wet so it had to be effective under such conditions.

The Head - The easiest of the three areas to protect, the conception of the expedition also heralded the start of the fancy hat competition. All the team manufactured their own neoprene rubber hats and though rather bizarre in appearance, were functional and very effective. Keith had a straight skull cap making him look like an Egyptian Pharaoh, whilst John and Sam had waterproofed brims and pull out neck protectors attached - along the lines of the 'High Planes Drifter style' - with ear muffs.

Feet - These are the most inactive part of the body whilst canoeing and because of the direct contact with the hull of the kayak were potentially very vulnerable to the cold. In addition to the wetsuits socks attached to the wetsuits already mentioned, home-made slippers were constructed from closed-cell polyurethane foam (more commonly known as Karrimat). The insulation afforded by these slippers was considerable. To complete the canoeing footwear kneelength overboots were made from neoprene-proofed nylon material with inner sole rubber soles.

Hands - A variety of hand protection was used. Long overmitts, previously mentioned, were made from proofed nylon with brattlene material stuck to the palms to give more grip on the paddle. These were worn by themselves or with silk or nylon gloves. Neoprene mitts were also found very useful, they were specially made from 3 millimetre double lined neoprene with single lined material on the palm to give better grip. One, or a number, of these gloves were worn on most canoeing days, particularly near ice or in windy conditions. Even a light breeze had a considerable chilling effect on the hands and although the gloves were bulky they were not uncomfortable for paddling.

Keeping canoeing gear dry was a main consideration when designing the equipment, for instance the neoprene socks attached to the wetsuits, overboots and long nylon boots. How successful this was and what the insulation properties of wet gear would have been over a long period were difficult to estimate as damp gear could be dried out in the occasional huts we used. It can be said, however, that the canoeing clothing was comfortable and effective.

LAND CLOTHING

Not only did we venture into a cold climate to canoe but mountaineered both as part of our journey and incidental to it. Three main factors were evident when considering the clothing to be worn on the land: once clothing was wet it was unlikely to dry out in that climate; it would be necessary to have more than one change of clothing; land clothing would have to be packed in the kayaks and space was at a premium.

Full advantage was taken of modern fabrics which are quick drying while still retaining their insulative properties when wet. The clothing consisted therefore of thermostatic underwear (Damart), a nylon pile suit and a duvet. Two sets of Damart underweare, comprising long-sleeved vest and long pants were taken by each team member. These were found to be snug, comfortable and able to be worn on their own in moderate temperatures. A piece nylon pile suit was specially designed and produced for the expedition by Tuiloch Mountaineer Ltd. This was very snug fitting and warm and comfortable to wear. A full frontal two way zip and a moon-shaped rear zip were invaluable for a quick dash in cold temperatures. The suit packed into an amazingly small size and the one piece garment avoided cold spots in the lumbar region. It is a ply nylon pile is not more windproof. The Damart combined with the pile suit provided an exceptionally warm outfit. Unfortunately, man-made fibres do have the tendency to smell if worn for any length of time without contact with hot water and detergent. The only consolation factor was that we all smell!

The duvets which were made especially for the expedition by Mountain Equipment were filled with P3 terylene fibre and incorporated several design features suggested by the team. Again close fitting with a full frontal zip and press stud for the front, another line of press studs and a belt allowed an even tighter fit if required. Using the belt as the only fastening the jacket could be worn loosely allowing ventilation at the front; a crutch strap prevented the elasticated bottom from riding up. The outer material was water-proof and not quilted with the rest of the garment. Although not as warm as a down duvet it was ideal for a wet cold environment.

The head and hands were catered for with the hats and gloves used for canoeing with the addition of Dachstein mits and woolen Balaclavas.

Footwear - The information gleaned about the portage area indicated that it would be wet, and any snow encountered would be wet and slushy. This was indeed the case. Boots would be essential and we decided on some form of rubber boot that would give us protection from the wet, as one of the team had already experienced frostbite from having cold wet feet. Unfortunately we could find nothing suitable until a Swedish company, Stockensten i Grange AB, gave us four pairs of their mountaineering boots. These proved to be highly successful; they were a leather boot extending upwards to the calf muscle with a large bellows tongue and lace up front. From the ankle to the sole the boot had an outer layer of rubber and the sole was a Klettershose. We found the boots water-proof and comfortable. They were too flexible for anything other than walking but did enable them to be packed more easily.

Apart from woolen socks we also used neoprene rubber socks during the portage and a pair of home-made proofed, nylon oversocks that were worn inside the boot and extended up to the knee. This combination kept the feet warm and comfortable.

Waterproofs - The canoeing anorak was designed with mountaineering in mind, it was combined with a pair of over-trousers. Because of the short length anorak the over-trousers were full salopettes with shoulder straps. They were both made by The Atholl Asbestos and Rubber Co., Stockport, in Brattlene material.

All expedition clothing functioned very well. Team members had adequate clothing to maintain a comfortable body temperature during the canoeing, although the real problem was chilling immediately after cessation of paddling. The land clothing was ideally suited for the climate and enabled the team to enjoy very comfortable body temperatures on the journey, despite the climate.
CAMPING EQUIPMENT
By Sam Cook

Shelter

The team considered it best to be accommodated in one tent so that there would be less equipment to be carried: the work load while camping would be reduced as only one person would be required to cook a meal with occasional help from an assistant; it would aid the packing of food as four-man-one-day packs could be made: and, not least in the considerations, it would make a healthier social unit. Rivalry amongst expedition members is often agitated by separated teunt units; we managed to avoid this. The problem against a four-man unit was that we were unable to find a suitable four-man tent. This inevitably led us into designing our own which was manufactured for us by Bradford Cover and Twine Co. Ltd. It was a ridge tent with three 'A' poles giving a reasonably strong pole structure. The inner tent was slung from the poles with pegs used on the ground sheet only. The floor area was determined by the space taken up by four air beds. Two double doors gave access from either end of the tent. The outer tent was pegged down to the ground and incorporated two large bell entrances, these provided ample room for four people's wet canoe clothing at one end and cooking space at the other. A large valance was added to the outer tent as we expected and indeed found that the terrain would severely restrict the use of pegs. On several occasions the tent was held down only by the weight of rocks on the valance. The inner tent material was a strong terylene/cotton mixture with a heavyweight P.V.C. groundsheet. The material used for the outer tent was a lightweight, proofed nylon donated to the expedition by Dave Clarke of Centresport Ltd. Although a strange looking shape and probably a little vulnerable to the wind the tent withstood the rigours of the expedition admirably. To avoid having all our eggs in one basket, and with the possibility of an accident in mind, a two man nylon fly sheet and bivy bags were carried.

Cooking Equipment

Apart from a pressure cooker given to us by the Prestige Group Ltd., all the cooking equipment was standard lightweight camping equipment. The pressure cooker, a Skyline Major, was found to be efficient and economical in fuel consumption. It was a practical size for a four man crew and stowed immediately behind the seat of one of the kayaks. The two external handles were removed and replaced with a wire billy type handle making stowage easier and allowing us to use it on an open fire. We experienced some difficulty with stew sticking to the base of the cooker as it was not possible to stir whilst under pressure. This sometimes added an interesting charcoal flavour to the beef stroganoff and made the chef's meal last longer as he scraped the bottom:

Other cooking equipment taken included:
2 - 1 pt. paraffin stoves (one spare)
3 - 6" diameter alloy billies
1 - collapsible frying pan
2 - home-made nylon water buckets
4 - sets of cutlery (one spoon hung around John's neck as he is prone to losing such items)
4 - mugs and bowls
40 pints of paraffin (10 pints each, carried in two pinto polythene containers by courtesy of Tylond Ltd.)
Meta fuel
Matches were carried with the food packs.

Sleeping Equipment

The expedition is indebted to Pete Hutchinson of Mountain Equipment Ltd. for his concern and generosity with regard to our comfort. Sleeping bags would be prone to dampness due to the nature and the environment of the expedition and down-filled bags would lose much of their insulation if this occurred. It therefore seemed that man-made fibres would be more suitable but for the same amount of insulation there would be a considerable increase in bulk, which we could not afford. The solution was a compromise aided by two factors: fibre pile was now being used for sleeping bags; and Mountain Equipment were now shaping their bags to give a much closer fit. Though both these were in the experimental stages, assured by Pete, we took the gamble — a successful gamble at that. After considering all the possibilities we took a double bag, the inner of fibre pile and the outer of a half weight Fitzroy PI bag. Both these were tapered to fit the body and the fibre pile bag had a built in hood. The combination was warm and very pleasant to sleep in although the Fitzroy could have been longer for Keith and John! The separate bags made packing easier and an added advantage of the pile bag is that it can be washed easily, with no deterioration of the material.

For additional comfort, particularly as we expected to be camping on rough terrain, we used air beds. We were concerned that the rubberised canvas, normally used for air beds, absorbs moisture making the surface damp. We eventually found rubberised nylon air beds made by Semperit and marketed by U.B. Leisure Ltd., who kindly donated the four we took. We experienced no problem with dampness in the material and apart from blowing them up they proved to be well worth their weight.

We also took a closed cell polyurethane foam but found it unnecessary possibly due to the air bed's or the all round insulation of the sleeping bags.

MISCELLANEOUS EQUIPMENT

Packing the Equipment

Packing equipment into the kayaks each day was a major task and the time taken to do it varied from half an hour to two hours, depending on how enthusiastic we felt about getting into our cold, damp canoeing clothing. All equipment that would suffer from becoming wet was packed into individual water-proof bags and sealed at the opening with inner tube rubber bands (great care was taken not to lose these bands, as a result of Sam's advice and experience). All these bags were tailor-made for their respective piece of equipment and to go through the seven inch hatches. Neoprene proofed nylon was used, donated by Tulloch Mountaingraft Ltd., and all the seams carefully sealed. Equipment carried in the cockpit areas of the kayaks included the tent, the emergency tent, the gun, the frying pan, the pressure cooker, paraffin and resin. Karrimor haul sacks, provided at a considerably reduced price by Frank Davies of Ambleside, were used on the portage and for carrying surplus equipment on the rear decks of the kayaks.

Repair Equipment

The following repair items were taken:
Fibreglass kits, Tent and sewing kit, Air-bed repair kit, Stove repairs, Neoprene and cement, Adhesive tape and Araldite, General Tool kit.

Fishing

It had been hoped to supplement the diet with fresh fish but this was unsuccessful. Fishing tackle, lines, spinners, hooks, etc., were carried but the few attempts at fishing made were unfruitful. During the first part of the journey, until the north-west coast, the sea water was very discoloured by meltwater rivers and the cold temperatures made stopping to fish unpleasant.
APPENDIX 5

EXPEDITION FOOD
By Keith McDowell

The aim was to choose a diet and method of packing that met with the following criteria:

Space and Weight. Self-sufficiency was essential but restrictions were forced upon us by packing space in the kayaks and the necessity to be land mobile for the portage section of the expedition.

Access. Two bulkheads divided the kayaks into three compartments of which the bow and stern sections were water-tight for dry storage. Entry to these compartments was via a seven inch diameter hatch in the deck; and consequently all food-packs had to be less than this size. Waterproofing. Although the hatch compartments were water-tight, the chances of holing a kayak could not be over-looked. Condensation might also have proved a problem with variations in temperature between the air and the sea.

Fumes. Resin fumes from the fibre-glass kayaks can impregnate the food stored inside the compartments over a period of time. This is much more of a problem with new kayaks which have not had sufficient time to cure. The expedition had two such kayaks for the journey. Another problem was the transfer of smells from one type of food to another; the spiced foods were particularly liable in this respect.

Variety. At all costs a monotonous menu had to be avoided, although with the choice of foods available repetition could not be avoided. Fish would hopefully supplement our diet but could not be relied upon.

Calorific value. Expecting a high work load, especially for the portage, and the possibility of long spells of cold weather, it was obvious that plentiful food of the correct type was essential. A balanced diet that could not only replace but build up our physical reserves was desirable.

Cost. Food was one of the most essential items to the success of the venture, and although it could not be skipped, the financial cost had to be considered. Suitable food manufacturers were approached in the hope of some assistance. Dehydrated foods had to be the answer to our dietary needs as any other food would be far too bulky. As regards the lunches however, many of which had to be eaten whilst on the water, a suitable solution was a combination of chocolates and savouries giving a more ‘instant energy’ pack. Little variation was possible with both the breakfasts and packed lunches but the evening meal consisted of four different types. A total of forty days food was taken to Spitsbergen and each person was to carry ten days’ worth. The menu for each person coincided with the four main course varieties. For packing the food it was decided to make up each day’s food into an evening meal and breakfast plus a separate lunch pack. A day’s food therefore consisted of two packs; and this made packing easier than one large pack that would not fit through the hatch. Food items were to be heat-sealed in 250 gauge polythene where necessary and then into an outer bag. The outer bag was also heat-sealed. A number of food stuffs were best carried in bulk, in light alloy screw-top containers, courtesy of ICI.

Below is a breakdown of the foods taken and the form in which they were packed:

**Evening meal**
- Choice of soups
- Dehydrated meat & vegetable
- Seasonings & spices, nuts & raisins, all mixed with meat in advance
- Choice of rice, spaghetti, macaroni or instant potato
- Choice of desserts

**Breakfast**
- Porridge oats
- Dehydrated egg powder
- Healthy Life Biscuits
- Oatcakes

All the above food was packed into one-day-pack units.

---

**Packed lunch**

<table>
<thead>
<tr>
<th>Item</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Flagjack</em></td>
<td><em>Milk powder</em></td>
</tr>
<tr>
<td>Nars Bars</td>
<td>Lemon juice</td>
</tr>
<tr>
<td>Shortbread</td>
<td>Vitamin tablets</td>
</tr>
<tr>
<td>Assorted Chocolate Bars</td>
<td>Fresh cheese</td>
</tr>
<tr>
<td>Mini Biscuits</td>
<td>Hagis</td>
</tr>
<tr>
<td>Boiled sweets</td>
<td>These last five items were not placed in metal containers</td>
</tr>
</tbody>
</table>

The polythene used for the individual items proved most successful with all but the fine powder type foods, particularly the potato and egg. Small grains of powder clung to the polythene and interfered with the heat sealing. This was overcome by double packing. For the outer bag, vacuum packing was the answer but inquiries following the 1975 Everest Expedition brought no solution. Messrs M & M Meats Ltd., Edinburgh, a bacon importer and curer, were finally contacted and certainly helped us over the final hurdle in food packing. They had a vacuum sealing machine and allowed us to put all our food through it. The vacuum was to have two distinct advantages; a more compact final bag and secondly, being completely airtight, it was impermeable to fumes, a property which normal polythene lacks! The irregular and angular nature of the dehydrated food packs made the units rather delicate to handle; consequently a number were punctured during carriage and when being packed into the kayaks. This did not, however, affect the problem of fumes, possibly because of the low temperatures. Perhaps the best techniques with vacuum sealing would have been to have left a certain amount of air inside the packs to act as cushion for handling/storage purposes.

**Summary**

To all our food sponsors we offer our full gratitude for the assistance that was given. The full range of products used served us well and we have no regrets in the choices made. It would be far too lengthy to comment on each item but we feel some special mention should be made to a few. The hagis, supplied by J. Boyd & Son, Edinburgh, certainly made a world of difference to the dehydrated stews. The hagis kept very well in the cold climate and it was a sad moment when the last one entered the pot! The 'Five Pints' milk powder, supplied by Unigate Food Ltd., proved to be the most versatile of our products and gave excellent results when used in both a cooking and cold sweet situation. No matter how the plastic containers were packed in the kayaks they were very resilient and showed very little sign of cracking or leaking. The shortbread, supplied by Peterson's Ltd., Livingston, was extremely palatable and was a taste to look forward to in the pack-lunches. In spite of the vacuum packing the shortbread resisted crumbling whereas some of the other biscuits did not survive as well under the pressure. Despite its bulk, the flagjack, courtesy of Humphrey Head Outdoor Pursuits Centre, Orange, Cumbria, was a vital part of the lunch.

The food managed to fit all the categories necessary for such a journey and if we failed at all it would have been in the first one, i.e. 'space and weight'. This could never be solved completely and still comply with the other sections; after all, 160 man-days of food must take up a lot of space!

It is worth noting that throughout the journey all prepared food was consumed. The great demand for nourishment was probably the result of two factors, first the work output undertaken with this particular expedition and secondly the need to maintain a body temperature that was subject to constant cooling, especially during periods of inactivity.
MOUNTAINEERING AND PORTAGE
By Keith McDowell

Research about Svalbard started in late 1975 when John and Sam returned from the Nordkapp Expedition. They had seen posters in the museum in Hammerfest of Spitsbergen, shots of the midnight sun, mountains, glaciers and icebergs all of which sparked their imagination and enthusiasm for a possible journey using the kayak as the principal means of transport. Investigations back in Britain started to reveal various names and contacts and gradually a massive file emerged. A round trip by kayak without any repetition is usually the most popular kind of journey by kayak, although, initially, Svalbard was a much more serious proposition and route selection was difficult. The northeast, Nordaustlandet, seemed very attractive, and a convenient size. It would certainly be packed with adventure although it was soon realised that such a kayak journey to such a section of Svalbard was beyond the limits from the point of the pack ice which was likely to be present and possibly ‘fast’ in this area throughout the whole year! The weather in this area was likely to be extremely cold and the region is a known denning area for the polar bear; the region was willingly abandoned. Finally, West Spitsbergen was reviewed and it appeared as though the northeast tip would offer some interesting kayaking. To achieve a one-way trip in this region a portage would have to be effected across about fourteen miles of glacier ice, plus about two miles via meltstreams in order to reach the ice.

Aerial photographs and maps of the portage area plus coastal maps were obtained with the help of Brian Harland at the Department of Geology, Cambridge University, and the Norsk Polar Institutt, Oslo. These naturally added greatly to the specific information we had and gave us the opportunity to study feasible lines through crevassed sections on the ice. Originally, it was thought wise to follow the line of the Leys School Spitsbergen Expedition, 1976, that visited Newtontappen (the highest point in Spitsbergen) as far as the snow fields of the main glacier, the Mittag-Lefflerbreen, which flows northwards. Once on this massive icefield we would hopefully have reasonable access to Wijdefjord and the north coast. It appeared, from the photographs, that a much shorter line was possible; this involved ascending the Ragnabreen glacier to a col which then led to the Mittag-Lefflerbreen. From fjord to fjord this was a distance of about sixteen miles and in order to reach the northern fjord it involved ascending five hundred metres above sea level. However, this was a more attractive proposition than the original line which would have involved an ascent of nine hundred metres! A meeting with Brian Harland during Easter 1977 verified our plans on the portage although he advised a descent on the west side of the Mittag-Lefflerbreen towards Wijdefjord instead of the north-east side. We had mistaken water drainage patterns on the photographs for crevasses, and his local knowledge proved most helpful.

Prior to the Leys School Expedition departing from their base camp in Billefjord in 1976, they kindly donated their home-made sledge to our party of four; they had made the sledge themselves using old cloth and the local resources available to them. This was a simple sleigh type sledge made by the sledgers and the sledge was easy to carry and can be adapted to different conditions.

In case the sledges disappeared during the year prior to our arrival at the ice. The team considered numerous possibilities, ranging from carrying the kayaks on alloy rucksack frames, making fibreglass sledges in the U.K., to simply dragging the kayaks on the ice. In fact, each team member settled for a large Karrimor haul sack which would aid portaging gear across the ice. The sack was also chosen as an aid to an emergency bivvy on the ice and as the main means of transporting a minimum of gear necessary to survive a walk-out to safety should the canoeing become impossible. In the event of abandoning the kayaks this sack would have to serve as a temporary aid to providing a shelter for each man although other items were included to supplement for a tent. To aid sledge and kayak hauling on the ice a padded harness was designed by John and Troll Products kindly agreed to manufacture the units to our specifications. It consisted basically of a ten inch wide belt with thigh loops and two long loops for towing an item from either behind or in front it was expected that a braking technique would be required down the major glacier. On certain sections of the portage the belts were used to hold the kayaks and sledges back and this belt worked very well. However, although the thigh loops were included in case a rescue was necessary, these were not used, and on certain occasions were left off. The two hundred feet of stretched terylene eight plait rope (ten kilometres) was also included in the portage equipment to be split into two lengths of a hundred feet. Hopefully two men could pull together on a hundred feet.

For the approach to the glacier snout we intended to kayak and tow the kayaks as high as possible up the valley of the Ragnab kon river before resorting to a carry. Our normal kayak clothing would hopefully be adequate: The wet-suits we intended to use, with snow/glued socks, would be the principal clothing against the freezing temperatures of the meltstreams and they certainly proved their worth. A Swedish firm, Skoncentralen I Graninge AB, supplied us with rubber mountain boots that consisted of calf-length leather wallington boot with a flexible klettersole. The latter took a crapron very well and the boots withstood very harsh conditions. These boots were the only out-of-the-kayak footwear that the team had and they gave very little trouble to the feet. Although the glaciers consisted almost entirely of water ice, fresh snow was experienced in the upper regions of the portage. Crampons were used on this section and for the whole of the twelve miles northwards. At no time did the crampons become separated from the boots. Most of the portage section was straightforward although very strenuous with a fair number of obvious crevasses to be negotiated. Apart from the state of the sledge, the equipment was transported fairly effectively despite the duration of the portage and effort involved. Due to the state of the sledges we decided to haul them laden with the heavy equipment and to drag the kayaks separately, using the hulls of the kayaks for runners.

Clothing on the portage was varied, some team members used Danart Thermaware while others used one-piece fibre pile suits provided by Tullough Mountaingraft Ltd., designed to our specifications. Both garments proved most satisfactory but as weather conditions deteriorated for the glacier descent northwards, a top waterproof layer was necessary. The water-proofs consisted of or an orak (which was also used for canoeing) and salopettes for the lower part of the body. These items were produced specially for the expedition by The Atholl Asbestos and Rubber Co., Stockport (see Clothing). The waterproofs were most effective, and offered considerable insulation from the cold, although the garments took some time to dry; partly due to the presence of salt from kayaking. Apart from the crampons which proved invaluable for pulling up hill and walking on water-ice, we took ski-sticks to assist with providing additional purchase for hauling.

Both these items were indispensable. Snow-shoes were also provided by Mr. T. Hardy from Cumbleshire for use in the event of poor snow conditions on the glaciers. However, the summer of 1977 experienced less snow than the previous summer and the shoes were discarded at the end of the portage, largely because of their weight and bulk.

Overall the portage went well with a good initial spell of weather supplying much impetus. The weather deteriorated considerably for the descent of the Mittag-Lefflerbreen towards Wijdefjord and rather than camp for more than one night on the ice, we continued to haul for over twenty-four hours, covering a section of twelve miles in this time. The hummock ice was more of a problem as the journey progressed northwards on the Mittag-Lefflerbreen and eventually the sledges disintegrated, and were abandoned on the ice. Surface drainage channels on the ice were used to complete
the portage, floating all the equipment down the streams in the kayaks, whilst holding the kayaks back with a rope from behind.

After a hundred and sixty five miles the expedition entered Magdalenefjord with the intention of a short period of mountaineering. The area is most impressive with peaks extending as far as the eye can see in a massive semi-circle round the fjord. The peaks ranged from seven hundred to a thousand metres above sea level with a fine array of glaciers, some reaching down to sea level with extensive towering snouts. We decided to attempt a mountain called Alkekongen, approximately eight hundred and fifty metres above sea level on the north side of the fjord, using the kayaks to approach the foot of the glacier. After a one and a half mile ascent of the glacier a loose ridge was climbed. The surface in the area is very unstable and the approach to Alkekongen took over six hours. The route consisted of many rock peaks that had fairly reasonable climbs on the approaching sides but precipitous cliffs on their far sides. Progress was severely hampered and eventually the mountain was abandoned at the col. However, the experience had been more than worthwhile and a welcome change from canoeing. The clothing used was similar to that used on the portage although ski-sticks were not taken up the mountain.

### APPENDIX 7

**EMERGENCY EQUIPMENT**

By Gwyn Edwards

Gun

We had been warned of the possibility of an encounter with a polar bear. Research into the likely distribution of polar bears around Spitsbergen during the months of July and August confirmed the possibility. A gun was the only answer. However, it immediately posed us with problems: which type of gun and ammunition; the carriage and stowage of gun and ammunition and permits for taking the weapon, together with ammunition, out of Britain and into Spitsbergen via Norway. None of the team had much experience of any types of firearms.

Expert advice was sought from Mr. C.M. Edwards from Llanfairfechan, North Wales, who has considerable experience in the field of guns and ammunition and Mr. Dales of the Gamebore Cartridge Company, Hull. As a result of their recommendations, it was decided to take a Hunsberg 12 bore pump-action shotgun together with suitable ammunition. The merits of this type of gun are as follows:

1. It can take a maximum load of six cartridges which can be fired in quick succession;
2. It is capable of firing a variety of types of cartridge;
3. It is easier to use than a high velocity rifle in the hands of the 'inexperienced' - one points and fires rather than 'aims';
4. It can be easily dismantled into three parts;
5. Compared with a rifle there are far fewer restrictions against possession, use and import and export.

The gun's prime function was to be our means of defence in the event of a polar bear paying us an unwelcome visit. However, because the weapon was capable of firing different types of ammunition, it could also have been used to hunt much smaller game. Should the need have arisen we could have used the gun to hunt in order to supplement our diet. We therefore took three types of waterproof ammunition specified as No. 6 shot, BB shot and S.G. The difference between these three types of cartridge lies in the size of the lead shot that they each carry. The No. 6 contains small lead shot suitable for shooting small game birds. The BB is loaded with a somewhat larger size shot suitable for shooting wildfowl. An S.G. cartridge contains nine lead shot, each of 3" diameter; this is the ammunition that we would have relied upon to halt a polar bear! On firing, the lead shot in each type of cartridge will spread, before hitting the target. Gevelot Firearms, Paris, kindly supplied us with ammunition through the Gamebore Company, Hull. They ensured that we had sufficient for practice as well as for taking with us on the expedition.

Prior to our departure from Britain Gwyn familiarised himself with gun and ammunition at a clay pigeon shoot through the courtesy of Mr. D.J. Roberts, Corwen. It was comforting to know that a small moving target could be hit with reasonable accuracy and consistency. The gun barrel was "an improved cylinder bore" resulting in a satisfactory pattern of shot as was shown when the S.G. ammunition was fired. The nine lead shot contained in this cartridge went clean through a piece of wood 2" thick with a 'spread' of about one square foot, when fired from twenty paces!!

It was not possible to carry the assembled gun inside any of the kayaks. To carry it assembled and packed in a waterproof bag strapped to the deck would have made it readily available but very susceptible to damage. It was therefore dismantled into three parts stock, magazine and barrel to facilitate its carriage. Each of the three parts were packed in waterproof bags and carried inside the cockpit area of the kayak, suspended from the deck by tape and shock-cord elastic. The ammunition was carried in screw-top containers and placed inside one of the watertight compartments of the kayak. A cleaning rod for the gun-barrel and some oil were also taken. The weapon was always assembled and loaded at each campsite.
Transmitter

In the event of an emergency and the need to request outside help, we carried a small transmitter, the EBC 102. This is manufactured by the Emergency Beacon Corporation, New Rochelle, U.S.A. and supplied by Camper and Nicholsons of Southampton. It is a very compact and lightweight piece of equipment that was carried in the pocket of a Bunyancy Aid. The transmitter is extremely robust, completely waterproof and has a transmitting range of one hundred and fifty miles. The unit is capable of constant transmission for seventy two hours and the batteries are replaceable. We were, however, aware of the transmitter’s limitations in the area that we visited. The expedition took place in a part of the world where radio waves are affected by a phenomenon known as the ‘aurora borealis’ (northern lights). The mountains would also certainly impede the effectiveness of the transmitter. There were few regular flights passing over our route or ships visiting the region making the likelihood of an emergency transmission being received even more remote.

Flares

Flares were a means of attracting a rescue craft but only once it came within visual range. The flares also have their limitations namely; they are only likely to be seen if the rescue party is looking out for them; they could be difficult to ignite under rough sea conditions; when they are needed they cannot be relied upon to work.

Each member carried three flares on his person - a waterproof day and night hand flare and two skyblazer rocket flares. Because the firing mechanisms of flares are prone to rust and jam they were all thoroughly pressed before the expedition.

The gun could also have provided an audible means of attracting attention while we were on the shore.

All the mentioned items were found to be in excellent condition at the end of the expedition. The gun performed repeatedly without jamming; all the flares ignited and the test button on the transmitter indicated that the electrical circuit was in working order.

APPENDIX B

EXPEDITION FIRST AID

By Gwyn Edwards

Prior to the expedition, preparations with respect to medical care fell into the following categories:
- Pre-expedition medical and dental check ups
- Enquiries into the health hazards likely to be encountered in Spitsbergen
- Enquiries into the medical facilities available in Spitsbergen
- Training in the field of First Aid

Contents of our medical kit and how it was to be carried:
Dr. Hugh Kidd of Buxton was extremely helpful with advice on medical kits and preparations.
Mr. C.R.J. Dissdale, B.D.S. of Buxton was also of considerable assistance with regard to dental care and kit.

Our pre-expedition medical consisted of a thorough medical check up and chest X-ray.
Similarly, pre-expedition dental care involved a check-up including X-rays well before our departure from the U.K. Exposure to infection from diseases in this part of the globe was not foreseen although rabies is endemic, particularly in the arctic fox; an encounter in our circumstances was not considered probable and pre-exposure prophylaxis not appropriate. We were, however, all immunised with Tetenus Toxoid.

Immersion with hypothermia and possibly drowning as a terminal effect were seen as our greatest danger. Peripheral cold injuries, i.e. frost-bite and trench-foot, were also a possibility. This was emphasised by all those who advised us with regard to the first aid aspect of the venture, including Surgeon Captain J.D. Walkers of the Institute of Naval Medicine.

As a result of communicating with Dr. Sisten Halrondson of the Scandinavian School of Public Health, Gothenburg, Sweden, information was collected concerning the availability of medical facilities in Spitsbergen. The Coal Mining Company has an excellent private hospital in Longyearbyen which the expedition could depend upon in an emergency. There are reciprocal arrangements for visitors from Britain to Norway with regard to medical expenses. A letter of introduction was sent in advance to the hospital in Longyearbyen concerning our intended journey.

All members of the expedition were competent first-aiders. In addition one member of the team had received training in suturing techniques. We had contingency plans for rescues under the conditions we expected to encounter and we were all practised in the techniques of cardio-pulmonary resuscitation.

The greatest difficulty in getting the First Aid kit together was deciding which were the essential items to be taken and what could be left behind. The amount of space available for packing any items of equipment into the kayaks was severely restricted because such a variety of gear had to be taken. Many items had to be kept dry - the medical stores in particular. Another consideration was whether to take one first aid kit each, making four in all, or just one lot of medical stores for the whole team. We decided to take two kits. Following the professional advice of Dr. Kenneth Hedges, Medical Director of Shell Canada Ltd., it was decided that the contents of the First Aid kit would be as follows:

Drugs and Medicines
- Chlorotetracycline Hydrochloride B.P. - eye ointment
- Lomotil tablets - for diarrhoea
- Paracetamol tablets - analgesic
- D.P. 118 - analgesic
- Imeron tubules - treatment of severe pain and shock
- Ampicillin - antibiotic
Fucidin ointment - antibacterial cream for wounds
Sanokot tablets - laxative
Piriton tablets - antihistamine

Additional Medications
Silicone cream - barrier cream
Sunscreen
Lip salve
Moxolat Powder
Vitamin C tablets
Small flask of malt whisky - treatment of frostbite

Dressings

<table>
<thead>
<tr>
<th>Field dressings</th>
<th>Surgical Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular bandages</td>
<td>Forceps</td>
</tr>
<tr>
<td>Adhesive dressings</td>
<td>Scissors</td>
</tr>
<tr>
<td>Paraffin gauze</td>
<td>Suture needle holder</td>
</tr>
<tr>
<td>Sterile gauze</td>
<td>Sutures</td>
</tr>
<tr>
<td>Cotton wool</td>
<td>Scalpel</td>
</tr>
<tr>
<td>Crepe bandages</td>
<td>Dental</td>
</tr>
<tr>
<td>Micropore tape</td>
<td>Temporary filling</td>
</tr>
<tr>
<td>Steril-strips</td>
<td>Probes</td>
</tr>
<tr>
<td>Neltast dressings</td>
<td>Mirror</td>
</tr>
<tr>
<td>Inflatable splint (full leg)</td>
<td>Forceps (uppers)</td>
</tr>
<tr>
<td>Safety pins</td>
<td>Local anaesthetic</td>
</tr>
</tbody>
</table>

Mr. Rogers, manager of the Buxton branch of Boots the Chemists, was most helpful in getting together almost all the above items. The above equipment was packed in waterproof tupperware containers (supplied by the Tupperware Company) accompanied by a list of contents and a brief description of application procedure. The two basic aid kits were distributed amongst the four kayaks.

In the event of an emergency the first aid equipment was, to a certain extent, duplicated to anticipate the party splitting into two groups of the possible loss of part of a kit. A small kit of basic items was packed in such a manner to be accessible at all times even while we were canoeing.

The expedition encountered no serious medical problems. The minor ailments can be summarized as follows:

- Headaches - possibly caused by exposure to bright sunlight (i.e., broken sunglasses)
- Sore feet - as a result of wearing neoprene socks during the portage and the portage itself, making the skin very wet and soft.
- Mouth sores - their cause was uncertain but were effectively treated by mouthwashing with sea water.

Apart from the above, the team experienced discomfort and inconveniences due to:

- Accumulative fatigue - the result of strenuous exercise, stress (both mental and physical), cold environment, insomnia (probably due to an irregular daily schedule and continuous daylight).
- All members of the expedition tended to urinate far more often than in their normal daily routine probably due to the cold, and sweating less.
- Small cuts and abrasions were reluctant to heal because they were constantly wet.

In retrospect the medical stores were adequate. The only deficiency was the omission of sleeping tablets, although their inclusion had originally been considered but not thought necessary. On the other hand, the expedition did not have to contend with a major illness or injury and it would only have been in the light of such an experience that we might have found our stores lacking in some area and having to improvise. By far the major concern with any serious injury, however, was that of evacuation - even with ample medication and equipment, effective independent evacuation would have been a very slow process, especially after the expedition had crossed over the glaciers to Mjødefjord.

APPENDIX 9

PHOTOGRAPHY

By Sam Cook

Photography became a major part of the work of the expedition after we were awarded a sum of money and the use of equipment to make a film for the BBC. Following an interview, the BBC chose our expedition, along with five others, to undertake a project for the 'World About Us' programme. We were to attempt the filming and editing of our own expedition film. Two of the team, John Anderson and San Cook, attended an intensive three-day course on the use of equipment and filming techniques. At the end of the course we realised that we would have almost insurmountable problems, particularly as we were uncertain if the BBC appreciated the problems of water-proofing the equipment and of filming from the kayaks, but at least we did have some idea of how to go about making the film as a result of the course. The three days were an invaluable experience and we would like to thank the BBC for their confidence in allowing us to handle their expensive equipment. The equipment lent to us included:

- Two Braun Niso super 8 cine cameras, one fitted with a synchronised sound-pulse
- Phillips Audio visual cassette tape recorder
- Two microphones
- Tripod
- Perspex camera housing for Niso Camera
- Plastic camera housing for Niso Camera (Olymp)
- Sixty 'Kodachrome 40' cine films
- Fifteen tapes for the cassette recorder

In the initial planning we had thought that much of the filming could be done on rest days or on days specifically set aside for the purpose. In practice this idea did not work, because the expedition was a journey and we were always on the move; filming of a particular situation had to be done at the same time. There was no way that we would return and cover the same distance again in order to film. Although very interesting, filming was hard work and very time-consuming. It was not always convenient to stop and film so consequently many situations are not recorded on cine film. A fair cross-section of our efforts will, however, have been filmed.

We shot a total of forty-one films, covering canoeing shot from the kayaks, canoeing shots from the land, packing, unpacking, camping scenes, hut scenes, the portage, mountaineering and many other important aspects of the expedition.

We experienced many problems with the equipment; it was heavy and bulky adding to our already heavily laden kayaks. The perspex water-proof housing, made up for us by the BBC, was strapped to the deck of one of the kayaks where it caused considerable windage. It housed the larger of the two cameras and was intended to film from the canoeist's eye view. However, after three days of the expedition we discovered it was leaking though luckily the camera was undamaged.

Unfortunately our ability to film on the water was now restricted and further restricted when the smaller camera got wet on the portage. As the larger camera would not fit into the smaller water-proof housing, filming on the water was now only possible in flat, calm conditions.

The tape recorder seemed unreliable from the start. Only hours before we were due to leave Britain it was rushed to BBC Leeds for repairs. Although mended we were unable to make any sound recordings throughout the expedition though we tried many times. Towards the end of the trip other equipment, such as the tripod, began to suffer severely from contact with sea water, despite washing and oiling.

Everything considered we are due for unsatisfactory results for our hard efforts.

The second aspect of our photography, namely still photography, has been most rewarding.

The following equipment was carried between the team.
Two Nikkor/calypso MK II Underwater cameras
One Nikonas MK III Underwater camera
One Nikon reflex camera with 50 mm lens
One Macro-zoom 75-210 mm lens
One Zeiss Ikon camera
Forty-two Kodachrome 'ASA 64' files
Seventeen high speed ektachrome films

The Nikkor waterproof cameras are ideal for photography on the water. Care needs to be taken to avoid drops of water on the lens as this distorts the picture. Chamois leathers were used to wipe the lenses dry. Grease did accumulate through constant wiping - possibly from the leather (animal oil?).

Conditions for photography varied considerably from very dull to bright sunlight on snow. Reflected light from snow and the sea made choice of exposures difficult, particularly as these were all guessed with the underwater camera. Considerably better results were gained from the Kodachrome ASA 64 film.

APPENDIX 10

EXPEDITION FINANCE
by Gwyn Edwards (Treasurer)

EXPENDITURE

Freight charges for equipment to and from Spitsbergen £ 136.25
Travel for members to and from Spitsbergen 864.60

Items of equipment and materials which included:

- Medical supplies 33.00
- Rucksacks 30.00
- Hauling ropes and harnesses 84.12
- Food (many items were donated) 82.00
- Altimeter 37.50
- Flares 12.71
- Transmitter 60.00
- Brochure and stationery 32.30
- Maps and aerial photographs 39.25
- Miscellaneous materials 96.48

Expedition Insurance 110.00
Expedition report 240.00

TOTAL EXPENDITURE £1878.30

INCOME

Donations to the Expedition Fund were received from:

- Mr. and Mrs. Mark Beavan £ 10.00
- Lesley Stone 5.00
- Hyde's Squirrel Brewery 5.00
- Gino Watkins Memorial Trust 100.00
- British Broadcasting Corporation 500.00
- Countryside Award (Lothian Region) 65.00

Contributions to the expedition from individual members (this did not include most items of personal camera equipment and accessories; postage and travelling costs incurred by team members in the course of preparations for the expedition) £193.30

TOTAL INCOME £1878.30
APPENDIX II

ACKNOWLEDGEMENTS

Without the generosity of the following individuals and organisations the expedition to Spitsbergen would never have got off the ground. It is due to this help that our journey was such a success. To you all we extend our sincere thanks. As a result of this help we have been able to venture safely into a potentially dangerous environment and return safe and well with a whole store of memories that will no doubt remain for a lifetime.

PATRONS

Sir Vivian Fuchs F.R.S.
British Camoeing Union.

Advice and help from individuals

Rick and Sue Abbott.
John Allen, Young Explorers Trust.
British Mountaineering Council.
Derek Bristow.
Brian Cudmore.

Lynn Cook.
Mr. Dale, Gameborne Cartridge Co., Hull.
Mr. C. Dinsdale, Dental Surgeon.

Dr. Hugh Simpson.
Dr. Hugh Kid, Buxton.
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